COMMENTS OF THE SEMICONDUCTOR INDUSTRY ASSOCIATION FOLLOWING THE SEPTEMBER 2, 2008 THIRD PUBLIC WORKSHOP TO DISCUSS AB 32 DISCRETE EARLY ACTION MEASURES FOR THE SEMICONDUCTOR INDUSTRY

September 15, 2008

I. INTRODUCTION

The Semiconductor Industry Association (SIA) appreciates this opportunity for continued dialogue with the California Air Resources Board (ARB) staff regarding "Discrete Early Action" pursuant to AB-32 §38560.5 for perfluorocarbon gases (PFCs) used in semiconductor manufacturing. We found the September 2, 2008 Third Workshop useful, and in particular, appreciated the additional information contained in ARB's "Proposed Performance Standards for Semiconductors and Related Devices" presentation at the Workshop.[1]

Unfortunately, as we stated during the Workshop, this additional information does not resolve SIA's two significant concerns regarding the contemplated performance standard detailed in our August 28, 2008 written comments.[2]

First, the additional information provided in conjunction with the Third Workshop continues to fall well short of what is necessary for ARB to justify the contemplated standard. SIA still has little to no understanding of the particular information ARB relied upon -- and its rationale based on that information -- for dividing the industry into three tiers, for selecting a performance level for each tier and for determining, as required by AB-32 §38560.5, that such performance level qualifies as both technologically feasible and cost effective.

Second, we continue to object to a partial ban on the use of SF_6 as unwarranted.

We appreciate the opportunity to expand on these concerns briefly below.

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[1] *See* AB 32 Discrete Early Action Measure: Semiconductor and Related Devices Public Workshop (September 2, 2008), *available at*: http://www.arb.ca.gov/cc/semiconductors/meetings/090208/presentation.pdf.

[2] *See* SIA Comments of the semiconductor industry association on the California Air Resource Board's revised proposed performance standards for semiconductors and related devices, August 28, 2008.

II. SIA CONTINUES TO BELIEVE THAT ADDITIONAL EXPLANATION OF THE STANDARD DEVELOPMENT PROCESS IS NECESSARY AND POSSIBLE

ARB has yet to provide a satisfactory explanation of how it derived key aspects of its contemplated performance standard. Instead, ARB has released a limited amount of information that outlines the regulatory framework for the standard – i.e., three tiers with an emissions limit based on per square centimeter of water production – and that provides a numerical accounting (apparently based on ARB's February 2008 survey results) of how many facilities fall within each tier and how many of those facilities will need to install abatement to comply with the standard.

Although we appreciate ARB's need to protect the confidentiality of survey responses, we do not believe that doing so can excuse ARB from its responsibility to explain the rationale and factual basis for its contemplated standard with respect to the statutory requirements of technological feasibility and cost effectiveness.[3] Some of the specific questions that remain for ARB to address include:

- ***What is the purpose and rationale for creating three tiers of facilities with different performance standards?***
  - ✓ **The five facilities in the Tier 1 are assigned a disproportionate amount of required reductions (about 70%) with no explanation. Indeed, ARB projects that three of these five companies will be responsible for achieving nearly all of the total estimated emission reductions across the industry in California. ARB must explain how and why the tiers were established so that the public has a sufficient basis to comment on whether this approach is legally appropriate and otherwise reasonable.**
- ***Having chosen a tiered approach, how were the actual emissions limitations per square centimeter of wafer production actually established?***
  - ✓ **ARB has never explained its methodology for determining these production-based emissions limitations and why, based on this methodology, the limitations should differ so significantly between each of the tiers. An explanation of this methodology is required to understand whether the regulation fairly allocates reductions among the different tiers.**
- ***Exactly how did ARB arrive at its cost estimate and determine the cost effectiveness of the proposed standard?***
  - ✓ **ARB has provided a variety of figures regarding the cost of the contemplated standard ranging from the $3 million mentioned in the draft scoping plan[4] to the $17.00 per ton and $23 million total mentioned orally**

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[3] *See* AB 32 §38560.5(c).

[4] *See* June 2008 Climate Change Draft Scoping Plan *available at*: http://www.arb.ca.gov/cc/scopingplan/document/draftscopingplan.htm.

during the recent work group meeting. ARB not only needs to provide a clear and consistent statement of its cost estimates, but also needs to articulate both the methodology used to derive -- as well as the information forming the basis for -- those estimates. During the work shop, ARB mentioned gathering information from emissions control equipment suppliers, but declined to explain the process used for gathering such information and the specific cost figures provided by the suppliers and for what types of equipment.

- ✓ Under the circumstances, ARB has failed to meet its legal obligations to justify its standard as "cost effective." Merely stating a "bottom line" cost figure without articulating how and based on what information the figure was derived falls well short of basic administrative law requirements. In addition, AB 32 requires ARB to use "the best available economic models, emission estimation techniques, and other scientific methods" when evaluating the costs of its greenhouse gas reduction measures.[5] To demonstrate this requirement has been met, ARB must disclose the model it used to estimate the costs to the semiconductor industry of complying with the proposed standard.

- ➢ *How does the proposed standard credit early emission reductions already made by SIA member companies?*
  - ✓ Since our dialogue began about a Discrete Early Action for semiconductor manufacturing operations, ARB has consistently stated its intention to credit early emission reductions made by SIA member companies under their longstanding Memorandum of Understanding with the U.S. Environmental Protection Agency.[6] Yet, ARB's contemplated standard does not appear to provide any such credit, but instead, adopts a performance standard that treats all companies equally whether or not they participated in the PFC MOU or otherwise have made substantial past reductions.
  - ✓ SIA recognizes that a company voluntarily making past reductions might have less reductions to make under the contemplated standard as compared with a company that has made no past reductions. This crude notion that one company might have to do less than another company, however, does not systematically and fairly credit past reductions. Notably, not providing such credit fails to capture significant, relatively recent emissions reductions investments, and hence, results in artificially low compliance cost estimates.
  - ✓ SIA believes strongly that ARB must act to reward early action. A variety of mechanisms may exist to do so, including picking an earlier date for the baseline year; choosing less aggressive emission reduction goals to

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5 *See* AB 32 § 38561(d).

6 AB 32 § 38563 gives the Board broad authority to provide "early reduction credit where appropriate."

recognize the degree to which emissions have already been reduced; and/or allowing an extended compliance schedule.

- ✓ information gathered in ARB's February 2008 survey of California semiconductor manufacturers. We appreciate that ARB has provided brief summaries of the information gathered in the survey[7] and also that confidentiality constraints prevent ARB from releasing individual company survey responses.
- ✓ In connection with addressing the questions identified in the previous bullets, however, ARB can and should do more in our view to provide aggregated information from the survey. Examples of survey information pertinent to these questions include:

    1. A breakdown for each Tier as to type of semiconductor manufacturing operations and size of wafers produced.

    2. Total quantity of gases purchased within each Tier.

    3. Total number and kinds of abatement devices (as opposed to number of facilities using such devices) in use within each Tier.

    4. Total number of remote plasma devices in use within each Tier.

    5. Total number of facilities in each Tier that currently rely and currently do not rely on process optimization and a summary of their explanation as to what type of optimization strategies are being utilized, or of their explanation as to why such strategies are not being utilized.

    6. Total number of facilities in each Tier that currently rely and currently do not rely on alternative chemistries and a summary of the explanation provided by those that do so rely regarding these chemistries.

    7. Total number of facilities in each Tier that currently rely and currently do not rely on capture/recovery techniques and a summary of the description provided by those that do so rely of these techniques.

    8. Total number of facilities within each Tier that participate in the PFC MOU or other voluntary programs.

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[7] *See* Draft: Semiconductor and Related Devices Industry Preliminary 2006 Survey Results, *available at*: http://www.arb.ca.gov/cc/semiconductors/survey/prelim2006 surveyresults.pdf; and Semiconductor and Related Devices Third Public Workshop at: http://www.arb.ca.gov/cc/semiconductors/meetings/ 090208/presentation.pdf.

9. A summary of the foregoing information for all facilities that would be exempted from the contemplated standard.

- Do research and development facilities fall under the "report only" category?
  - ✓ In both previous discussions and ARB's presentation at the September 2 Workshop, ARB has indicated that research and development (R&D) facilities will fall under the "reporting only" category of the regulation, and therefore be "exempt" from the emission reduction requirements of the companies in Tiers 1, 2 and 3. However, it is not clear how a R&D facility that emits greater than 0.0008 MMTCO$_2$E will fall under the "report only" category. Please explain the method of exemption for R&D facilities that emits greater than 0.0008 MMTCO$_2$E.

III. SIA CONTINUES TO OPPOSE THE PROPOSED BAN ON THE SF_6 IN CHAMBER CLEAN APPLICATIONS

SIA appreciates ARB's proposal to preserve our ability to use SF_6 in etching applications. As indicated at the Workshop, however, we continue to oppose ARB's contemplated ban on its use in chamber clean applications at Tier 1 and Tier 2 facilities.

ARB seemed to suggest at the Workshop that it intends to ban SF_6 widely, except in a few critical applications, due to its higher GWP relative to the other gases. Our problem with this approach is three-fold.

First, the Kyoto Protocol and other longstanding climate change programs have followed a basket of gases approach, with SF_6 being one gas in this basket. Under this approach, no gas gets singled out for ban, but instead, companies maintain the flexibility to utilize the basket of gases in a manner consistent with their manufacturing demands as long as their total "gases in the basket" use remains within certain limits. This approach recognizes that no logical reason exists to ban an individual gas, whatever its global warming potential, from any particular use as long as the overall emission reductions and other performance standards are being achieved. In our view, ARB has no legal or policy basis for deviating from this approach.

Second, to do so would raise particular concerns for semiconductor manufacturers, which require process flexibility for global competitiveness. Indeed, flexibility to optimize manufacturing processes is critical to innovation, and ultimately, to our industry's economic viability. The loss of our ability to use SF_6 could compromise the future capacity to innovate and maximize production efficiency.

Third, ARB never collected data from semiconductor manufacturers regarding the potential criticality of SF_6 now or in the future. ARB's ban approach seems to stem from a simplistic extrapolation of survey responses based on current gas use. Putting aside the legal flaws with such an approach, SIA also has reason for serious concern that such a ban --without a rigorous

analysis of SF_6 criticality -- would establish an inappropriate policy precedent that might be used to pursue future bans of other chemicals in the semiconductor industry.[8]

IV. CONCLUSION

We appreciate the time and effort ARB staff has devoted thus far to developing the Early Action Measure performance standards for the semiconductor industry. As described above, however, we continue to believe that ARB must provide more explanation and more information regarding the technological feasibility and cost effectiveness of the contemplated standard, and should. With that in mind, we respectfully request ARB to provide the additional information identified in these comments. We also hope ARB will consider revising the performance standard to credit early reductions made by the industry. Finally, we are evaluating whether the proposed wafer area-based performance standards adequately account for differences in potential PFC emissions related to wafer complexity and may be submitting additional comments on this issues when we have completed our evaluation.

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[8] As ARB has recognized in its scoping plan, AB-32 regulations could serve as a model for other states and at the national level.