Comments of the
Semiconductor Industry Association (SIA)
On the Draft
"Emission Standard of Pollutants for Electrical Industry"

November 9, 2015

The Semiconductor Industry Association (SIA), the voice of the U.S. semiconductor industry,[1] appreciates the opportunity to submit comments to the draft "Emission standard of pollutants for electrical industry" issued jointly by the Ministry of Environmental Protection (MEP), General Administration of Quality Supervision, Inspection and Quarantine.

SIA shares the goal of minimizing the environmental impacts of semiconductor manufacturing in China. The member companies of SIA, including those who operate in China, have an established record of taking action to prevent and reduce releases of pollutants, conserve resources, and manage operations in a responsible manner. The industry will continue to improve its environmental, health, and safety practices on an ongoing basis.

SIA looks forward to the opportunity to engage in a dialogue with MEP on the development of the draft Emission Standard. We believe that a dialogue will help us better understand the goals of the government in the development of this emission standard and enable us to better assist the government officials in refining the standard. We would be pleased to offer our expertise in assisting in this effort.

General Comments

The draft standard needs to be revised in several important respects. First, the standard needs to be revised to differentiate between different types of facilities. For example, the standard establishes an effective date of July 1, 2018 for implementation of the standard. This date may be appropriate for a newly constructed facility, but it is not reasonable for existing facilities. The standard needs to provide at least 3.5 years for existing enterprises to comply with the new air pollutant emission standards. Similarly, the standard needs to differentiate between the discharge limits applicable to facilities that directly discharge into a waterway as compared with facilities that discharge into a wastewater treatment facility. In addition, the standards need to be revised to provide greater clarity on how specific provisions will be applied to our industry. We identify a number of these provisions below.

Detailed Comments on the Draft Standard

The following are SIA's comments on specific provisions of the draft standards.

[1] Additional information on SIA is available at www.semiconductors.org.

Comment Number	Standard Language	SIA Suggestions
1.	Foreword - In terms of control of emission of water pollutants and air pollutants, this standard shall apply to newly established electrical industry enterprises from July 1, 2016 and to existing enterprises from July 1, 2018, replacing the *Integrated wastewater discharge standard* (GB 8978-1996) and Comprehensive emission standard of air pollutants (GB 16297-1996).	It often takes time to perform a thorough analytical study and develop a project plan to implement changes to a facility that is currently in operation. For existing semiconductor fabrication facilities that meet the current discharge standards but that will require new equipment to meet the new standard, we request a longer implementation cycle of 3.5 years to meet the effective date.
2.	Forward - For the items of pollutant not defined in this standard, local pollutant emission standards can be developed by the competent provincial-level people's government.	Sewage wastewater discharge that is treated by a local treatment plant can often easily manage parameters of Oil and grease, suspended solids, and Chemical Oxygen Demand. In many cases those are necessary to good treatment plant performance. We propose that those limits should be set by the provincial government based on the treatment capabilities in that province. Otherwise only the Direct emitters of wastewater should be subject to the discharge requirements. Additionally, if the company discharging the sewage, discharges above the stated limit, the provincial treatment plant authority should charge an extra cost to treat discharge amounts above the allowed limit.
3.	Section 4.1 – Requirements for control of water pollutant emission Table 1 and Table 2 Note (1) Except the total cadmium, total chromium, hexavalent chromium, total arsenic, total lead, total nickel and total silver implementing the control requirements for indirect discharge specified in this table, the control requirements for other water pollutants are to be discussed by enterprises and	It is not clear what constituents are referenced by the "other water pollutants". Please identify if this references the list of metal ions and the sewage constituent and analytical parameters. Also, please clarify if this means that when the effluent discharges into the urban wastewater treatment system, the other 13 parameters of Table 1 could be implemented/followed the other standard/limit if the enterprises and

	public wastewater treatment system operators, or follow appropriate standards, and shall be reported to local environmental protection regulators for registration. The emission from public wastewater treatment system shall meet relevant environmental protection requirements.	the urban waste water system operator reach a consensus and receive official approval.
4.	Section 4, Table 2 Section 4.2.3 “regions where high level exploitation of homeland, weakening environmental bearing capacity or limited environmental capacity and fragile eco-environment easily spark serious environmental pollution issues, thus requiring special protection”	Please add clarification in the standard for the following: 1) Are there any criteria established for when the values for pollutants in Table 2 would be applied by the local authority? 2) What timeframe would a business have to comply if/when the limits change from Tables 1 and 2? 3) How are these particular areas (regions) identified? Is this information clearly identified in another government document/website/etc.? How is this information updated?
5.	Section 4, Table 3. Product Specification “12” chips”	SIA requests clarification in this section to specify if this is referring to 12 inch diameter wafers or the number of individual chips from a 12 inch diameter wafer.
6.	Section 4, Table 3. “Benchmark effluent volume per unit product”	SIA requests clarification in this section to specify if this is the amount of water for the entire processing of the wafer or chip (from beginning to end), or if it is the amount of water used in manufacturing all products in process on a given day (all wafers/chips in some portion of processing in the operation).
7.	Section 4.1.4 - The statistical cycle of product yield and effluent volume is a working day.	Similar to Comment No. 6 above, wafers/chips are not manufactured in one day, therefore please clarify if

		this is the amount of water used versus the total wafers/chips in process on a particular day or versus the number of final wafer/chips produced on that day.
9.	Section 4.1.4 - Table 3	SIA requests clarification of the purpose of having a benchmark water use for production processes. Is this meant to prevent sites from using water to dilute pollutant concentrations to meet the effluent limits in Tables 1 or 2? Every production process and operation is unique to each business such that defining a single benchmark is not practical. This will require the regulation to be continuously updated to account for changes and/or differences in operations. Also, production information is typically considered confidential and not used for the documentation of compliance. If the goal is to prevent sites from using more water to dilute pollutant concentrations in the wastewater, the regulation could simply state that it is illegal to use water to dilute pollutant concentrations. Sites can also be limited in their allowable wastewater discharge flows in local permits to prevent sites from using more water to dilute pollutant concentrations.
10.	Section 4.1, Table 3 – Benchmark effluent volume per unit product	SIA requests clarification of the basis for the benchmark water values included in this Table as well as the plan (if any) to continually update these values as technology changes.
11.	Section 4.1, Table 3 – Benchmark effluent volume per unit product	SIA requests clarification in the standard in the event that a production process is not included in any of the product specifications listed.

12.	Section 4.2.1 “Current standard remains effective for existing enterprises before July 1, 2018. From July 1, 2018, the limits of emission of air pollutants specified in Table 4 shall take effect.”	A deadline of 2018 (assuming standard is finalized around middle of 2016) is not a reasonable amount of time to design, acquire, install, test, and put into regular operation, air abatement devices, if they are needed to comply with the new standard for existing enterprises. This entire process takes up to 3.5 years. Therefore, SIA requests a period of 3.5 years for existing enterprises to comply with the new air pollutant emission standards.
13.	Section 4.2 – Table 4 – Limits of emission of air pollutants – Semiconductor device Section 4.2 – Table 5 – Special limits of emission of air pollutants – Semiconductor device	Semiconductor facilities have multiple exhaust stacks for multiple emission sources. These proposed air emission limits are written as single limits for an entire semiconductor manufacturing facility. However, emission levels vary between sources and stacks. SIA requests that MEP identify which emission source(s) these limits apply to. This specificity is necessary for compliance demonstrations (such as with emissions testing).
14.	Section 4.2 – Table 4 – Limits of emission of air pollutants – Ammonia for Semiconductor device Section 4.2 – Table 5 – Special limits of emission of air pollutants – Ammonia for Semiconductor device	The proposed ammonia standard of 5 mg/m^3 is not feasible even with abatement. SIA requests that MEP increase this emission limit to allow for an emission standard that could be achieved, while still providing protection to air quality. The specific ammonia limit (in lieu of 5 mg/m^3) would depend on which emission source the limit applies to.
15.	Section 4.2.7 “Before the benchmark exhaust volume per unit product is defined for production facilities, the actual concentration can serve as the basis for identifying whether meet the standards.”	Please add clarification to this section, as this section’s intent and specific requirements are not clear; specifically the “benchmark exhaust volume permit unit product” and how this is defined.

16.	Section 4.2.9 "…the environmental protection regulators should maintain a monitoring of environmental quality of the surrounding residential areas and other sensitive areas such as schools and hospitals. Specific scope of monitoring should be the surrounding sensitive areas determined by the environmental impact assessment."	SIA requests that MEP add clarification to the frequency and specific requirements of monitoring (such as how often and what air pollutants required monitoring, what information must be reported to MEP, etc.). Although the proposed standard points to the *Environmental Monitoring Regulations*, it's not clear if those *Regulations* include a sufficient level of detail to understand a facility's specific requirements.
17.	4.2.9 Specific scope of monitoring should be the surrounding sensitive areas determined by the environmental impact assessment. For the existing enterprises without undergoing environmental impact assessment, the scope of monitoring should be determined by the overseeing environmental protection regulator according to the characteristics and frequency of discharges and local factors such as natural conditions and weather, and based on the technical guidelines for environmental impact assessment. Local governments are responsible for environmental quality of their respective jurisdiction, and should take measures to ensure the environmental conditions meet the standards. Table 6 Limits of concentration of air pollutants on enterprise boundary	SIA believes that the Table 6 limits of concentration of air pollutants for an enterprise boundary may be too difficult to attain. Emissions from one area can traverse regional and local distances before contaminating the sample or reacting and forming ozone or fine particulate matter making it difficult to meet standards at a particular enterprise boundary. Also, emissions from mobile sources and meteorological conditions at the time of enterprise boundary sampling can affect the results making it difficult to discern emissions between sources inside and outside of an enterprise boundary**.** It is also not clear what would be expected of industry if an unfavorable result occurred. SIA feels there is too much uncertainty to make an accurate determination of real concentration at an enterprise boundary. (See Appendix I). For these reasons we suggest that boundary or fence-line monitoring is not used as a regulatory requirement for industry. Additionally, we suggest that a company that meets the emission limits in Tables 4 and 5 by performing periodic performance

		monitoring at site specific point sources (i.e stack) would be exempt from consideration of area monitoring used to determine regional emissions performance by the authorities.
18.	Table 8 Standards for determination of concentration of air pollutants S/N 7 Fluorides	Detection of Fluoride (F2) in air is more easily measured as a fluorine molecule such as HF or SiF_4. We suggest that numeric limits are attached to molecules such as HF which is a predominant form of fluorine in semiconductor factory exhaust. F2 is not easily captured by the existing sampling methods. We also propose that a provision is added that will allow for other methods to be used and that those allowances are determined by a performance based criteria. This provision would allow for more advanced methods to be approved by appropriate regional regulatory authorities if the methods are provided and proven in advance of their use. An example of a performance testing method to use to allow other detection methods is USEPA Method 301. See Appendix I

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We appreciate the opportunity to comment. We request that MEP apprise SIA of future developments in this area, and we welcome the opportunity to engage with MEP on an ongoing basis. For further assistance, please contact David Isaacs at disaacs@semiconductors.org.

Appendix I
Links

Air Pollution Transport Information

http://www3.epa.gov/airtransport/
https://www.tceq.texas.gov/airquality/sip/the-epas-transport-rule

Method 301

http://www3.epa.gov/ttn/emc/promgate.html