Ruma Kohli
4/19/17

GLOBALFOUNDRIES® Testimony on S.103 - Regulation of Toxic Substances
House Committee on Natural Resource, Fish and Wildlife
Ruma Kohli, Product Stewardship Program Manager

GlobalFoundries Background:

GLOBALFOUNDRIES U.S. 2 LLC(GLOBALFOUNDRIES) is the largest for-profit employer in Vermont. Our company employs over 2,800 persons from 13 of Vermont's 14 counties. The semiconductor chips manufactured in GLOBALFOUNDRIES Essex Junction/Williston campus are incorporated into products such as cell phones, tablets, GPS devices, and cars.

As GLOBALFOUNDRIES' Product Stewardship Program Manager I ensure that our products meet worldwide chemical content regulations. I have a Master of Science degree in Chemistry. I served for several years as a member and Co-Chair of the Vermont Advisory Committee on Mercury Pollution, served as a member of the State of Vermont Beyond Waste Advisory Group, served as an Act 154 Working Group member, whose recommendations are the basis of S.103 and have been appointed by Gov. Shumlin to the Act 188 Chemicals of High Concern to Children Working Group.

History of Environmental Stewardship:

GLOBALFOUNDRIES' Essex Junction/Williston campus has a long history of environmental excellence and continuous improvement in our environmental performance.

- We proactively evaluate chemicals proposed for or used in our processes and products for environmental, health and safety impacts
- Reduce chemical usage when technically feasible
- Eliminate, restrict and/or prohibit the use of substances ahead of regulatory action, when a more preferable alternative is available that is capable of meeting quality and safety requirements of our processes and products

Our record of voluntary material restrictions and prohibitions stretches back over three decades, and is evidence of our commitment to and expertise in safe and responsible chemical use that is protective of human health and the environment. GLOBALFOUNDRIES environmental specification currently bans or restricts

over 100 chemicals from our products and supply chain. The environmental specification is updated frequently to capture emerging requirements.

These practices and programs have resulted in our location receiving numerous environmental awards and recognition. *(See attached handout for details)*

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House Committee on Natural Resource, Fish and Wildlife
Ruma Kohli, Product Stewardship Program Manager
April 13th, 2017

Thank you for the opportunity to provide testimony on Senate Bill 103, an act relating to the regulation of toxic substances and hazardous materials.

GLOBALFOUNDRIES finds Senate Bill 103, as passed by the Senate, to be a significant improvement over the Bill as originally drafted. However, GLOBALFOUNDRIES still has concerns with the composition of the citizen advisory panel and the Interagency Committee on Chemical Management, and the charge of the Interagency Committee on Chemical Management. Therefore, we respectfully recommend the following changes:

Toxics Use Reduction (TUR) program expansion:

- Toxics Use Reduction (TUR) expansion (both in threshold and chemical listing) would significantly increase the administrative burden and compliance costs for the regulated entities.
    - GLOBALFOUNDRIES' Vermont campus expends about $5,000,000.00 annually to comply with existing environmental regulations[i].
    - The campus currently has 10 chemicals and 3 hazardous waste streams in our TUR plan
    - Annually, the campus expends approximately 2 to 2.5 person years to implement our TUR efforts developed under the existing requirements (See Attachment TUR reduction document)

- The TUR expansion would subject companies and entities that are not currently regulated and who may have no knowledge and expertise in the area of chemical management and pollution prevention to a significant expense in order to comply.

- States that have expanded their TUR Program have devoted significant funding and infrastructure to ensure compliance. By way of example, the Massachusetts TUR Program is supported by the following agencies:
    - Office of Technical Assistance and Technology
    - The Massachusetts Lowell Toxic Use Reduction Institute
    - The Administrative Council on Toxic Use Reduction
    - Massachusetts Department of Environmental Protection

Please note that Massachusetts program has State-sponsored workshops, technical assistance, grants, and targeted research for companies. The program has implemented a phased-in approach to expanding the chemical list covered under the TUR regulations since its adoption in 1989.

Composition of Citizen Advisory Panel:

- The composition of the Citizen Advisory Panel as currently proposed includes a number of people with overlapping expertise. As a result, the Advisory Panel will lack a diversity of opinion and may produce decisions and/or recommendations that may not accurately reflect real world experience.
- The group should consist of experts from businesses and other entities that are subject to, and have expertise in, compliance with existing chemical reporting and environmental regulations. While S.103 does call for persons with expertise in manufacturing products, it does not specify persons that are subject to compliance with chemical reporting and regulation.

Composition of Interagency Committee on Chemical Management:

- The Interagency Committee on Chemical Management recommendations could have significant impacts to State commerce. Therefore we recommend including the Agency of Commerce and Community Development in the Interagency Committee, as a non-voting ex officio member to provide expertise on the economic impact of any proposed recommendations.
- The Committee is charged with recommending how the State should establish a centralized or unified electronic reporting system. However, the Interagency Committee lacks expertise in data management and IT infrastructure. To ensure the planning of an efficient and effective IT system

the Interagency Committee should consider including a representative from the newly formed Agency of Digital services.

Charge of the Interagency Committee on Chemical Management:

- The Interagency Committee on Chemical Management is charged with estimating the staff and funding necessary to administer the reporting system. Additionally, the Committee should be charged with estimating the cost of compliance for the businesses, retailers, institutes of higher education and any other parties that would be impacted by the recommendations of the Committee.
- The Interagency Committee should also estimate the cost of additional resources for State outreach and technical assistance to businesses implementing changes to comply with the resulting regulations.
- Before recommending legislative or regulatory action to the Interagency Committee, the citizen advisory panel should conduct hearings to receive testimony from businesses that would be impacted by such legislative or regulatory action.

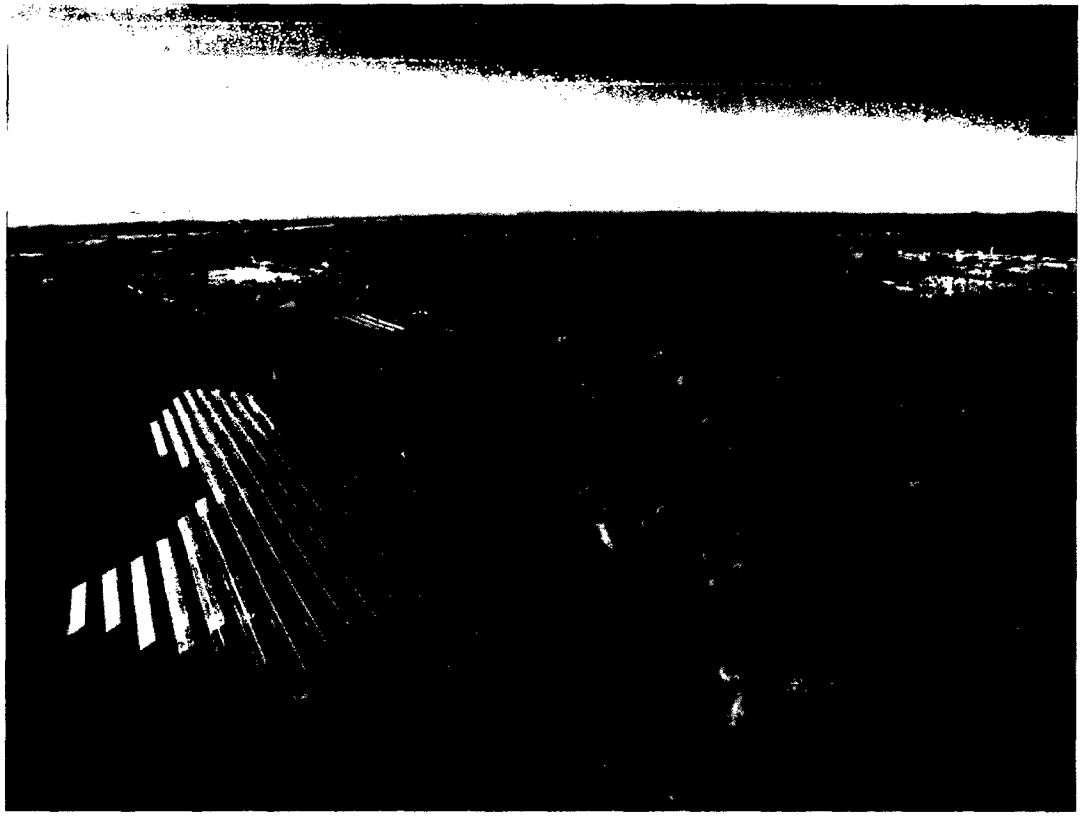
We appreciate your consideration of our views. Please contact me at 1-802-769-4269 or ruma.kohli@globalfoundries.com if I can be of any further assistance.

Sincerely,

Ruma Kohli
Product Stewardship Program Manager
GLOBALFOUNDRIES US 2, LLC

[i] This figure includes labor and materials, analysis, maintenance, certifications, IT support, and fees. In addition, this does not include the work that it takes to actually implement a process change with alternative chemistry.

Regional Test Center and 4.69MW Solar Facility



Two Solar Facilities:

- **DOE Sandia National Labs Regional Test Center**
  - 1 of 4 facilities in the nation
  - Tests, collects, and shares data on effectiveness of different panel types
- **4.69MW Facility**
  - Vermont's largest array
    ~20,000 panels, 55 Acres
    ~1,100 Homes
  - Low cost solar

Vermont Site's Environmental Recognition

Vermont Governor's Environmental Excellence Awards (1993–2016):

- Energy Optimization in Chillers (2016)
- Nitrates reductions in chemical mechanical polish process (2016)
- Industrial Wastewater Treatment Plant Resource Optimization (2015)
- Greenhouse Gas Reduction Projects (2015)
- Solvent Block project on Photolithography Tools (2014)
- manufacturing (2012)
- Nitrates Reduction in wastewater effluent (2011)
- U-Tube scrubber design and installation (2011)

National Pollution Prevention Roundtable (2007, 2009-2013, 2014, 2016):

- Nitrates reductions in chemical mechanical polish process (2016)
- Industrial Waste Water Treatment Plant resource optimizations (2014)
- Green House Gas Reductions In IBM's TSV Semiconductor Process (2013)
- Centennial Energy Outreach Project (2012)
- Performance Optimization and Increased Treatment of Nitrates (2011)
- Chemical emission reduction and energy savings (2011)

EPA Region-1 Environmental Merit Award 2015, 2016

- Nitrates reductions in chemical mechanical polish process (2016)
- Greenhouse Gas Reduction Projects (2015)

EPA Climate Leadership Award (2012)

Assoc. of Energy Engineers – New England

- Best Overall Energy Project in New England (2012)

Vermont Governor's Award for Outstanding Workplace Safety (2010):

- VOSHA Voluntary Protection Program (VPP)

Green Mountain Water Environment **Association (2010)**:

- Outstanding Industrial Facility Award
- Laboratory Excellence Award

Keep America Beautiful (2010)

An Example of a Toxic's Use Reduction project in semiconductor manufacturing:

Chemical use reduction or alternate chemistry project qualifications in semiconductor manufacturing are complex and time consuming. Alternative chemistries need technical justification to support a change, and the new chemistry must not have negative process, quality, reliability or safety impacts.

As an example, GlobalFoundries Chemical Mechanical Polish project for slurry reduction was evaluated by a team of engineers (a Phd in Chemical engineering and two technicians). The project took 11 months to evaluate and implement and required 100s of data points to be collected and reviewed.

This project resulted in decreased Chemical Mechanical Polish process time, the project saved 184,000 gallons of chemicals from four slurries annually, containing ferric nitrate, hydrogen peroxide, alumina, silica, and various inorganic and organic constituents. The site runs an on-site wastewater treatment facility that processes inorganic and organic manufacturing and site wastewaters. Lower chemical usage translates into less waste treatment, thereby reducing the energy and chemicals needed for such treatment.

This example is of just one project for one TUR chemical. Significantly increasing the number of chemicals on the TUR list would be burdensome, and would require additional resources to make this program a success.

Note: The example project was submitted for this year's Governor's environmental excellence awards.