

Testimony of
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Oversight Hearing on:
“The Past, Present and Future of the Federal Helium Program”

AND

Legislative Hearing on:
“HR 527 – The Responsible Helium Administration and Stewardship Act”

February 14, 2013

Mr. Chairman, thank you for the opportunity to testify on HR 527, “The Responsible Helium Administration and Stewardship Act.” My name is Rodney Morgan and I am the Vice President of Procurement for Micron Technology. In this capacity I oversee all purchasing by Micron, including critical materials like helium.

On behalf of Micron and the Semiconductor Industry Association (SIA)¹, our industry trade association, I am here to lend my voice to the growing chorus of manufacturers concerned about the imminent closure of the Federal Helium Reserve. HR 527 is important legislation for the semiconductor industry. It will ensure the continued operation of and sales of helium from the Federal Helium Reserve, providing a stable and secure supply of a critical material for the next few years.

Founded nearly 35 years ago in Boise, Idaho, Micron has grown into a global leader in computer memory technology. In fact, we are the only pure play memory manufacturer based in the United States. In addition to our headquarters in Boise, we have major manufacturing operations in Lehi, Utah, and Manassas, Virginia, as well as in Asia and in Europe. Micron also has design and research and development facilities in California, Texas, Colorado, and Minnesota. In all we employ more than 25,000 people, approximately half of which are in the United States.

The U.S. semiconductor industry is a key driver of the economy and one of our top exports.² Semiconductors are the basic building block of all modern electronics, and every year

¹ More information on Micron is available at www.micron.com. Additional information on SIA, including a list of members, is available at www.sia-online.org.

² There are 244,800 direct jobs in the industry. SIA has also calculated that there are 1.1M indirect jobs.
Source: calculations based on Official U.S. Government data from the U.S. Bureau of Labor Statistics

approximately 250,000 Americans work together to produce millions of computer chips that make smart phones, GPS, and MRI's possible. It is a signature American industry and one in which we still the lead.

Manufacturing semiconductors is an incredibly complex process. It takes weeks and hundreds of processes to make a chip, using sophisticated equipment and techniques developed by the world's leading scientists and engineers.³ The technology is constantly evolving to produce faster and better products. It is also an incredibly capital intensive business. A typical semiconductor manufacturing facility is a multibillion dollar investment. Micron typically introduces a new product every six months. We introduced two just last week, for instance. But for all the technology, many of the processes and materials are fairly basic. Helium is just one of a number of gasses used to make our memory chips, but it's absolutely vital. To put it simply, without helium, we cannot operate. Micron is not alone in its dependence on this crucial gas.

Helium's unique physical and chemical properties make it critical to the manufacture of semiconductors. Helium is inert, has a low boiling point (4 Kelvin, near absolute zero), and high thermal conductivity. Some principle uses of helium in the semiconductor industry are as a carrier gas for deposition processes, as a dilutant in plasma etch processes, and in some specialized wafer cooling applications.

Helium is used to achieve ultra-clean manufacturing and assembly environments that are essential for advanced semiconductor manufacturing.⁴ According to the National Academy of Sciences, semiconductor and optical fiber manufacturing account for 13 percent of total helium usage.⁵ Suppliers to the industry have indicated that semiconductor manufacturing accounts for approximately 6 percent of helium usage. Although the semiconductor industry consumes only a small amount of the overall quantity of helium used today, it remains a critical, irreplaceable input into our manufacturing process.

In some applications, alternatives to helium such as argon or nitrogen may be used, but this typically results in a decrease in manufacturing output. Micron has been working to develop alternatives to helium, but for some processes, we have been unable to find

³ USPTO granted 913 patents to Micron in 2012, and six of top 15 US companies were semiconductor companies (IBM, Qualcomm, Intel, Broadcom, Micron, and Texas Instruments).
Source: USPTO, compiled by IFI Claims

U.S. semiconductor industry invests on average 15-20 percent of sales in R&D. In 2011, U.S. industry invested 18 percent of total sales (or \$27 billion) in R&D Source: WSTS and IC Insights

⁴ "Selling the Nation's Helium Reserve" (2010) at pp. 63, 67.

⁵ "Selling the Nation's Helium Reserve" (2010) at p. 17.

another option. Alternatives could also result in costly, unproven retrofits to the tools used to make our products.

For all its great properties, helium is really difficult to manage. Because it is a small molecule, it quickly leaks out of containers. Anyone who has filled a latex balloon with helium only to find it on the ground the next day, has witnessed this. Due to the problems associated with storing helium, we are dependent on regular deliveries to our facilities. A delay of even a few days could slow production at a semiconductor facility. A significant delay, could idle a plant entirely. This possibility would result in significant costs to our company, the industry and country as a whole.

It's worth noting that we are already facing supply shortages. In fact, for most of the past year, we have only been receiving about 80 percent of the helium for which we have contracted. Again, Micron is not unique in this situation. All US users of helium have had to struggle through reduced helium deliveries.

As everyone here today knows, the Federal Helium Reserve operated by the Bureau of Land Management comprises a significant portion of the world's helium supply. What would happen if the helium reserve were to stop making helium available for sale to private entities? It's hard to say for certain, but there is no question that it would be disruptive to the market. And for reasons already mentioned, it has the potential to be damaging to U.S. manufacturers, and the semiconductor industry in particular. If supplies were disrupted for a significant period it could even impact the overall economy. That may seem like a stretch, but we should not forget the impact flooding in Thailand had on the shipment of hard disk drives.

In November of 2011, widespread flooding in Thailand forced a number of hard disk drive manufacturers to halt production. Fewer hard disk drives were shipped, leading to price increases and shortages.⁶ Now imagine not just the delay of computer chips, but the computers, life-saving medical devices, and weapons systems that they power. That's an unacceptable scenario.

Congress must act to prevent the looming helium shortage. BLM's authority to operate the reserve is set to expire, and it requires an act of Congress to keep the reserve open. As such, SIA worked with a group of helium end-users to develop a set of principles that we thought should be included in any legislation to address the helium supply. These were:

⁶ Thomas Fuller, "**Thailand Flooding Cripples Hard-Drive Suppliers,**" **The New York Times, 11/6/11**

1. Establish a framework for secure, continuous supplies of helium that can be implemented through long-term contracts with suppliers.
2. Ensure price transparency.
3. Provide for mechanisms to prevent market speculation or manipulation.
4. Adequate transition period to assure continuity in supplies.
5. Promote increased supplies of helium in the future.

When used to evaluate HR 527, “The Responsible Helium Administration and Stewardship Act,” we see that it is largely consistent with the spirit of these principles. The bill provides a framework for a secure supply. It provides price transparency through clear reporting requirements for both the BLM and those who purchase the helium. HR 527 also provides some protection against market speculation. And it provides an ample transition period. The new approach envisioned by the bill would pose some uncertainty for helium users and our practice of entering into long term supply contracts, but we believe the bill provides the Secretary of Interior with the discretion to manage those uncertainties. These concerns should not delay the need to address this issue immediately.

Micron Technology and the Semiconductor Industry Association are absolutely committed to ensuring a stable and secure supply of helium. HR 527, “The Responsible Helium Administration and Stewardship Act,” represents a significant step forward in addressing the concerns associated with the helium supply from the reserve. The bill provides for the continued operation of the Federal Helium Reserve and the sale of helium to private entities, thereby helping to ensure a stable and secure supply of helium in the near term. It is important and urgently needed that the House act on legislation to address the helium supply. We applaud Chairman Hastings, and Ranking Member Markey for their work on this bill, and we urge the full House to consider the legislation soon.

Again, thank you for the opportunity to testify, Mr. Chairman. I am happy to answer any questions.

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