



Washington averts helium shortage

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Helium has recently entered the national spotlight in the United States with passage of the Helium Stewardship Act of 2013. This law provides for continued access to the federal helium supply in the short term and sets up a gradual transition to the private market by 2021. This law effectively prevents immediate helium shortages and allows a diverse range of helium-based industries to continue to operate.

According to Stuart Henderson, Associate Laboratory Director for Accelerators at Fermilab, “Most of the large scientific user facilities require helium for cryogenics.... Together these facilities support many thousands of US and international scientists.” Henderson said that had the bill not passed, he expected their annual expense for helium to double, leaving less room in the budget for employment and experiments. In addition, Henderson predicted that loss of the federal helium supply would likely have resulted in helium rationing, which he described as “a complete disaster” that would leave major scientific facilities without a steady supply of helium.

Indeed, the largest use of helium in the country is for cryogenics—an application where there is no viable substitute. And while cryogenics are extremely important for science, they are equally important in the health care industry where helium is used to cool the large magnets in magnetic resonance imaging (MRI) machines. Restricted access to helium could cause delays and increase in cost for these important diagnostic tests, affecting millions of people every year. In addition to cryogenic use, helium is critical for a variety of industries and applications. From pressurizing and purging gas in rockets, to an inert and controlled atmosphere under which crystals used to make microchips can be grown, to a protective cover gas

for industrial welding, to the well-known lifting gas used in balloons—helium is a versatile and important resource.

The creation of the US Federal Helium Reserve was spawned by the short-lived use of airships (blimps) for national defense in the 1920s. Through the 1950s, helium was considered a critical resource for national security in the United States because it was used to purge liquid-fueled rockets during the Cold War and the Space Race. With the growing need for helium, the Bureau of Land Management (BLM) stockpiled helium and stored it in a geological formation called the Bush Dome Reservoir located outside of Amarillo, Texas. The Helium Act of 1960 authorized the Secretary of the Interior to sell crude helium for federal, medical, scientific, and commercial uses, and established a national helium production program that expanded the reserve to include storage, withdrawal, and transportation facilities.

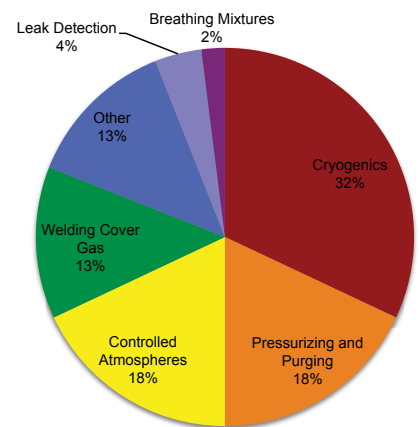
By 1996, helium was no longer considered critical to US national security, and with the trend toward privatization, the Helium Privatization Act (HPA) was passed. The HPA set a January 1, 2015 deadline for two requirements: first, the BLM was required to gradually sell helium to pay off the \$1.3 billion debt the reserve had accrued over its lifetime, and second, the amount of helium in the reserve had to be reduced to 600 million cubic feet. After the debt has been paid, the law provides for no further funding to operate the reserve, effectively shutting down the reserve and privatizing the helium market.

As stipulated by the HPA, the BLM has steadily sold down the helium reserve—but the privatization scheme envisioned by Congress has not materialized. Indeed, the helium crisis that was averted by passage of the Helium Stewardship Act this year was in part created by the helium pricing set up by the HPA. In 1996, helium was

in low demand and the price was set to ensure that the reserve met the repayment requirement. Despite the BLM raising the helium price as demand increased, it was still cheaper to buy helium from the reserve than for the open market to develop new sources. With the increasing price of helium, the reserve paid off its debt nearly two years early—by February 2013.

With the repayment requirement met, the helium reserve was only funded to continue operation through September 2013, the end of the fiscal year. In 2012, the reserve supplied 40% of US and 30% of world helium demand. About 10% of the helium sold from the reserve goes to federal users who get first priority—the remaining 90% goes to private users. Shutting the reserve in October 2013 would have disrupted the global helium supply causing a significant shortage and price jump—something that federal and private helium users would not have been able to afford. The BLM alerted the US Congress to the likelihood of early repayment several years ago and staffers began working with BLM officials, the National Academy of Sciences, and helium refiners, retailers, and end users to draft legislation that would extend the life of the helium reserve while new sources of helium were developed.

The Helium Stewardship Act went through a few iterations and it took time to build the momentum and support needed to move the legislation through the US Congress. A coalition of scientific and



Helium use in the United States in 2012, 1.8 billion cubic feet. Source: US Geological Survey Mineral Commodity Summary 2013.



industrial helium users was formed with a diverse membership, including professional societies like the Materials Research Society (MRS), trade associations representing the semiconductor and MRI/health care industries, as well as manufacturing and large industrial users. The coalition members testified at congressional hearings, spoke at congressional briefings, and met with member offices to educate Congress on the importance of extending the life of the helium reserve to provide stability to the helium market in the short term.

Alex King, who served as director of Ames Laboratory and is a former MRS President, took part in the MRS congressional visits and spoke about the real impact the scientific community was already facing. "One case I talked about was a colleague who had to make a choice between hiring a post-doc or keeping a helium-dependent instrument running—with the rising price and uncertainty of the helium market he was not sure his funding would cover both the necessary helium and the post-doc to conduct the experiments." King, who is now director of the Critical Materials Institute at Ames Laboratory, had also told congressional staffers that due to helium supply uncertainty, helium delivery delays were already occurring with some laboratories receiving "30 to 50% less helium which translates to a significantly lower number of experiments being run."

Congress responded to the call to ac-

tion on helium with the introduction of the Helium Stewardship Act of 2012. The bill was first introduced in the Senate during the 112th Congress by then-Chair of the Energy Committee Jeff Bingaman (D-N.M.) and Senator John Barrasso (R-Wyo.). Despite the bill's strong bi-partisan support, the 2012 Presidential and Congressional elections coupled with end-of-the-year must-address legislation spelled doom for the bill.

In the 113th US Congress, Energy and Natural Resources Chair Ron Wyden (D-Ore.) and Ranking Member Lisa Murkowski (R-Alaska) reintroduced the Helium Stewardship Act in the Senate. The House also introduced a version of the bill, the Responsible Helium Administration and Stewardship Act, championed by Committee on Natural Resources Chair Doc Hastings (R-Wash.) with bi-partisan support from Representatives (now Senator) Ed Markey (D-Mass.), Rush Holt (D-N.J.), and Bill Flores (R-Texas). With continued support from the helium industry and end users, the House passed its version of the bill in April and the Senate amended and passed the bill five months later, very close to when funding was due to end. The bill went through a final amendment process to resolve differences before it was passed again by both the House and Senate on September 26 and signed into law by President Obama on October 2, 2013.

The Helium Stewardship Act has established a new scheme to sell helium

at market-driven prices and sets a three-phase schedule to transition away from a federal helium program by 2021. In the first phase the reserve will continue to operate under the current conditions until September 30, 2014. The second phase begins with the establishment of a helium auction starting in 2014 with 10 percentage points and adding an additional 15 percentage points every year thereafter. Federal users will continue to receive priority access and when the reserve is depleted to 3 billion cubic feet, the third phase of the transition starts with sales from the reserve restricted to federal users only. Helium sales from the reserve will generate revenue to be applied to other important federal programs and to reduce the federal debt.

"It's nice to see Congress respond to a cry for help from the science community," King said. And with the natural gas boom (helium is found with natural gas and can be captured and separated), King said, "This is a good time to transition toward a free market—hopefully the helium auctions and pricing increase mandated by the new law will attract more businesses to come into the production side."

As with most new laws, it is uncertain whether the new helium legislation will produce the desired outcomes, but most helium users can agree it has averted an immediate crisis and will provide some much-needed stability to the helium market.

Jennifer A. Nekuda Malik

European Commission publishes report on coal and steel research

<http://ec.europa.eu/research>

The European Coal and Steel Community treaty expired in 2002 but its financial assets, built up over 50 years, were transferred to a fund, the Research Fund for Coal and Steel (RFCS), to finance research and innovation projects relevant to the two sectors. Independent experts from the coal and steel sectors considered projects funded by RFCS between 2003 and 2010, analyzing in depth 23 projects where quantifiable commercial benefits were assessed. The main benefits reported by the beneficiaries of

the RFCS projects were cost reductions, increased productivity, energy saving, new applications, new solutions, and new market share. The cumulative quantified benefit they declared amounted to about €100 million/year for RFCS funding of about €30 million.

The experts also estimated what the overall commercial return of RFCS funding would be if the same impact achieved in the 23 projects were extended across the entire European coal and steel sectors. The result: an estimated

overall commercial return close to €700 million per year compared with average annual RFCS funding of €55 million.

Forty percent of world electricity generation derives from coal, which remains the main energy source for some EU countries.

According to the report, "Research Fund for Coal and Steel," the European Union (EU) is the second largest producer of steel in the world, accounting for 11% of global output. But Europe's producers are facing increasing global competition. Research is therefore essential for EU industry to remain competitive, according to the report. □