

# Helium supply critical to Army research

U.S. Army

REDSTONE ARSENAL, Ala. (Aug. 15, 2013) -- Army senior research scientist Henry Everitt doesn't take helium lightly, because the second lightest element in the universe is in high demand by research laboratories such as his at the U.S. Army Aviation and Missile Research, Development and Engineering Center.

"Helium is a much more useful material than just for balloons," Everitt said. "Helium is, because of its unique properties, the element that is primarily used for cryogenics. It's what we use to do cold experiments; to cool things down to very cold temperatures."

Roughly a third of the world's helium is supplied by the Federal Helium Reserve, an underground stockpile located just outside of Amarillo, Texas. The reserve was established in 1925 as a strategic supply of gas for airships. In the 1950s it became an important source of coolant during the space race and Cold War.

Today the single largest use of liquid helium is in cooling MRI machines. Helium is used in manufacturing semiconductors and fiber optic cables. It is used to pressurize and purge piping systems, detect leaks, and specialized welds.

Scientists and engineers at U.S. Army Aviation and Missile Research, Development and Engineering Center use helium to conduct cryogenic research.

"The primary use of cryogenics for the public's interest is detectors, whether its medical detectors, Border Patrol detectors, or in my lab," Everitt said.

Everitt leads two active research groups and advises the Army and DOD on a variety of emerging technologies. One lab focuses on plasmonics and the ultrafast optical characterization of wide bandgap semiconductor heterostructures and nano structures. Another lab focuses on developing terahertz spectroscopic and imaging techniques, serving as an honest broker for the Army in emerging THz technologies.

"I have detectors that require liquid helium," Everitt said. "And the reason for that is, when you're detecting some really weak signal, you need to make all the background go away. And you do that by cooling down the detector so much so that the only signal that you're seeing is the signal that you want. The rest of the world is 'cooled away.'"

At the Charles M. Bowden Laboratory, Everitt has several cryostats for conducting experiments as low as 1 ½ degrees above absolute zero. Liquid helium is the only material capable of maintaining these temperatures.

Today these cryostats are collecting dust.

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"For the last three or four years I have not been able to get helium, and many of my experiments depend on liquid helium to work," Everitt explained. "So it's dramatically affected the way I work."

He attributes this primarily to changes in practice in the supply chain, volatility in the helium market over the last decade, and uncertainty over the future supply. A 2010 report by the National Academy of Sciences entitled "Selling the Nation's Helium Reserve" discusses these affects on the helium market.

On Oct. 7, 2013, the Federal Helium Reserve will no longer be allowed to sell helium to private industrial and scientific users per the Helium Privatization Act of 1996.

"Helium is a precious, precious and relatively rare commodity," Everitt said. A reduction in the national supply would have "a direct impact on the work we do in Huntsville."

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