Helium: Supply Shortages Impacting our Economy, National Defense and Manufacturing

Witnesses:
Panel 1
Tim Spisak
Deputy Assistant Director, Minerals and Realty Management, Bureau of Land Management

Panel 2
David Joyner
President, Air Liquide Helium America, Inc.
Walter Nelson
Director, Helium Sourcing & Supply Chain, Air Products and Chemicals, Inc.
Tom Thoman
Gases Production President, Airgas, Inc.
Tom Rauch
Global Sourcing Manager-Services & Aftermarket Solutions, GE Healthcare
Mark Haynes
Next Generation Nuclear Plant Industry Alliance Representative
John R. Campbell
President & CEO of J.R. Campbell and Associates
N. Phuan Ong
Professor of Physics, Princeton University

Subcommittee Members Present:
Doug Lamborn (R-CO), Chair
Rush Holt (D-NJ), Ranking Member
Jeff Duncan (R-SC)
Peter De Fazio (D-OR)
Glenn Thompson (R-PA)
Paul Tonko (D-NY)
Bill Flores (R-TX)

On July 20, the House Committee on Natural Resources Subcommittee on Energy and Mineral Resources held a hearing on the impacts of the helium supply shortage. The Bureau of Land Management (BLM) operates a helium reserve which is no longer funded after next year in accordance with the Helium Privatization Act of 1996 (HPA) (P.L. 104-273). Private industry has not yet developed alternative sources of helium to prepare for this closure.

Chairman Doug Lamborn (R-CO) opened the hearing by discussing the history of the Federal Helium Program (FHP). The program was started in 1925 to create the Federal Helium Reserve in Amarillo, Texas after it was used in military aircraft and blimps during World War I. Today, helium is used in health equipment, LCD screens, lasers and rocket fuel. American companies that have bought helium from the reserve in the past will rely more on foreign helium from Algeria, Qatar, and Russia if the U.S. cannot develop a stable domestic supply Lamborn specifically mentioned the global shortage of Helium-3, (H3) an isotope used by defense agencies to detect smuggled nuclear weapons and other homeland security purposes. The chairman said he hopes the witnesses' testimonies could help Congress decide on a course of action to combat the shrinking supply of helium by developing a private supply of the critical gas.

Ranking Member Rush Holt (D-NJ) discussed the HPA and repayment of the helium debt by BLM in his opening statement. He criticized Congress for ignoring this issue saying, "Members don't understand that helium is the result of alpha decay of elements … and ends up deposited with natural gas … and needs to be separated and saved if it's going to be used." Holt discussed a bill he is

writing with Representatives Edward Markey (D-MA) and Paul Tonko (D-NY) to address a shortage of helium once the federal reserve is shut down. He said this issue “should not be partisan” and said he hopes for Republican help on this bill.

Tim Spisak, the Deputy Assistant Director of the Minerals and Realty Management division of BLM, outlined the goals and practices of the FHP in his testimony. He said in fiscal year 2013 (FY 2013) the program will have paid off the “helium debt” the U.S. Treasury incurred by building the helium stockpile. Spisak said the BLM paid this debt by selling helium at a reduced price to domestic users. When the HPA was passed it stopped BLM from producing any more helium and mandated it to sell the current stockpile.

He explained the BLM’s “In-Kind” program, requiring federal agencies to buy helium from private suppliers who must then buy the gas from the stockpile. Spisak summarized the 2000 National Academy of Sciences report entitled “The Impact of Selling the Federal Helium Reserve” which concluded the “HPA-mandated sell-off is negatively impacting … current and future users of helium.”

During questioning by Lamborn, Spisak explained that a pipeline was set up from the reserve in Amarillo to processing plants in Oklahoma and Kansas. This pipeline was built by the Bureau of Mines, a federal agency which oversaw mining activity and controlled the helium stockpile until it was closed in 1995. There are only four refining plants along the pipeline, and Spisak said additional plants cannot be added because its capacity is close to being exceeded.

Holt asked if different natural gas reserves have different amounts of helium and if deposits with sufficient concentration of the critical gas are easy to find. Spisak explained that “essentially all” gas fields contain helium, but it is only “economically viable” if it is more than 0.3 percent of the deposit. He said that such deposits are being found domestically but they are small. Spisak later explained that the price of helium is kept low by BLM because it will be more costly to the government in the long run as the reserve is sold off.

Representative Glenn Thompson (R-PA) asked about the “straight line extraction” requirement of HPA. It requires BLM to draw from the reserve at a steady rate and Thompson said that may not make sense as the reserve is being emptied. Spisak responded that the straight line extraction is “impossible” to maintain as the reserve ages and its pressure decreases.

Responding to Tonko, Spisak said the reserve should be paid off by the first quarter of FY 2013. When this happens however, the reserve will still contain 14 billion cubic feet of helium. BLM sells helium in packages of 100 million cubic feet, and sells about 2 billion cubic feet per year.

Representative Jeff Duncan (R-SC) expressed concern that other countries may be supplying U.S. helium needs in the future. He criticized the government for “fixing prices” and its negative effects “downstream.”

David Joyner, President of Air Liquide Helium America, testified as the head of a corporation which distributes helium “globally” to the electronics industry, health researchers, automotive suppliers, laboratories and manufacturing facilities. He explained that the Federal Helium Reserve contains “crude” helium which must be refined before use. Gas from the reserve is transported solely by the helium pipeline to six processing plants. Joyner said these plants have received “a windfall” by having the ability to control the supply of helium. He argued that allowing more refiners to have access to the reserve, supply would increase.

Joyner said the price of helium from the stockpile negatively impacts private suppliers. The BLM price of helium is “solely designed” to pay the debt to the U.S. Treasury. Because the BLM is not trying to make a profit, it can provide the gas at a much lower price than private suppliers, working against the purpose of the HPA.

Walter Nelson, Director of Helium Sourcing and Supply at Air Products and Chemicals, testified that the BLM helium reserve is “essential” to the helium market’s stability. Air Products is one of the companies that owns a helium processing plant along the pipeline. Rather than a controlled shortage as suggested by Joyner, Nelson claims the shortage is due to maintenance problems at helium production plants in Wyoming and Qatar. He points to a “shift in focus” by drilling companies toward natural gas resources with more liquid rather than dry gas which contains more helium. Nelson said natural gas fields “rarely” contain helium.

Tom Thoman, Division President of Gases Production at Airgas, cited the six-plant “monopoly” of refined helium and the reduced price at which the government can sell it at as the cause of the shortage in his testimony. He supported the NAS report recommendations that helium pricing follow a “market-based approach” and BLM broaden its distribution of crude. Thoman closed by appealing to concern for the U.S. economy saying Airgas is losing business though it supports “millions of U.S. jobs.”

Tom Rauch, Global Sourcing Manager of GE Healthcare, testified to the importance of helium in Magnetic Resonance Imaging (MRI). A helium shortage does not pose immediate danger for patients, but the magnets in Magnetic Resonance Imaging (MRI) machines will have to be replaced with the gas to cool it after use. He said a long-term shortage could force patients in need of medical care to travel long distances for a functioning MRI. Rauch recommended the Federal Helium Program be funded for another year or so to allow more time for helium supply privatization.

Mark Haynes, President of Concordia Power and representing the Next Generation Nuclear Power Alliance (NGNP), discussed the critical use of helium in the energy industry in his testimony. He said helium is used to cool reactions for petroleum, natural gas and coal processing and nuclear reactors including High Temperature Gas Reactions (HTGR). HTGR does not require human operation even for safety purposes and is more energy efficient than nuclear power. Haynes said many other countries, including China, have test HTGR reactors and are developing commercial reactors.

John Campbell, member of the NAS helium report committee, testified based on his experience with the helium supply. He reiterated the recommendations of former witnesses. Campbell said the BLM can offer much lower prices than private suppliers because it is just repaying the U.S. Treasury. He said that because helium comes from natural gas fields, the two resources are “inexorably linked.” While natural gas production is inconsistent the helium supply cannot be stabilized, according to Campbell.

N. Phuan Ong, physics professor at Princeton University and Director of the Princeton Center for Complex Materials, discussed the use of helium in his and related research in his testimony. Quantum properties of materials and magnetic research require helium to cool materials and superconductive magnets, respectively. Ong said this research can impact the fields of quantum computing, MRI, superconductor chips in electronics and graphene- a single sheet of carbon atoms with unique conductive properties. Academic research requires less helium than industry, but is still negatively impacted by the supply shortage.

In response to Lamborn’s questions, Nelson summarized the recommendations of the NAS report. He recommended extending the life of the helium reserve until it is sold off. He said Congress should broaden the Federal Helium Users Program which currently supplies research and defense applications and allow more organizations to buy helium directly from the BLM rather than private suppliers as directed by the In-Kind Program.

Holt asked if the helium shortage was based on geological or economic limitations. Campbell explained that Wyoming, New Mexico, Arizona, Iraq, Russia and Algeria contain significant helium reserves capable of being economically mined. He said the shortage issue is more a result of relying on BLM as the “flywheel” or constant source of helium for “day to day” use. Now that the reserve is in the process of closing, Campbell said there will be economic instability before a new main source is established.

Ong and Nelson told Holt that the use of helium in academic research is between five and 10 percent. Holt was attempting to understand the “appropriate use and pricing” of a critical resource owned by the taxpayer, suggesting that research is a more important use of helium. Thompson asked how helium pricing affects research. Ong explained that to compete with research groups from Japan or Germany, his lab must spend an “absurd” $50,000 on helium. He said he usually receives $100,000 from National Science Foundation (NSF) grants.

Tonko asked if the government should maintain a “strategic” helium reserve for defense and emergency use. Campbell and Nelson supported this idea, considering the many uses the critical gas has for defense. Ong said that because helium is “one of the most important elements and the easiest to use” it must be recycled and saved. Especially because the U.S. has such significant deposits, Ong believes not having a strategic reserve would be “wasteful.”

Opening statements, witness testimonies and a web cast of this hearing can be found on the committee’s web site.