

AN OVERVIEW OF THE SHIFTING LANDSCAPE OF FEDERAL HELIUM REGULATIONS

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FROM FEDERAL RESERVE TO PRIVATE SUPPLY

The U.S. government began commercially extracting helium in the early 20th century. At this time, high enough concentrations of helium were found in natural gas deposits in parts of the country (especially along the Texas panhandle and into Kansas) that it was deemed economically viable to separate the helium from the natural gas stream. In the early years of helium production, the U.S. mostly used helium for its lifting capabilities, as a safer alternative to hydrogen, which is highly flammable. Helium became an important substance in the government's wartime aviation programs.

In 1960, the U.S. government established the *Federal Helium Reserve*, which is a strategic supply of crude helium (approximately 50-85% purity) that the government stores in a natural underground reservoir (the *Bush Dome Reservoir*) near Amarillo, Texas. The Reserve is managed by the Bureau of Land Management (BLM), which assumed jurisdiction over the Federal Helium Program/System in 1996 when the federal government terminated the Bureau of Mines.

The *Federal Helium Pipeline*, also managed by BLM, is connected to the Federal Helium Reserve. The pipeline is 450 miles long, running from the Cliffside Field (of which the Bush Dome Reservoir is a part) near Amarillo, Texas, to Bushton, Kansas. Each day, the pipeline delivers approximately 3 million cubic feet of crude helium to refiners. These refiners are private companies who have contracts with the federal government. As of 2015, there were four companies purchasing crude helium from BLM through the pipeline. Together, these companies have formed the Cliffside Refiners Limited Partnership (CRLP), a partnership of refiners along the pipeline. BLM meets monthly with CRLP to provide updates on helium operations. 50 U.S. Code § 167. Other companies that do not have refining capabilities purchase refined helium at an agreed upon price from refiners along the pipeline. As of 2015, nine companies were doing so.ⁱ

BLM's Division of Helium Resources is headquartered at the Amarillo Field Office in Texas, which is overseen by the BLM New Mexico State Office. The Division includes the Engineering and Technical Support Team, Gas field and Pipeline Operations Team and Helium Enrichment Unit Team, and the Cliffside Gas Plant and the Satanta (Kansas) Maintenance Station.ⁱⁱ

In the 1990s, the federal government began shifting the focus of its helium program. No longer intent on maintaining a critical and strategic supply, the government wanted to recoup the costs it had invested into the Federal Helium Reserve by privatizing it. This has been the focus of the Federal Helium Program ever since. The U.S. plans to completely dispose of its Federal Helium Reserve by 2023.

GLOBAL HELIUM MARKET

The U.S. has played a critical role in the global helium market. It has been the world's largest helium producer, supplying approximately 30% of global helium demand. The U.S. is also the world's largest helium consumer. In the coming years, other countries Qatar, Algeria, Tanzania, South Africa, Russia, and Canada are expected to increase helium production.ⁱⁱⁱ

The global helium supply is concentrated in the hands of very few corporate actors, primarily: Linde (which merged with Praxair in 2018), Air Products, Air Liquide, and Taiyo Nippon Sanso.^{iv} These companies and smaller companies handle secondary distribution of helium to end-users, like individual medical or research facilities.

FEDERAL REGULATION: 1917-2021

1917 – Federal Helium Program

The U.S. Bureau of Mines began sampling gas wells for helium content.^v

1920 – Mineral Leasing Act of 1920

The MLA reserved all helium produced from federal lands to the federal government.

1925 – Helium Act of 1925

This Act authorized the Secretary of Commerce and the War Department to acquire land or interest in land for the purpose of supplying helium to the Navy and Army. It authorized the Bureau of Mines to produce such helium and authorized the Navy and Army to “experiment” with helium gas. Finally, the Act banned the export of helium to other countries unless explicit permission has been received by the Secretary of the Interior. The purpose of this export ban was to conserve helium resources for the United States. *Subsequent amendments in 1927, 1937, 1954. Next major amendment in 1960.*

1960 – Helium Act Amendments of 1960

Authorized private parties to extract helium from non-federal lands and sell it to the federal government for storage at the Bush Dome Reservoir. These Amendments to the Act required the government to take action to conserve helium. In the 1960s and 1970s, the federal government purchased approximately 34 billion cubic feet of crude helium from private producers (crude helium is a gas containing 50-85% helium, which must be further refined).^{vi}

1960 – Establishment of Federal Helium Reserve and Bush Dome Reservoir

As intended in the 1960 Helium Act Amendments and as part of the U.S. Cold War efforts, the government established the Federal Helium Reserve, which was meant to be an uninterrupted supply of helium for defense needs, space programs, and research.^{vii} The Federal Helium Reserve constituted crude helium, which was injected into the Bush Dome Reservoir, a giant natural underground reservoir located near Amarillo, Texas.

1996 – Helium Privatization Act of 1996

Required the Bureau of Land Management to sell off the vast majority of the Federal Helium Reserve by 2015 (all but 600 million cubic feet) to recover the costs that the government initially invested in the helium, plus interest (approximately \$1.3 billion). The Act also required that BLM shut down its helium refineries and create an “in-kind” program so that government agencies and contractors who used to buy helium from BLM now had to buy refined helium from private companies, who would in turn buy the equivalent in crude helium from the Federal Helium Reserve. In studying the impacts of the Helium Privatization Act, the National Research Council found that the Act priced helium below its value, which had the effect of keeping helium prices low and encouraging waste.^{viii}

2005-2007, 2012-2013, and 2018-2020 – Helium Shortages

Industries in the U.S. felt the blow of global helium shortages in 2005-2007, 2012-13, and beginning in 2018, respectively. In the helium community, these are each called “helium shortage 1.0, 2.0, and 3.0” respectively. While there had been helium shortages in the past – for instance, in 1958 when the Macy’s Day Parade organizers had to fill their balloons with air instead of helium^{ix} – these more recent shortages were greater in length and in scope. The 21st century shortages were brought on by a combination of factors: construction delays in helium plants being built around the world; the gradual depletion of the resource; the low price of helium set by the 1996 Helium Privatization Act, which caused instability in private markets in the U.S.; and, as some speculate, the rise of fracking in the U.S., which encouraged drillers to target natural gas from shale, where helium does not tend to be present.^x

2013 – Helium Stewardship Act of 2013

The Helium Stewardship Act of 2013 amended the Helium Privatization Act of 1996 to encourage more competition in the sale of the Federal Helium Reserve by introducing auctions of helium to be held by the Bureau of Land Management, which would generate a better return on helium sales for taxpayers. The overall aim of the Act was to keep the Federal Helium Program revenue positive through the sale of crude helium and to develop a long-term strategy to ensure U.S. research and industry access to helium. The Act set out a strategy to dispose of the Federal Helium Reserve by 2021.^{xi}

2014 – BLM Holds First Live Helium Auction

As per the provisions of the Helium Stewardship Act of 2013, BLM conducted its first live auction of helium from the Federal Helium Reserve in 2014. BLM has held auctions each year since.

2018 – Helium Listed as a “Critical Mineral”

In May 2018, the United States Department of the Interior (DOI) published a list of 35 “critical minerals”. Helium was listed as one of these minerals. The definition of “critical mineral” is based on a Trump Administration Executive Order 13817, “A Federal Strategy to Ensure Secure and Reliable Supply of Critical Minerals”. The Executive Order defines a critical mineral as: “(i) a non-fuel mineral or mineral material essential to the economic and national security of the United States, (ii) the supply chain of which is vulnerable to disruption and (iii) that serves an essential function in the manufacturing of a product, the absence of which would have significant consequences for our national security”.^{xii}

As part of the implementation of Executive Order 13817, federal agencies, including DOI, the Departments of Energy, Agriculture, Commerce, were required to develop strategies to reduce the Nation’s reliance on critical minerals; assess recycling reprocessing alternatives as well as alternatives to critical minerals; support exploration and recovery of critical minerals; and streamline environmental permitting and review processes for critical mineral recovery.

Critics of Executive Order 13817 pointed out that in its streamlining provisions, it threatens to undermine the National Environmental Policy Act. Moreover, as Earthworks argued, the selection of minerals on the list appeared to be arbitrary, with little justification provided as to how specific minerals met the criteria of “criticality”. When it came to helium and other byproducts of common minerals, Earthworks argued that DOI failed to justify their inclusion. For example, helium is a byproduct of natural gas, a fuel product that is decidedly excluded from the critical minerals list. The danger of including byproducts on the list is that any extractive project for a “common mineral” could be deemed “critical” and thus receive less regulatory and public scrutiny, even if what is really sought is only the byproduct of the primary product produced.^{xiii}

2020 – BLM Announces Disposal Process for Federal Helium System

As of September 2020, about 2.25 billion cubic feet of crude helium remained in the Bush Dome Reservoir.^{xiv} In April 2020, BLM announced that it would no longer manage the Federal Helium System (including the Federal Helium Reserve) as of September 30, 2021. This projected timeline would bring the agency into compliance with the Helium Stewardship Act of 2013. Any helium that remains in the Federal Helium Reserve after September 2021 will be transferred to the custody of the U.S. General Services Administration (GSA), which will carry out disposal activities. BLM will continue operations at the Federal Helium System, under management of GSA, until all privately owned helium is produced from the field (approximately 2023). Federal in-kind helium users will have access to the federal supply until September 30, 2022.^{xv}

2020-2021 – COVID-19: Helium Production and Demand

Helium production decreased in the United States and worldwide during the COVID-19 pandemic.^{xvi} Some analysts predict that the medical industry will drive demand for helium globally. Cryogenic (cooling) uses of helium may be in high demand to keep COVID-19 vaccines cool.^{xvii}

ⁱ United States Government Accountability Office, “Bureau of Land Management: More Information Needed to Implement the Helium Stewardship Act of 2013” (Washington, D.C., 2015).

ⁱⁱ Bureau of Land Management, “The Division of Helium Operations,” Helium, 2021, <https://www.blm.gov/programs/energy-and-minerals/helium/division-helium-operations>

ⁱⁱⁱ Steven Anderson, “Economics, Helium, and the U.S. Federal Helium Reserve: Summary and Outlook,” *Natural Resources Research* 27, no. 4 (2018), <https://doi.org/DOI: 10.1007/s11053-017-9359-y>

^{iv} National Research Council, “Selling the Nation’s Helium Reserve” (Washington, D.C.: The National Academies Press, 2010); Anderson, “Economics, Helium, and the U.S. Federal Helium Reserve: Summary and Outlook”

^v Bureau of Land Management, “The Helium Stewardship Act and Changes to the Federal Helium Program,” https://science.osti.gov/-/media/Isotope-Research-Development-and-Production/pdf/workshops/2014/presentations/Hamak_HSA_Changes_to_FHP_Slide_Ver.pdf?

^{vi} United States Government Accountability Office, “Bureau of Land Management: More Information Needed to Implement the Helium Stewardship Act of 2013.”

^{vii} National Research Council, “Selling the Nation’s Helium Reserve” (2010).

^{viii} Adrian Cho, “New U.S. Rules on Helium Sales Said to Stifle Competition,” *Science*, July 8, 2015, <https://www.sciencemag.org/news/2015/07/new-us-rules-helium-sales-said-stifle-competition>; Manny Fernandez, “A Helium Shortage Leads to Fewer Balloons in the Sky,” *The New York Times*, December 19, 2012, <https://www.nytimes.com/2012/12/20/us/a-helium-shortage-leads-to-fewer-balloons-in-the-sky.html>

^x Craig Bettenhausen, "Podcast: How Helium Shortages Have Changed Science," *Chemical & Engineering News*, October 21, 2020, <https://cen.acs.org/business/specialty-chemicals/Podcast-helium-shortages-changed-science/98/web/2020/10> National Research Council, "Selling the Nation's Helium Reserve"

^{xii} E.O. 13817 of Dec 20, 2017, retrieved from: <https://www.federalregister.gov/documents/2017/12/26/2017-27899/a-federal-strategy-to-ensure-secure-and-reliable-supplies-of-critical-minerals>

^{xiii} Earthworks et al, "Joint Comments Submitted to the Interior Department on Draft List of Critical Minerals," 2018, <https://www.earthworks.org/cms/assets/uploads/2018/05/Critical-Minerals-Draft-List-Joint-Comments-20180319.pdf>; Steven Fortier et al., "Draft Critical Mineral List—Summary of Methodology and Background Information—U.S. Geological Survey Technical Input Document in Response to Secretarial Order No. 3359" (United States Geological Survey, 2018).

^{xiv} United States Geological Survey, "Helium," Mineral Commodity Summaries, 2021, <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-helium.pdf>

^{xv} Bureau of Land Management, "News Release: BLM Announces Disposal Process for Federal Helium System," April 16, 2020, <https://www.blm.gov/sites/blm.gov/files/BLM%20NM%20Helium%20Press%20Release%20April%2016%202020.pdf>

^{xvi} United States Geological Survey, "Helium". 2021.

^{xvii} The Business Research Company, "Helium Global Market Report 2020-30: COVID 19 Impact And Recovery, A Helium Market Overview By The Business Research Company" (London, January 20, 2021), <https://www.globenewswire.com/news-release/2021/01/20/2161616/0/en/Helium-Global-Market-Report-2020-30-COVID-19-Impact-And-Recovery-A-Helium-Market-Overview-By-The-Business-Research-Company.html>; Loni Prinsloo, "Renergen Patents Helium-Cooled Cases for Coronavirus Vaccines," *Bloomberg*, December 9, 2020, <https://www.bloomberg.com/news/articles/2020-12-10/renergen-patents-helium-cooled-cases-for-coronavirus-vaccines>.