

GAO

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HELIUM PROGRAM

Key Developments Since the Early 1990s and Future Considerations

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GAO

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Highlights of [GAO-10-700T](#), a testimony before the Subcommittee on Energy and Mineral Resources, Committee on Natural Resources, House of Representatives

Why GAO Did This Study

The federal government has been extensively involved in the production, storage, and use of helium since the early part of the 20th Century. The federal helium program is currently managed by the Department of the Interior's Bureau of Land Management (BLM). During the 1960s and early 1970s, Interior purchased about 34 billion cubic feet of crude helium for conservation purposes and to meet federal helium needs, such as for the space program and scientific research. Crude helium is a gas of 50 to 85 percent helium. While some of the helium was used to meet federal needs, most of it was retained in storage. The funds used to purchase the helium became a debt owed by the program. GAO reported on the management of the helium program in the 1990s (GAO/RCED-92-44 and GAO/RCED-93-1).

Since GAO's reviews of the program in the 1990s, key changes have affected the federal helium program and a recent report by the National Academy of Sciences concluded that it is time to reassess the program. This testimony discusses (1) GAO's findings and recommendations in the early 1990s, (2) key changes that have occurred since the early 1990s, and (3) some of the issues facing the helium program in the near future.

To address these issues, GAO reviewed prior reports, applicable laws and regulations, National Academy of Sciences' reports, and BLM data. GAO is not making any new recommendations.

View [GAO-10-700T](#) or key components. For more information, contact Anu K. Mittal at (202) 512-3841 or mittala@gao.gov.

HELIUM PROGRAM

Key Developments Since the Early 1990s and Future Considerations

What GAO Found

In 1991 and 1992, GAO reported on various aspects of the federal helium program including the helium debt, pricing, purity, and alternatives for meeting federal helium needs, and made recommendations to the Congress. For example, in 1992 GAO recommended that the Congress cancel the helium program's debt. As of September 1991, the debt had grown to about \$1.3 billion, over \$1 billion of which was interest that had accrued on the original debt principal of about \$290 million. The debt was also a factor in setting the price of federal helium because the Helium Act Amendments of 1960 stipulated that the price of federal helium cover all program costs, including interest on the debt. In addition, in 1991, GAO recommended that Interior take action to preserve the purity of the helium in storage. GAO found that the unrestricted extraction of helium from the reserve was causing the purity of the crude helium to degrade faster than would otherwise occur, which in turn had increased the program's operating costs. In 1992, GAO also recommended that the Congress reassess the conservation objectives of the helium program and consider other alternatives to meet federal helium needs.

Since GAO's reports in the early 1990s, two key developments—the Helium Privatization Act of 1996 and the construction of the Cliffside Helium Enrichment Unit in 2003—have caused considerable changes to the helium program and addressed or altered GAO's prior concerns. Specifically, the 1996 act froze the program's debt and as a result over half the debt has been paid off and the remainder should be paid off by 2015. The 1996 act also required a specific method for pricing helium. This along with other changes in the supply and demand for helium, has resulted in BLM's price to be at or below the market price. Lastly, in resetting the program's objectives, the act directed Interior to stop refining helium and it established a modified in-kind approach for meeting federal helium needs. Agencies must purchase helium from refiners who then purchase an equivalent amount of crude helium from BLM. The Cliffside Helium Enrichment Unit has addressed concerns about helium purity by enriching the crude helium through extracting excess natural gas.

Changes in the helium market have generated concerns about the future availability of helium for federal and other needs. The 1996 act did not provide a specific direction for the federal helium program past 2015. Some of the uncertainties facing the program include:

- *How should the helium owned by the federal government be used?* BLM's effort to sell off the helium in storage is going slowly and will not be completed by 2015; and some believe that the United States could become a net importer of helium within the next 10 to 15 years.
- *How will the helium program be funded after 2015?* If the helium program's debt is paid off by 2015, the revolving Helium Fund that is used to pay for the program's day-to-day operations will be terminated.
- *At what price should BLM sell its helium?* In the past, the debt has been a factor in the price and the price has been above the market price. After 2015 the debt will be paid off and the current price is at or below market.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to participate in this hearing to discuss the federal helium program currently managed by the Department of the Interior's (Interior) Bureau of Land Management (BLM). As you know, helium is an important nonrenewable natural resource that has a variety of uses. The federal government uses helium for, among other things, the space program, national security applications, and scientific research. For many of its uses, helium has no substitute.

During the 1960s and early 1970s, to fulfill the conservation objective of the Helium Act Amendments of 1960,¹ Interior purchased about 34 billion cubic feet of helium from private crude helium producers.² In the 1990s, we reported to, and testified before this Subcommittee on Interior's management of the helium program.³ In May 1993, we testified that Interior had enough helium in storage to meet federal needs until at least 2070 and that a reassessment of the objectives of the Helium Act was needed.

Since our reports in the early 1990s, key changes have affected the federal helium program and a recent report by the National Academies' National Research Council concluded that it is time once again to reassess the program.⁴ My testimony today will (1) summarize the findings and recommendations from our work in the early 1990s, (2) highlight key changes that have occurred in the areas that we reported on in the early 1990s, and (3) describe some of the issues facing BLM's helium program in the near future.

¹Pub. L. No. 86-777, 74 Stat. 918 (1960), *codified as amended at* 50 U.S.C. §§ 167-167m.

²"Crude helium" is a gas containing approximately 50 to 85 percent helium.

³GAO, *Mineral Resources: Federal Helium Purity Should Be Maintained*, [GAO/RCED-92-44](#) (Washington, D.C.: Nov. 8, 1991); GAO, *Mineral Resources: Meeting Federal Needs for Helium*, [GAO/RCED-93-1](#) (Washington, D.C.: Oct. 30, 1992); GAO, *Mineral Resources: Meeting Federal Needs for Helium*, [GAO/T-RCED-93-44](#) (Washington, D.C.: May 20, 1993); GAO, *Mineral Resources: H.R. 3967 – A Bill to Change How Federal Needs For Refined Helium Are Met*, [GAO/T-RCED-94-183](#) (Washington, D.C.: Apr. 19, 1994); and GAO, *Terminating Federal Helium Refining*, [GAO/RCED-95-252R](#) (Washington, D.C.: Aug. 28, 1995).

⁴National Research Council, *Selling the Nation's Helium Reserve* (Washington, D.C.: National Academies Press, prepublication copy released on Jan. 22, 2010). Last accessed at http://www.nap.edu/catalog.php?record_id=12844 on April 20, 2010.

To address these issues, we reviewed our prior reports and testimonies from the early 1990s. To identify key changes that have occurred in the areas that we reported on in the past and some of the issues facing BLM's helium program in the near future, we reviewed applicable laws and regulations, relevant studies, and data on the helium program from BLM and Interior's U.S. Geological Survey. In addition, we interviewed BLM officials associated with the helium program located at BLM's headquarters in Washington, D.C.; BLM's New Mexico State Office in Santa Fe, New Mexico;⁵ and BLM's Amarillo Field Office in Amarillo, Texas. To assess the reliability of data used in this statement, we examined the data to identify obvious errors or inconsistencies, interviewed knowledgeable BLM officials, and, to the extent possible, compared the data with other sources. We determined the data to be sufficiently reliable for the purposes of presenting overall trends. Officials with BLM's helium program concurred with the new information presented in this testimony and provided technical clarifications, which we incorporated as appropriate.

We conducted this performance audit from April 2010 to May 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Helium is an inert element that occurs naturally in gaseous form and has a variety of uses (see table 1).⁶ Helium's many uses arise from its unique physical and chemical characteristics. For example, helium has the lowest melting and boiling point of any element and as the second lightest element, gaseous helium is much lighter than air.

⁵In addition to New Mexico, BLM's New Mexico State Office also has jurisdiction over Kansas, Oklahoma, and Texas. The helium program is administered by BLM's Amarillo Field Office in Amarillo, Texas.

⁶Helium in this statement refers to helium-4, the most abundant naturally occurring helium isotope. Helium-3, which has its own supply and demand issues, is not the focus of this statement. We currently have an ongoing review looking into the implications of shortages in helium-3.

Table 1: Estimated Helium Uses in the United States, 2008

Category of use	Examples of applications	Amount used (million cubic feet)	Percentage
Cryogenics	Magnetic resonance imagining (MRI)	685	32
	Fundamental science		
	Industrial cryogenic processing		
Controlled atmospheres	Optical fiber manufacturing	382	18
	Semi-conductor manufacturing		
Pressure/purge	Space and defense rocket purging and pressurizing	382	18
Welding	Metal welding	285	13
Chromatography/ lifting gas/ heat transfer	Chromatography	270	13
	Weather balloons		
	Military reconnaissance		
	Heat transfer in next-generation nuclear reactors		
Party balloons	Party balloons	94	4
	Leak detection		
Leak detection	Leak detection	94	4
Breathing mixtures	Commercial diving	50	2
Total		2,149	100

Sources: U.S. Geological Survey's 2008 Minerals Yearbook and National Research Council.

Note: Totals may not add because of rounding.

Certain natural gas fields contain a relatively large amount of naturally occurring helium, which can be recovered as a secondary product. The helium is separated from the natural gas and stored in a concentrated form that is referred to as crude helium because it has yet to go through the final refining process.

The federal government has been extensively involved in the production, storage, and use of helium since the early part of the 20th Century. The federal government and private sector cooperatively produced helium before 1925, specifically for military uses. The Helium Act of 1925,⁷ as amended, assigned responsibility for producing helium for federal users to the Department of the Interior's Bureau of Mines.⁸ The act provided that

⁷Pub. L. No. 68-544, 43 Stat. 1110 (1925), *originally codified at* 50 U.S.C. § 161 *et seq.* These sections of the United States Code were completely amended, renumbered, revised, or repealed. The current citation is 50 U.S.C. §§ 167-167m.

⁸The Bureau of Mines was established in 1910 and abolished in 1996. The helium program was transferred to BLM.

funds from helium sales be used to finance the program. From 1937 until 1960, the Bureau of Mines was the sole producer of helium. The 1925 act, as amended, also established a revolving fund known as the helium production fund for the program. Such revolving funds are used to finance a continuing cycle of government-owned business-type operations in which outlays generate receipts that are available for continuing operations. In the federal budget, this fund is referred to as the Helium Fund and it is used to account for the program's revenues and expenses.

The Helium Act Amendments of 1960 stipulated that the price of federal helium cover all of the helium program's costs, including interest on the program's debt. The 1960 act required the Secretary of the Interior to determine a value for net capital and retained earnings and establish this value as debt in the Helium Fund, and to add subsequent program borrowings to that debt. The program's borrowings were authorized by subsequent appropriations acts and recorded as outlays in the federal budget in the years in which they were expended. In addition, the interest was added to the debt in the Helium Fund. However, the interest is simply a paper transaction, not a government outlay. The Bureau of Mines determined that the value of the program's net capital and retained earnings was about \$40 million in 1960. Subsequent borrowings from the U.S. Treasury totaling about \$252 million were used to purchase helium for storage. By September 30, 1991, the debt had grown to about \$1.3 billion, of which more than \$1 billion consisted of interest because the interest accrued faster than the program could repay the debt.

The government's reserve of crude helium is stored in the ground in an area of a natural gas field that has a naturally occurring underground structural dome near Amarillo, Texas. The purity of the stored crude helium diminishes (degrades) over time as it mixes with the natural gas that is present in the storage area. Moreover, when extracted at an excessive rate, the degradation is accelerated because the natural gas surrounding the helium is pulled toward the extraction wells faster than the helium. This causes the helium to mix with the natural gas more rapidly. As a result, larger volumes of the mixture of natural gas and helium must be extracted to obtain the needed helium. In addition to the government's reserve of crude helium, private companies that are connected to BLM's pipeline and pay a storage fee are also able to store and retrieve their own private crude helium reserves from the same storage area.

As directed by the Congress, the National Academies' National Research Council reviewed the helium program and released a report in 2000 that

evaluated changes made in the program, effects of these changes on the program, and several scenarios for managing the federal helium reserve in the future.⁹ Because of subsequent changes in price and availability of helium, in 2008, the National Research Council convened a committee to determine if the current implementation of the helium program was having an adverse effect on U.S. scientific, technical, biomedical, and national security users of helium. The committee reported on these effects in early 2010 and concluded that the current implementation of the program has adversely affected critical users of helium and was not in the best interest of the U.S. taxpayers or the country.

GAO Reported on Helium Debt, Pricing, Purity, and Alternatives for Meeting Federal Helium Needs in the Early 1990s

Our November 1991 and October 1992 reports included findings and recommendations on the helium program's debt, the pricing of crude helium, the purity of helium in storage, and three alternatives for meeting federal needs for helium.¹⁰

In 1992, GAO Recommended that Congress Cancel the Debt in the Helium Fund

In October 1992, we reported that the Helium Fund debt had grown to about \$1.3 billion, as of September 30, 1991.¹¹ Section 6(c) of the Helium Act Amendments of 1960 stipulated that (1) the price of federal helium should cover all of the helium program's costs, including interest on the program's debt; and (2) the debt should be repaid within 25 years, unless the Secretary of the Interior determines that the deadline should be extended by not more than 10 years. With the 10 year extension, the deadline for paying off the debt and accumulated interest was September 13, 1995. In 1992, we estimated that, in order for the Bureau of Mines to repay the debt by the 1995 deadline, it would have to charge federal agencies with major requirements for helium over \$3,000 per thousand

⁹National Research Council, *The Impact of Selling the Federal Helium Reserve* (Washington, D.C.: National Academy Press, 2000).

¹⁰[GAO/RCED-92-44](#) (helium purity); and [GAO/RCED-93-1](#) (helium debt, pricing, and alternatives).

¹¹[GAO/RCED-93-1](#).

cubic feet, compared with the 1992 price of \$55. These agencies, which were required under section 6(a) of the 1960 act to purchase helium from the Bureau of Mines, would have had no choice but to pay a higher price for helium. We concluded that this would have no net effect on the overall federal budget if those agencies received additional appropriations to pay for helium at a higher price because the appropriations would offset the increased revenues to the helium program.

Because conditions affecting the Bureau of Mines' helium program had changed since the Helium Act Amendments of 1960, one of the recommendations in our October 1992 report was that the Congress should consider canceling the debt in the Helium Fund. This is because we concluded at the time that it was no longer realistic to expect the agency to repay the debt by the statutory deadline of 1995, and canceling the debt would not adversely affect the federal budget as the debt consisted of outlays that had already been appropriated and interest that was a paper transaction. We reported that canceling the Helium Fund debt, however, would likely allow the Bureau of Mines to undercut private industry's refined helium prices, thus adversely affecting the private helium-refining industry.

In 1992, GAO Found That the Federal Price for Helium Affected the Private Helium Industry and Identified Alternatives to Foster the Private Helium Industry

The Helium Act Amendments of 1960 also were intended to foster and encourage a private helium industry. In our October 1992 report, we found that the helium price set by the Bureau of Mines had an effect on the growth of the private helium industry.¹² After the 1960 act was passed, the Bureau of Mines' refined helium price for federal users rose from \$15.50 per thousand cubic feet to \$35 in 1961 to cover the anticipated costs of conserving helium, which principally included purchasing helium for storage. This 126-percent increase in the federal refined helium price caused the private industry to believe that it could economically produce and sell refined helium. While private-sector prices fluctuated from a low of \$21 in 1970, they gradually increased to \$37.50 by 1983, which matched the Bureau of Mines' 1982 price. Over this period, the Bureau of Mines' price for helium continued to be higher than or equal to the private-sector price, and from 1983 to 1991 it appeared to act as a ceiling for private-sector prices. In 1991, the federal price increased to \$55, and private-sector prices gradually increased to about \$45. These price trends led us to conclude in 1992 that once a private helium refining industry had

¹²[GAO/RCED-93-1](#).

developed, it was able to successfully compete with the Bureau of Mines' program.

However, in our October 1992 report, we also noted that if the Congress decided to cancel the Helium Fund debt then this would affect how the Bureau of Mines sets its helium prices and would likely allow it to undercut private-sector prices. Therefore, we noted that if the Congress decided that fostering the private helium industry was still an objective of the Helium Program then additional actions would be needed. One alternative we identified was to require the Bureau of Mines to price its helium comparably to private-sector prices by ascertaining private-sector prices and using a comparable price or by setting a price that covered the Bureau of Mines' capital costs, operating expenses, estimated costs of a normal level of inventory, and an industry-like rate of return on its investment. A second alternative was to eliminate competition by requiring that all federal needs be met by the Bureau of Mines but prohibiting the federal helium program from selling helium to nonfederal customers.

In 1991, GAO Made a Recommendation on the Purity of the Helium in Storage

In our November 1991 report on helium purity, we found that the Bureau of Mines was not restricting the rate at which helium was being extracted from the helium reserve, causing the purity of the crude helium to degrade faster than would otherwise occur.¹³ We noted that because of this accelerated degradation, the Bureau of Mines was incurring additional costs to extract and refine federal helium.¹⁴ While some mixing with natural gas is inevitable, according to a study by the Bureau of Mines in 1989, the mixing should be minimized so that the crude helium's purity can be maintained at as high a level as possible in order to avoid higher future costs of extracting and refining federal helium. In our 1991 report, we reported that, according to Bureau of Mines' engineers, the accelerated degradation could be avoided by restricting total extractions to 3 million cubic feet of helium per day. At the Bureau of Mines' request, an outside petroleum engineering consulting firm reviewed the Bureau of Mines' engineering, geologic, and other studies and agreed that an extraction rate restriction of 3 million cubic feet per day was needed to protect the purity of the stored crude helium.

¹³ [GAO/RCED-92-44](#).

¹⁴ Refined helium has a varying purity of 99.99 percent to 99.9999 percent helium.

In 1989, the Bureau of Mines decided to restrict total daily extractions to 3 million cubic feet but later rescinded that restriction after an industry association expressed concern to the Director of the Bureau of Mines that the restriction might adversely affect private companies' ability to obtain crude helium to meet their needs. At the time of our 1991 review, the Director told us that he had not reviewed the Bureau of Mines' study when making the decision to rescind the restriction and Bureau of Mines' engineers estimated that if the helium continued to be degraded at the rate it was being degraded at that time, the Bureau of Mines would incur additional costs of as much as \$23.3 million in 1991 dollars to extract and refine federal helium from the helium reserve through the year 2050.

In 1991, we recommended that the Bureau of Mines determine if setting an acceptable extraction rate was warranted and, if so, to specify that rate. In addition, we noted that if an extraction rate was specified, the Bureau of Mines should either restrict private company extractions or impose a charge on private companies that store helium in the helium reserve when their extractions exceed the established acceptable rate.

**In 1992, GAO
Recommended That
Congress Reassess
the Objectives of the
Helium Program**

In our October 1992 report, we evaluated three alternatives for meeting federal needs for helium: (1) continue the Bureau of Mines' existing program, (2) require that all federal needs be supplied by private industry, and (3) allow all federal agencies to choose to purchase helium from the Bureau of Mines or private industry.¹⁵ These three alternatives had the potential to affect the objectives of the Helium Act Amendments of 1960, the program's debt, the federal budget, and the total cost of supplying helium to the U.S. economy differently. For example, in 1992, we reported that the growth of a private industry capable of meeting federal needs created a competitive market where the federal helium prices directly affected the private industry. In this environment, if the Bureau of Mines priced helium to repay the Helium Fund debt by 1995, it would need to charge an extremely high price, which would likely drive the Bureau of Mines out of the helium business. On the other hand, if the debt had been repaid or cancelled, the federal price likely would be lower than private prices, which could have an adverse effect on the private helium refining industry. We concluded that the choice among these and other possible alternatives was ultimately a public policy decision that should consider many issues. We recommended that the Congress reassess the act's

¹⁵ [GAO/RCED-93-1](#).

objectives in order to decide how to meet current and foreseeable federal needs for helium.

Two Key Developments Have Affected the Issues That GAO Reported on in the Early 1990s

Since our reports in the early 1990s, two key developments—the Helium Privatization Act of 1996 and the construction of the Cliffside Helium Enrichment Unit in 2003—have caused considerable changes to the federal helium program. These two developments addressed or altered the areas that we had raised concerns about in the early 1990s. Specifically, the Helium Privatization Act of 1996 affected helium debt and pricing, and it reset the program’s objectives. The Cliffside Helium Enrichment Unit addressed the issue of helium purity in storage.

The Helium Privatization Act of 1996 Affected the Helium Debt, Pricing, and the Program’s Objectives

After our reports in the early 1990s, the Congress passed the Helium Privatization Act of 1996, which significantly changed the objectives and functions of Interior’s helium program.¹⁶ For example, the 1996 act made the following key changes:

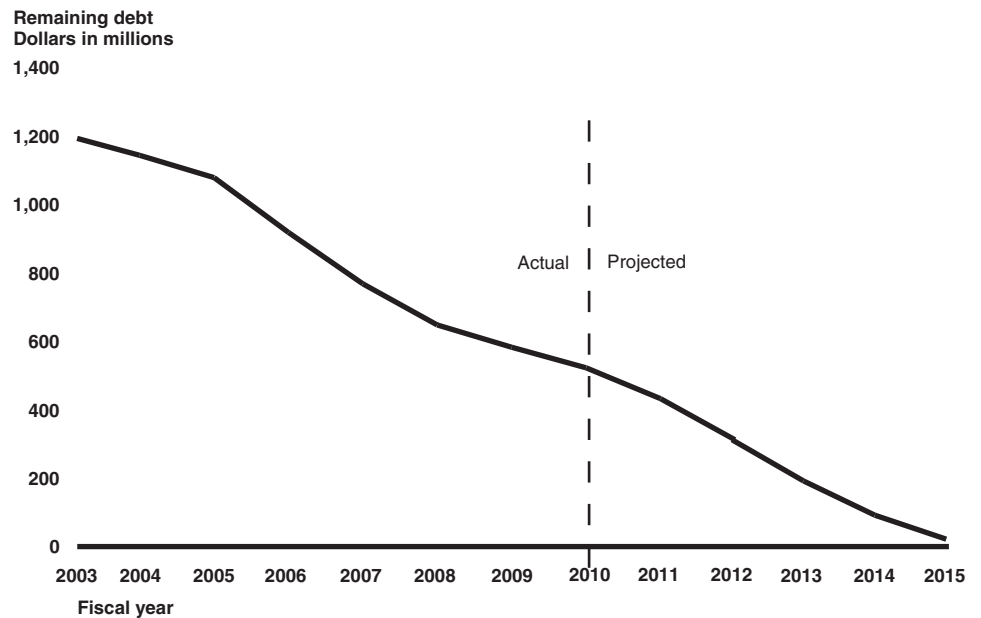
- Interior was required to close all government-owned refined helium production facilities and to terminate the marketing of refined helium within 18 months of enactment (50 U.S.C. § 167b(b));
- the helium program’s debt was frozen as of October 1, 1995 (50 U.S.C. § 167d(c));
- Interior was required to offer for sale all but 600 million cubic feet of the crude helium in storage on a straight-line basis—a depreciation method that spreads out the cost of an asset equally over its lifetime—by January 1, 2015 (50 U.S.C. § 167f(a)(1));
- Interior was required to set sale prices to cover the crude helium reserve’s operating costs and to produce an amount sufficient to reimburse the federal government for the amounts it had expended to purchase the stored helium. The price at which Interior sells crude helium was required to be equal to or greater than a formula that incorporates the amount of debt to be repaid divided by the volume of crude helium remaining in storage, with a Consumer Price Index adjustment (50 U.S.C. §§ 167d(c), 167f(a)(3)). Furthermore, when the debt is fully paid off, the revolving Helium Fund shall be terminated (50 U.S.C. § 167d(e)(2)(B));
- Interior should maintain its role in the helium storage business (50 U.S.C. § 167b(a)); and

¹⁶Pub. L. No. 104-273, 110 Stat. 3315 (1996), *codified at* 50 U.S.C. §§ 167-167m.

- established a modified “in-kind” program to meet federal needs for helium. Rather than purchasing refined helium directly from Interior, federal agencies were required to purchase their major helium requirements from persons who have entered into enforceable contracts to purchase an equivalent amount of crude helium from Interior (50 U.S.C. § 167d(a)).¹⁷

These changes affected the federal helium program in various ways. For example, because the 1996 act effectively froze the debt at \$1.37 billion and interest no longer accrued, BLM has been able to pay off a large portion of its debt. As of the end of fiscal year 2010, BLM expects to have paid off 64 percent of the debt; it expects to pay off the entire debt around 2015 (see fig. 1).

Figure 1: Actual and Projected Balance of the Helium Debt, Fiscal Years 2003 through 2015



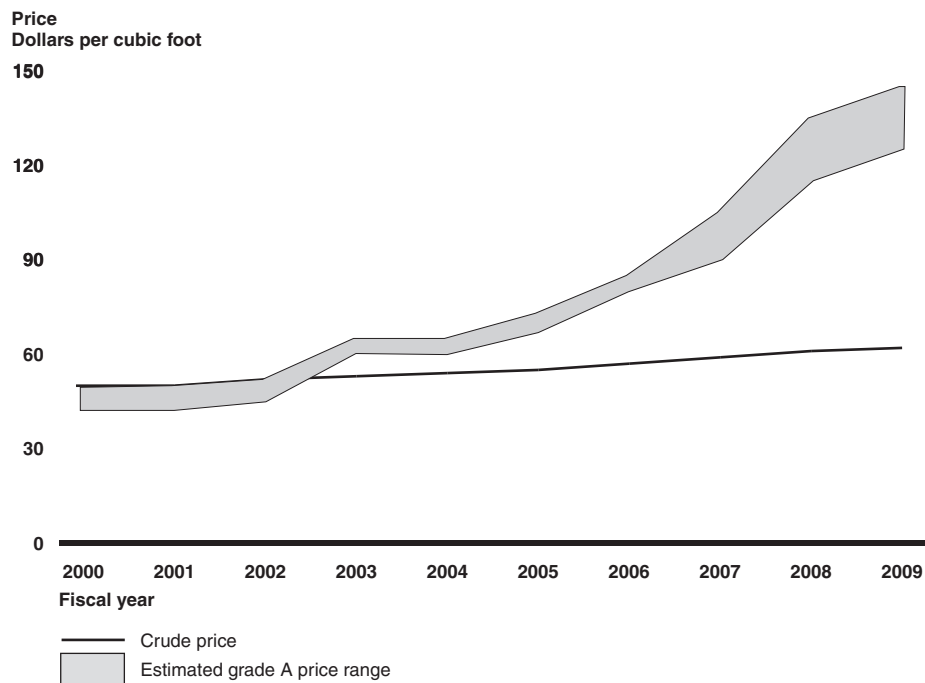
Source: BLM.

In addition, since the 1996 act required a specific method for pricing crude helium, the initial minimum BLM selling price for crude helium after the

¹⁷The term “person” means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, or state or political subdivision thereof. 50 U.S.C. § 167(2).

act was passed was almost double the price for private crude helium at that time. However, after BLM started to sell its crude helium according to the method specified in the act, the market price for crude and refined helium began to change. According to the National Research Council, the private sector began using the BLM crude price as a benchmark for establishing its price, and, as a result, privately sourced crude helium prices increased and now they meet or exceed BLM's price. Increases in the price of crude helium have also led to increases in the price of refined helium (see fig. 2). Refined helium prices have more than doubled from 2002 through 2008 pursuant to demand trends. One of the factors for recent price increases was a disruption in helium supply from plants closing because of weather-related issues. Prices increased around 2007 due to the decline in production capacity.

Figure 2: BLM Crude Helium Price and Grade A Price Estimates

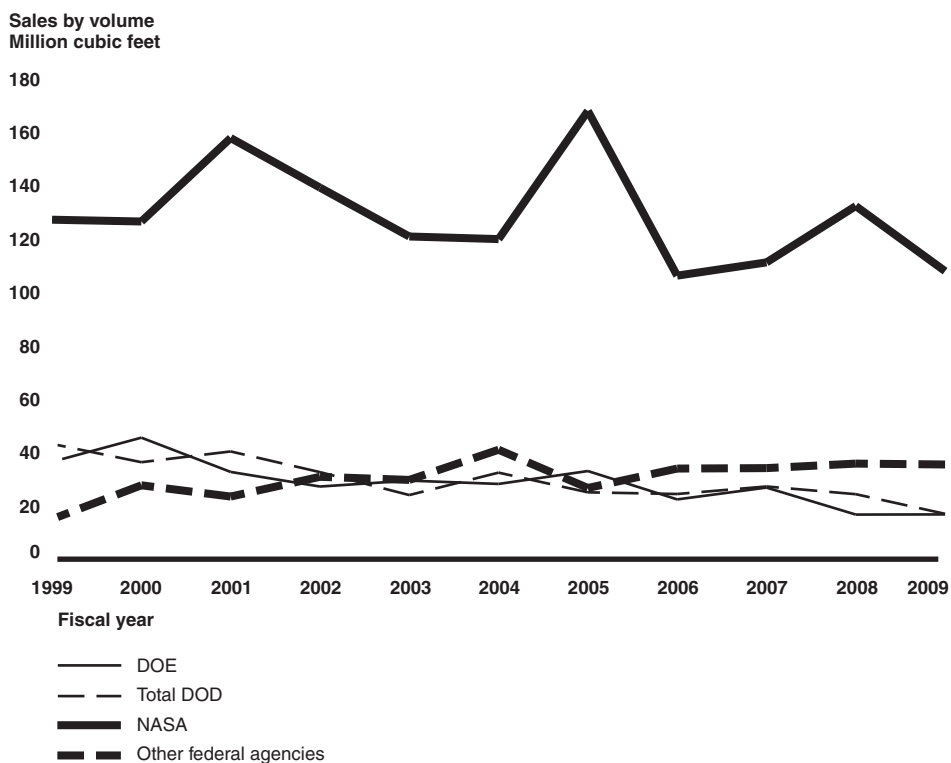


Source: BLM.

As part of the resetting of the helium program's objectives, the 1996 act established a revised approach for meeting federal needs for helium. In 1998, BLM began engaging in in-kind sales to federal agencies. The in-kind regulations established procedures for BLM to sell crude helium to authorized helium supply companies and required federal agency buyers

to purchase helium from these approved suppliers.¹⁸ Since the in-kind program started, the sales to federal agencies have fluctuated, primarily due to the National Aeronautics and Space Administration's (NASA) unique requirement for large volumes of helium on a sporadic basis. Total federal in-kind sales for fiscal year 2009 were 175.67 million cubic feet (see fig. 3).

Figure 3: In-Kind Helium Sales by Federal Agency, Fiscal Years 1999 through 2009



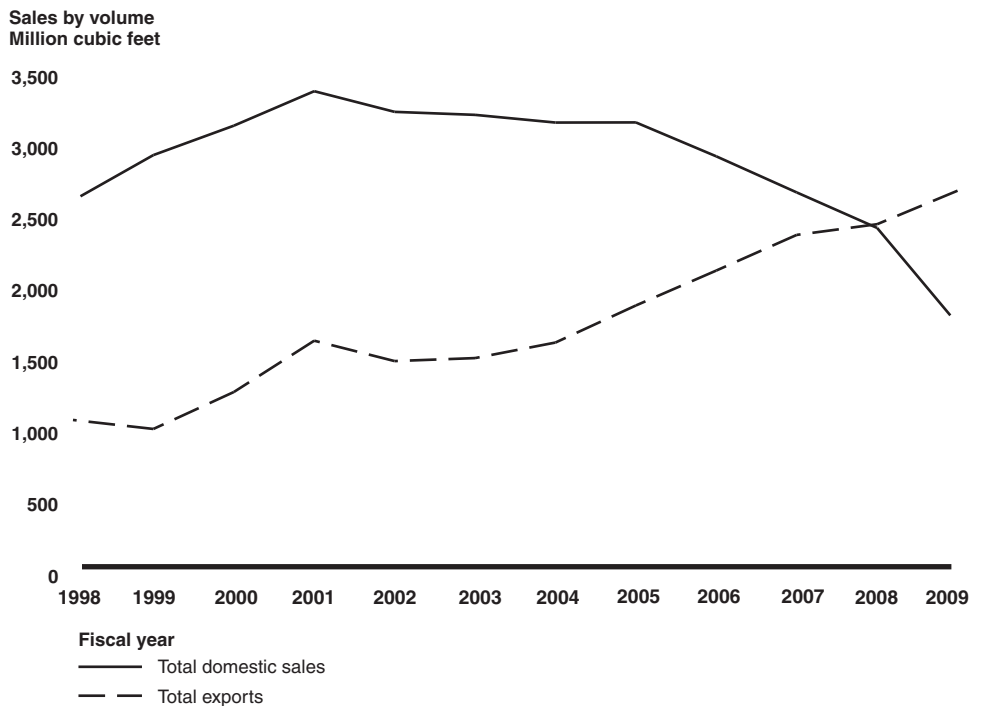
Source: BLM.

Since the act was passed, demand for helium has changed over time (see fig. 4). Total domestic demand has generally decreased since 2001. The vast majority of domestic sales are made to private industries, with federal agencies making up about 10 percent of the sales. On the other hand, total foreign demand has consistently increased, and the amount of helium exported was approximately equal to the amount of helium

¹⁸ 43 C.F.R. § 3195.

removed from storage each year from 2000 to 2007. In 2008, the amount of helium exported exceeded the amount of helium removed from storage.

Figure 4: Domestic Sales Compared to Exports



Sources: BLM and U.S. Census Bureau.

The Cliffside Helium Enrichment Unit Addressed the Helium Purity Issue

The second key development, which has affected the helium purity issue that we reported on in the early 1990s, is the construction and operation of the Cliffside Helium Enrichment Unit. In response to degrading helium supplies, in 2003, Cliffside Refiners Limited Partnership—a consortium of private-sector refiners—designed and constructed an enrichment unit to produce crude helium of sufficient concentration and pressure for further refining. According to BLM officials, the total cost of building the enrichment unit was approximately \$22 million and was paid for by the Cliffside Refiners Limited Partnership. BLM, in partnership with the Cliffside Refiners Limited Partnership, operates the unit. At full capacity, the enrichment unit supplies more than 6 million cubic feet per day or 2.1 billion cubic feet per year of crude helium. The crude helium that is produced from this process is either sold or retained in storage, depending upon demand. As part of the operation, pipeline-quality residual natural gas is also made available for sale. In addition to the proceeds from the

helium sales, BLM uses proceeds from the natural gas sales to fund the Cliffside helium operations and the remaining revenues are returned to the U.S. Treasury.

According to BLM officials, the enrichment unit has allowed BLM to better manage the drawdown and purity of the helium in storage because it is able to control the wells and the helium content of the feed. Without the enrichment unit, BLM would have to produce from high helium wells first to meet purity requirements and that would have a detrimental effect on the purity of later production, according to these officials.

The Helium Program's Direction after 2015 Is Uncertain

Changes in helium prices, production, and demand have generated concerns about the future availability of helium for the federal government and other critical purposes. The Helium Privatization Act of 1996 does not provide a specific direction for the helium program past 2015—less than 5 years away. As a result of these factors, there is uncertainty about the program's direction after 2015. Specifically:

- *How should the helium remaining in storage after 2015 be used?* The Helium Privatization Act of 1996 required BLM to offer for sale substantially all of the helium in storage by January 1, 2015. While the required amounts have been offered for sale, only 68 percent of the amounts offered for sale have actually been sold (see table 2). If the past sales trends continue, BLM will still have significantly more crude helium in storage than the 600 million cubic feet target established in the 1996 act. In addition, the demand for helium has changed over time, with foreign demand outpacing domestic demand. According to the recent report by the National Academies' National Research Council, the United States could become a net importer of helium within the next 10 to 15 years, and the principal new sources of helium will be in the Middle East and Russia. Given these circumstances, the National Academies' report recommended that the Congress may want to reevaluate how the domestic crude helium reserve is used or conserved. It is uncertain at this point how the helium in storage after 2015 will be used.

Table 2: Actual and Projected Crude Helium Sales, 2003 through 2015

Amounts in millions of cubic feet				
Fiscal year	Amount offered for sale	Amount sold	Amount not sold	Percentage sold
Actual sales through March 2010				
2003	1,640	1,640	0	100
2004	2,100	675	1,425	32
2005	2,100	1,390	710	66
2006	2,100	1,565	535	75
2007	2,100	2,030	70	97
2008	2,100	1,638	462	78
2009	2,100	925	1,175	44
2010 (1st half of fiscal year)	1,050	525	525	50
Subtotal	15,290	10,388	4,902	68
Projected sales				
2010 (2nd half of fiscal year)	1,050	480	570	46
2011	2,100	1,600	500	76
2012	2,100	1,430	670	68
2013	2,100	1,230	870	59
2014	2,100	1,230	870	59
2015 (1st quarter of fiscal year)	460	271	189	59
Total	25,200	16,629	8,571	66

Source: BLM.

- *How will the helium program be funded after 2015?* Regardless of whether BLM is directed to continue selling off the crude helium in storage after 2015 or conserve it, there will almost certainly continue to be some form of a helium program after 2015. However, if the helium debt is paid off in 2015 as currently projected and the revolving helium fund is terminated, it is not clear how the operations of the helium program will be paid for. Currently the helium program does not receive any appropriated funds for its operations. The revenues generated by the program go into the Helium Fund and the program has access to those funds to pay for its day-to-day operations. It is uncertain at this point how the helium program's operations will be funded after 2015.
- *At what price should BLM sell its crude helium?* Since the Helium Privatization Act of 1996 was passed, BLM has set the price for federal crude helium at the minimum price required by the act. However, because

federal crude helium reserves provide a major supply of crude helium, we expect BLM's prices will continue to affect private industry market prices for crude and refined helium. In addition, in recent years, the helium market has been influenced by other market forces as well as supply disruptions that have resulted in price increases. For example, in 2006, failure of a major crude helium enrichment unit process vessel led to unscheduled outages and eventually to a major plant shutdown. When BLM first set its price after the 1996 act, its price was estimated to be significantly higher than the market price, but now the reverse is true—BLM's price is estimated to be at or below the market price. On one hand, BLM could consider raising its price to ensure that the federal government is getting a fair market return on the sales of its assets. On the other hand, raising the price could potentially further erode sales. Furthermore, the 1996 act, like the Helium Act Amendments of 1960 before it, tied the price to the program's operating expenses and debt. If the debt is paid off in 2015 as projected, the debt will no longer be a factor in setting helium prices. BLM officials told us that the 1996 act sets a minimum selling price and that the Secretary of the Interior has the discretion to set a higher price. BLM is planning to reevaluate its selling price, according to agency officials. As a result, it is uncertain how BLM will price its crude helium in the future.

In conclusion, Mr. Chairman, there have been a number of changes in the market for helium since the Congress passed the Helium Privatization Act of 1996. As the end point for the actions that were required to be taken under the act come upon us in the next 5 years, the Congress may need to address some unresolved issues such as how to use the remaining helium in storage, how the helium program will operate once the Helium Fund expires in 2015, and how to set the price for the helium owned by the federal government.

Mr. Chairman, this concludes my prepared statement. I would be pleased to answer any questions that you or other Members of the Subcommittee may have at this time.

GAO Contact and Staff Acknowledgments

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