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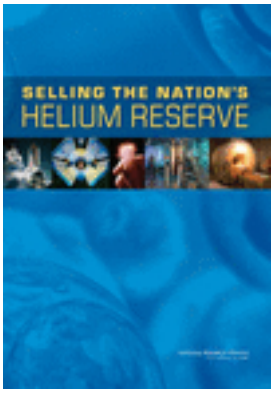

Selling the Nation's Helium Reserve

Committee on Understanding the Impact of Selling the Helium Reserve; National Materials Advisory Board; National Research Council

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Helium has long been the subject of public policy deliberation and management, largely because of its many strategic uses and its unusual source-it is a derived product of natural gas and its market has several anomalous characteristics. Shortly after sources of helium were discovered at the beginning of the last century, the U.S. government recognized helium's potential importance to the nation's interests and placed its production and availability under strict governmental control. In the 1960s, helium's strategic value in cold war efforts was reflected in policies that resulted in the accumulation of a large reserve of helium owned by the federal government. The latest manifestation of public policy is expressed in the Helium Privatization Act of 1996 (1996 12 Act), which directs that substantially all of the helium accumulated as a result of those earlier policies be sold off by 2015 at prices sufficient to repay the federal government for its outlays associated with the helium program. The present volume assesses whether the interests of the United States have been well served by the 1996 Act and, in particular, whether selling off the helium reserve has had any adverse effect on U.S. scientific, technical, biomedical, and national security users of helium.

Executive Summary

Helium has long been the subject of public policy deliberation and management, largely because of its many strategic uses and its unusual source—it is a derived product of natural gas and its market has several anomalous characteristics. Shortly after sources of helium were discovered at the beginning of the last century, the U.S. government recognized helium's potential importance to the nation's interests and placed its production and availability from federally owned mineral interests under strict governmental control. In the 1960s, helium's strategic value in cold war efforts was reflected in policies that resulted in the accumulation of a large reserve of helium owned by the federal government. The latest manifestation of public policy is expressed in the Helium Privatization Act of 1996 (1996 Act), which directs that substantially all of the helium accumulated as a result of those earlier policies be sold off by 2015 at prices sufficient to repay the federal government for its outlays associated with the helium program.[1] The present report assesses whether the interests of the United States have been well served by the 1996 Act and, in particular, whether selling off the helium reserve "has had any adverse effect on U.S. scientific, technical, biomedical, and national security users of helium." [2]

[1]Although the 1996 Act directs that substantially all federally owned helium be sold by 2015, sales efforts to date have fallen short of the act's directive, and significant amounts of helium will remain after the mandated sell-off deadline. This presents its own set of issues, which are briefly discussed at the end of the Executive Summary.

[2]Statement of task—see Appendix A.

In response to its charge, the committee finds that selling off the helium reserve, as required by the 1996 Act, has adversely affected critical users of helium and is not in the best interest of U.S. taxpayers or the country. The committee recommends several ways to address the outstanding issues. Several of its recommendations respond to the very large impact that selling off the reserve has had and is continuing to have on the helium market in general. The amount of federally owned helium being sold is enormous: it is currently equivalent to approximately one-half of U.S. helium needs and almost one-third of global demand. One consequence is that the price of federally owned helium, which is set not by current market conditions but by the terms of the 1996 Act, dominates, if not actually controls, the price for crude helium worldwide. The committee recommends that procedures be put in place that open the price of federally owned helium to the market.

Another of the committee's concerns is that the drawdown schedule required by the 1996 Act, which dictates that the reserve helium be sold on a straight-line basis—the same amount must be sold each year until the reserve is substantially gone—is a wasteful way to draw down a reservoir. Because it is much more costly and more likely to leave significant amounts of helium unrecoverable than alternative drawdown scenarios, the committee recommends that this portion of the 1996 Act be revisited. In addition, given recent developments in the demand for and sources of helium (the principal new sources of helium will be in the Middle East and Russia, and if the sell-down continues, the United States will become a net importer of helium in the next 10 to 15 years), the committee recommends that Congress reconsider whether selling off substantially all federally owned helium is still in the nation's best interest.

The committee also addresses the needs of small-scale government-funded researchers who use helium, a group that has been hit particularly hard by sharp price rises and shortages that have characterized the helium market in recent times. This group was singled out mainly because such research is an important public enterprise and the funding mechanisms available to the researchers, typically grants on 3-year cycles for set amounts, do not allow them to respond to short-term fluctuations. These research programs should have some protection from the instabilities recently characterizing the helium market. Accordingly, the committee recommends that the researchers be allowed to participate in an existing program for government users of helium that would give them priority when there is a helium shortage; it also recommends that funding agencies help such researchers to acquire equipment that would reduce their net helium requirements. Implementing these recommendations would not subsidize such users nor would it require significant additional outlays: Indeed, over time, it would lead to the much more efficient use of the federal funds with which helium is purchased. The remaining conclusions and recommendations consist of steps to help properly manage

the helium reserve and to develop and implement a plan that would protect this important national resource.

Finally, while noting that the question of how critical helium users in the United States will be assured a stable supply of helium in the future is beyond the scope of its charge, the committee points out that several important issues related to this topic remain unanswered. How will the large amounts of federally owned helium that remain after the mandated sell-off deadline in 2015 be managed after that date? Moreover, from a wider perspective, should a strategic helium reserve be maintained? These questions need to be answered in the near future, well before most federally owned helium is sold.

SELLING THE NATION'S HELIUM RESERVE

Committee on Understanding the Impact of Selling the Helium Reserve

Board on Physics and Astronomy

National Materials Advisory Board

Division on Engineering and Physical Sciences

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Preface

In the public's mind, helium is the gas that fills balloons and the Goodyear blimp. Supply shortages or price structures that result in the loss of either helium-filled balloons or the Goodyear blimp would probably stimulate media coverage of the problem and generate some regret, but their loss would not impact national security or the public welfare. Interestingly, it was lighter-than-air use—to supply airships—that motivated the creation of the Federal Helium Reserve back in 1925. This report deals principally with those lesser-known but essential uses of helium that have evolved, along with the technology, to become of critical importance to the nation's research, space, medical, and defense programs. It follows the National Research Council (NRC) report released in 2000[1] that assessed the impacts of the Helium Privatization Act of 1996 by which Congress directed the government to sell essentially all of the helium reserve to compensate it, the government, for its investment in the helium and in the helium's storage infrastructure. Changes in price and availability since that NRC study have caused concerns about the availability of helium to critical users and raised questions about the previous report's conclusion that the sale of the helium reserve would not significantly affect helium availability.

The NRC convened the Committee on Understanding the Impact of Selling the Helium Reserve to determine whether selling off the U.S. helium reserve in the manner prescribed by law has had any adverse effect on U.S. scientific, techni-

[1]NRC, *The Impact of Selling the Federal Helium Reserve* (Washington, D.C.: National Academy Press, 2000).

cal, biomedical, and national security users of helium. The Board on Physics and Astronomy (BPA) and the National Materials Advisory Board (NMAB) developed the charge for this study in consultation with the study's sponsors at the U.S. Department of the Interior's Bureau of Land Management. The complete charge is reproduced in Appendix A.

The full committee met in person four times (see Appendix C) to address its charge. It formed subgroups to study specific areas in further detail and to develop the text of the final report. At its meetings, the committee heard from members of the communities involved in all the aspects of helium handling, from its extraction from underground reservoirs and its various stages of purification to its delivery and use by the end users. The work of the committee between meetings relied upon conference calls and e-mail correspondence. This final report reflects not only the committee's concerns about how the helium reserve is being managed but also its considered opinion on how it should be managed in the future.

The committee that prepared this report is composed of representatives from the many disparate communities that use helium, experts able to address the intricate economic issues that arise in assessing the helium markets, as well as representatives from industry (see Appendix B for biographical sketches of the committee members). In the course of its deliberations, members of the committee, scientists and non-scientists alike, were struck by the inordinate impact that increases in helium prices and its periodic scarcity are having on the small-scale science community. Unless structural changes are adopted that would allow members of this community to avail themselves of the existing so-called in-kind program, continued price increases and scarcities may result in these programs losing significant research capability, which in turn may have long-term impacts for the nation from the loss of both research results and the future researchers who would otherwise be receiving training. The committee believes that with clear guidance and measured responses, the helium reserve will be able to support the many critical users of helium in the United States for years to come. As it notes changes in conditions not anticipated in the 2000 Report, the committee advocates the establishment of an ongoing mechanism for monitoring the supply situation and the availability of helium to priority users.

As committee co-chairs, we are especially grateful to the committee members for their wisdom, cooperation, and commitment to ensuring the development of a comprehensive report. The capable and energetic support provided by BPA and NMAB staff members Michael Moloney and James Lancaster was essential to completion of the study and this report.

Charles G. Groat, *Co-Chair*
Robert C. Richardson, *Co-Chair*
Committee on Understanding the Impact of Selling the Helium Reserve

Acknowledgment of Reviewers

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

Gordon Baym, University of Illinois at Urbana-Champaign
John Curtis, Colorado School of Mines
Robert Dynes, University of California at San Diego
Donald Gessaman, EOP Group, Inc.
William Halperin, Northwestern University
Charles Howe, University of Colorado
Carl Johnson, Pipeline and Hazardous Materials Safety Administration (retired)
Robert Kephart, Fermilab
Jane Long, Lawrence Livermore National Laboratory
Chris Sims, Princeton University
G.J. Wasserburg, California Institute of Technology

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by Julia Phillips, Sandia National Laboratories. Appointed by the National Research Council, she was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

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