

HELIUM

(Data in million cubic meters of contained helium gas¹ unless otherwise noted)

Domestic Production and Use: The estimated value of Grade-A helium (99.995% or better) extracted domestically during 2006 by private industry was about \$400 million. Nine industry plants (five in Kansas and four in Texas) extracted helium from natural gas and produced only a crude helium product that varied from 50% to 80% helium. Nine industry plants (four in Kansas, and one each in Colorado, Oklahoma, Texas, Utah, and Wyoming) extracted helium from natural gas and produced an intermediate process stream of crude helium (about 70% helium and 30% nitrogen) and continued processing the stream to produce a Grade-A helium product. Six industry plants (four in Kansas, one in Oklahoma, and one in Texas) accepted a crude helium product from other producers and the Bureau of Land Management (BLM) pipeline and purified it to a Grade-A helium product. Estimated 2006 domestic consumption of 79 million cubic meters (2.8 billion cubic feet) was used for cryogenic applications, 28%; for pressurizing and purging, 26%; for welding cover gas, 20%; for controlled atmospheres, 13%; leak detection, 4%; breathing mixtures, 2%; and other, 7%.

| Salient Statistics—United States: | 2002 | 2003 | 2004 | 2005 | 2006^e |
|--|-------------|-------------|-------------|-------------|-------------------------|
| Helium extracted from natural gas ² | 87 | 87 | 86 | 76 | 76 |
| Withdrawn from storage ³ | 40 | 35 | 44 | 57 | 58 |
| Grade-A helium sales | 127 | 122 | 130 | 133 | 134 |
| Imports for consumption | — | — | — | — | — |
| Exports ⁴ | 39.5 | 41.3 | 44.9 | 51.4 | 55.0 |
| Consumption, apparent ⁴ | 87.6 | 80.7 | 85.1 | 81.6 | 79.0 |
| Employment, plant, number ^e | 325 | 325 | 325 | 325 | 325 |
| Net import reliance ⁵ as a percentage of apparent consumption | E | E | E | E | E |

Price: The Government price for crude helium was \$2.037 per cubic meter (\$56.50 per thousand cubic feet) in fiscal year (FY) 2006. The price for the Government-owned helium is mandated by the Helium Privatization Act of 1996 (Public Law 104-273). The estimated price range for private industry's Grade-A gaseous helium was about \$2.88 to \$3.06 per cubic meter (\$80 to \$85 per thousand cubic feet), with some producers posting surcharges to this price.

Recycling: In the United States, helium used in large-volume applications is seldom recycled. Some low-volume or liquid boiloff recovery systems are used. In Western Europe and Japan, helium recycling is practiced when economically feasible.

Import Sources (2002-05): None.

| Tariff: Item | Number | Normal Trade Relations |
|---------------------|---------------|---------------------------------|
| Helium | 2804.29.0010 | <u>12-31-06</u> 3.7% ad val. |

Depletion Allowance: Allowances are applicable to natural gas from which helium is extracted, but no allowance is granted directly to helium.

Government Stockpile: Under the Public Law 104-273, the BLM manages the Federal Helium Program, which includes all operations of the Cliffside helium storage reservoir and the Government's crude helium pipeline system. The BLM no longer supplies Federal agencies with Grade-A helium. Private firms that sell Grade-A helium to Federal agencies are required to purchase a like amount of crude helium (in-kind) from the BLM.

In FY 2006, privately owned companies purchased nearly 5.1 million cubic meters (182 million cubic feet) of in-kind crude helium. In addition to this, the privately owned companies also purchased 60.1 million cubic meters (2,165 million cubic feet) of open market sales helium. During FY 2006, BLM's Amarillo Field Office, Helium Operations (AMFO) accepted about 20.2 million cubic meters (730 million cubic feet) of private helium for storage and redelivered nearly 76.3 million cubic meters (2,751 million cubic feet). As of September 30, 2006, about 17.3 million cubic meters (625 million cubic feet) of privately owned helium remained in storage at Cliffside Field.

| Material | Stockpile Status—9-30-06⁶ | | | | Disposal plan FY 2006 | Disposals FY 2006 |
|-----------------|---|--------------------------------|------------------------------------|------------------------------------|----------------------------------|------------------------------|
| | Uncommitted inventory | Committed inventory | Authorized for disposal | Authorized for disposal | | |
| Helium | 662.3 | 16.6 | 662.3 | 63.8 | 65.2 | |

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Events, Trends, and Issues: During FY 2006, most helium suppliers again announced price increases of 12% to 15%. These adjustments were necessary because of sustained record-high energy and transportation costs, continuing increases in crude helium costs, rising utility and labor costs, and regulatory compliance costs. In addition to price increases, most of the companies will continue cost-recovery efforts through various charges and surcharges. It is anticipated that helium costs will continue to rise along with increasing production costs as U.S. helium reserves continue to be depleted. Even with escalating helium prices, helium demand is expected to continue to grow slowly at about 2.5% to 3.5% per year. Based on helium export totals through July 2006, calendar year 2006 exports are expected to increase by 10% to 12% from 2005 exports. During FY 2006, the AMFO conducted four open market helium sales. Sales totaled 60.1 million cubic meters (2,165 million cubic feet). During FY 2006, the BOC/Linde merger was approved, first by the European Union in June, followed by the Federal Trade Commission in September. Two overseas helium projects at Skikda, Algeria, and Qatar came onstream in late 2005. The Skikda expansion project, designed to increase production capacity by 16.6 million cubic meters (600 million cubic feet) per year came onstream at about one-half of capacity, but operational problems have so far resulted in less output. The Qatar project, a new helium extraction facility with a production capacity of 8.3 million cubic meters (300 million cubic feet), also had operational problems, and output has so far been less than expected.

World Production, Reserves, and Reserve Base:

| | Production | | Reserves ⁸ | Reserve base ⁸ |
|--|------------|-------------------|-----------------------|---------------------------|
| | 2005 | 2006 ^e | | |
| United States (extracted from natural gas) | 76 | 76 | 3,500 | ⁹ 8,300 |
| United States (from Cliffside Field) | 57 | 58 | (¹⁰) | (¹⁰) |
| Algeria | 17 | 22 | 1,850 | 8,400 |
| Canada | NA | NA | NA | 2,000 |
| China | NA | NA | NA | 1,100 |
| Poland | 3 | 3 | 29 | 280 |
| Qatar | 0.2 | 7 | NA | 10,000 |
| Russia | 7 | 7 | 1,680 | 6,700 |
| Other countries | NA | NA | NA | 2,800 |
| World total (rounded) | 160 | 170 | NA | 40,000 |

World Resources: The identified helium resources of the United States were estimated to be about 8.5 billion cubic meters (305 billion cubic feet) as of January 1, 2003. This includes 0.87 billion cubic meters (31.4 billion cubic feet) of helium stored in the Cliffside Field Government Reserve (these resources are included in the reserves and reserve base figures above), 3.7 billion cubic meters (133 billion cubic feet) of helium in helium-rich natural gas (0.30% helium or more) from which helium is currently being extracted, and 3.1 billion cubic meters (112 billion cubic feet) in helium-lean natural gas (less than 0.30% helium). The Hugoton (Kansas, Texas, and Oklahoma), Panhandle West, Panoma, Riley Ridge, and Cliffside Fields are currently depleting gasfields and contain an estimated 3.6 billion cubic meters (130 billion cubic feet) of helium. Future helium supplies will probably come from known helium-rich natural gas with little fuel value and from helium-lean gas resources.

Helium resources of the world exclusive of the United States were estimated to be about 31 billion cubic meters (1.1 trillion cubic feet). The locations and volumes of the major deposits, in billion cubic meters, are Qatar, 10; Algeria, 8; Russia, 7; Canada, 2; and China, 1. As of December 31, 2006, AMFO had analyzed more than 21,700 gas samples from 26 countries and the United States in a program to identify world helium resources.

Substitutes: There is no substitute for helium in cryogenic applications if temperatures below -429° F are required. Argon can be substituted for helium in welding, and hydrogen can be substituted for helium in some lighter-than-air applications in which the flammable nature of hydrogen is not objectionable. Hydrogen is also being investigated as a substitute for helium in deep-sea diving applications below 1,000 feet.

^eEstimated. E Net exporter. NA Not available. — Zero.

¹Measured at 101.325 kilopascals absolute (14.696 psia) and 15° C, 27.737 cubic meters of helium = 1 Mcf of helium at 70° F and 14.7 psia.

²Helium from both Grade-A and crude helium.

³Extracted from natural gas in prior years.

⁴Grade-A helium.

⁵Defined as imports – exports + adjustments for Government and industry stock changes.

⁶[See Appendix B for definitions.](#)

⁷Team Leader, Resources Evaluation, Bureau of Land Management, Amarillo Field Office, Helium Operations, Amarillo, TX.

⁸[See Appendix C for definitions.](#)

⁹All domestic measured and indicated helium resources in the United States.

¹⁰Included in United States (extracted from natural gas) reserves and reserve base.