

## HELIUM

(Data in million cubic meters of contained helium gas,<sup>1</sup> unless otherwise noted)

**Domestic Production and Use:** During 2001, the estimated value of Grade-A helium (99.995% or better) extracted by private industry was about \$225 million. There are 11 private industry plants (6 in Kansas, 4 in Texas, and 1 in Oklahoma) that extract helium from natural gas and produce only a crude helium product that varies from 50% to 80% helium. There are 10 private industry plants (4 in Kansas, 2 in Texas, and 1 each in Colorado, Oklahoma, Utah, and Wyoming) that extract helium from natural gas and produce an intermediate process stream of crude helium (about 70% helium and 30% nitrogen) and continue processing the stream to produce a Grade-A helium product. There are six private industry plants (four in Kansas, one in Texas, and one in Oklahoma) that accept a crude helium product from other producers and the Bureau of Land Management (BLM) pipeline and purify this to a Grade-A helium product. The estimated 2001 domestic consumption of 83 million cubic meters (3.0 billion cubic feet) was used for cryogenic applications, 24%; for pressurizing and purging, 20%; for welding cover gas, 18%; for controlled atmospheres, 16%; leak detection, 6%; breathing mixtures, 3%; and other, 13%.

<b>Salient Statistics—United States:</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001<sup>e</sup></b>
Helium extracted from natural gas <sup>2</sup>	116	114	114	98	100
Withdrawn from storage <sup>3</sup>	(9.3)	(0.7)	3	29	37
Grade-A helium sales	107	114	117	127	137
Imports for consumption	—	—	—	—	—
Exports <sup>4</sup>	29.5	27.8	26.8	37.0	48.1
Consumption, apparent <sup>4</sup>	77.4	84.7	90.3	89.6	83.3
Employment, plant, number <sup>e</sup>	605	530	500	320	325
Net import reliance <sup>5</sup> as a percentage of apparent consumption	E	E	E	E	E

**Price:** The Government price for crude helium was \$1.803 per cubic meter (\$50.00 per thousand cubic feet) in fiscal year (FY) 2001. The price for the Government-owned helium is mandated by Public Law 104-273. Private industry's estimated price range for Grade-A gaseous helium was about \$1.51 to \$1.80 per cubic meter (\$42 to \$50 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 boil-off recovery systems are used. In Western Europe and Japan, helium recycling is practiced when economically feasible.

**Import Sources (1997-2000):** None.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
Helium	2804.29.0010	<u>12/31/01</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 Helium Privatization Act of 1996 (Public Law 104-273), the BLM operates the Federal Helium Program, including a helium storage system. Because the BLM can no longer supply Federal agencies with Grade-A helium, private firms that sell Grade-A helium to the Federal agencies are now required to purchase a like amount of crude helium (in-kind) from the BLM. In FY-2001, privately owned companies purchased nearly 6.52 million cubic meters (235 million cubic feet) of in-kind crude helium. During FY 2001, BLM's Amarillo Field Office, Helium Operations (AMFO) accepted more than 17.4 million cubic meters (627 million cubic feet) of private helium for storage and redelivered nearly 61.9 million cubic meters (2,233 million cubic feet). As of September 30, 2001, 83.2 million cubic meters (3.0 billion cubic feet) of helium was owned by private firms.

### Stockpile Status—9-30-01<sup>6</sup>

<b>Material</b>	<b>Uncommitted inventory</b>	<b>Committed inventory</b>	<b>Authorized for disposal</b>	<b>Disposal plan FY 2001</b>	<b>Disposals FY 2001</b>
Helium	810.7	16.6	810.7	6.52	6.90

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**Events, Trends, and Issues:** During 2001, BOC Gases, Inc., Air Products and Chemicals Inc., and Praxair, Inc., announced helium price increases. The increases were in response to rising costs of purchasing, producing and distributing helium. The higher costs for helium are due to increased worldwide helium demand which has shifted supply to higher cost natural gas used for helium refining and from which helium is extracted. It is anticipated that the trend toward higher costs will continue as the industry experiences helium shortages. The helium shortages will result from continued depletion of U.S. helium reserves and the worldwide increase in demand for helium. It is anticipated that demand for helium will grow at a rate of about 8% per year through the end of 2002. During 2001, helium exports increased significantly due to continued increased European demand for helium. In early 2001, the AMFO initiated work on the drafting of helium regulations to provide guidance for the Federal helium program. Prior to starting the work on the regulations, several public meetings were conducted to obtain feedback from any and all interested parties; drafting of the regulations was underway in late 2001.

### World Production, Reserves, and Reserve Base:

	Production		Reserves <sup>7</sup>	Reserve base <sup>7</sup>
	2000	2001 <sup>e</sup>		
United States	98	100	6,000	8,900
Algeria	14	14	2,000	3,000
Canada	NA	NA	NA	2,000
China	NA	NA	NA	1,100
Poland	1	1	40	280
Former Soviet Union <sup>8</sup>	4	4	1,700	6,700
Other countries	NA	NA	NA	2,800
World total (rounded)	117	119	NA	25,000

**World Resources:** The identified helium resources of the United States were estimated to be about 8.9 billion cubic meters (323 billion cubic feet) as of January 1, 2000. This includes 0.95 billion cubic meters (34.3 billion cubic feet) of helium stored in the Cliffside Field, 4.1 billion cubic meters (147 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 (111 billion cubic feet) in helium-lean natural gas (less than 0.30% helium). The Hugoton (Kansas, Texas, and Oklahoma), Panhandle West, Panoma, and Riley Ridge Fields are currently depleting gasfields and contain an estimated 4.0 billion cubic meters (143 billion cubic feet) of helium. Future supplies will probably come from known helium-rich natural gas with little fuel value and from helium-lean resources.

Helium resources of the world exclusive of the United States were estimated to be about 15 billion cubic meters (540 billion cubic feet). The locations and volumes of the principal deposits, in billion cubic meters, are the former Soviet Union, 7; Algeria, 3; Canada, 2; China, 1; Poland, 0.3. As of December 31, 2001, AMFO had analyzed nearly 21,000 gas samples from 26 countries and the United States in a program to identify world helium resources.

**Substitutes:** There is no substance that can be substituted 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.

<sup>e</sup>Estimated. E Net exporter. NA Not available. — Zero.

<sup>1</sup>Measured 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.

<sup>2</sup>Helium from both Grade-A and crude helium.

<sup>3</sup>Extracted from natural gas in prior years (injected in parentheses).

<sup>4</sup>Grade-A helium.

<sup>5</sup>Defined as imports - exports + adjustments for Government and industry stock changes.

<sup>6</sup>See Appendix B for definitions.

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<sup>8</sup>See Appendix C for definitions.

<sup>9</sup>As constituted before December 1991.