## HELIUM

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

Domestic Production and Use: During 2000, the estimated value of Grade-A helium (99.995% or better) extracted by private industry was about \$215 million. There are 13 private industry plants (5 in Kansas, 4 in Oklahoma, and 4 in Texas) that extract helium from natural gas and produce only a crude helium product that varies from 50% to 80% helium. There are six private industry plants (two in Colorado, and one each in Oklahoma, Texas, Utah, and Wyoming) that extract helium from natural gas and produce an intermediate process stream of crude helium (about 70% helium) and continue processing the stream to produce a Grade-A helium product. There are five private industry plants (four in Kansas and one in Texas) 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 2000 domestic consumption of 95 million cubic meters (3.4 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%.

Salient Statistics—United States:	<u> 1996</u>	<u> 1997</u>	<u>1998</u>	1999	<u>2000</u> e
Helium extracted from natural gas <sup>2</sup>	103	116	112	114	117
Withdrawn from storage <sup>3</sup>	(8.3)	(9.3)	(0.7)	3	8
Grade-A helium sales	95	107	112	117	125
Imports for consumption	_	_	_	_	
Exports <sup>4</sup>	22.8	29.5	27.8	26.8	29.3
Consumption, apparent <sup>4</sup>	67.1	77.4	83.5	93.2	95
Employment, plant, number <sup>e</sup>	631	605	531	500	500
Net import reliance <sup>5</sup> as a percent of					
apparent consumption	E	Е	Е	Е	Е

Price: The Government price for helium contained in crude helium was \$1.785 per cubic meter (\$49.50 per thousand cubic feet) in fiscal year (FY) 2000. 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-\$1.80 per cubic meter (\$42-\$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 (1996-99): None.

Tariff: Item	Number	Normal Trade Relations	
<del></del>		<u>12/31/00</u>	
Helium	2804.29.0010	3.7% ad val.	

<u>Depletion Allowance</u>: 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. During FY 2000, BLM's Amarillo Field Office, Helium Operations (AMFO) accepted more than 25.1 million cubic meters (906 million cubic feet) of private helium for storage and redelivered nearly 46.9 million cubic meters (1,690 million cubic feet). Also in 2000, privately owned companies purchased nearly 6.43 million cubic meters (232 million cubic feet) of in-kind crude helium. As of September 30, 2000, 124 million cubic meters (4.5 billion cubic feet) of helium was owned by private firms, which is the largest amount to date.

## Stockpile Status—9-30-00

	Uncommitted	Committed	<b>Authorized</b>	Disposal plan	Disposals
Material	inventory	inventory	for disposal	FY 2000	FY 2000
Helium	828.4	16.6	828.4	6.43	7.0

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**Events, Trends, and Issues:** During 2000, merger and acquisition activity involving companies such as BOC Gases, Inc., Air Products and Chemicals Inc., and Air Liquide did not materialize. Helium exports increased significantly in 2000 due to cutbacks in Algerian helium production. There were also capacity expansions made at some of the purification plants along the BLM pipeline. The AMFO continued crude helium sales, operation of the pipeline and storage field, and collection of helium royalties and fees.

## World Production, Reserves, and Reserve Base:

	Production		Reserves <sup>7</sup>	Reserve base <sup>7</sup>	
	<u>1999</u>	<u>2000</u> °			
United States	114	117	6,000	811,000	
Algeria	16	16	NA	2,000	
Canada	NA	NA	NA	2,000	
China	NA	NA	NA	1,100	
Poland	1	1	40	280	
Former Soviet Union <sup>9</sup>	4	4	1,700	6,700	
Other countries	<u>NA</u>	<u>NA</u>	<u>NA</u>	2,800	
World total (rounded)	135	140	NA	26,000	

**World Resources:** The identified helium resources of the United States were estimated to be about 11.1 billion cubic meters (400 billion cubic feet) as of January 1, 1999. This includes 0.97 billion cubic meters (35 billion cubic feet) of helium stored in the Cliffside Field, 6.0 billion cubic meters (215 billion cubic feet) of helium in helium-rich natural gas (0.30% helium or more), and 4.1 billion cubic meters (148 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 4.4 billion cubic meters (159 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, 2; Canada, 2; China, 1; Poland, 0.3. As of December 31, 2000, AMFO had analyzed nearly 21,000 gas samples from 26 countries and the United States in a program to identify world helium resources.

<u>Substitutes</u>: There is no substance that can be substituted for helium 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>&</sup>lt;sup>e</sup>Estimated. E Net exporter. NA Not available.

<sup>&</sup>lt;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>&</sup>lt;sup>2</sup>Helium content of both Grade-A and crude helium (consisting of approximately 70% helium and 30% nitrogen).

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

<sup>&</sup>lt;sup>4</sup>Grade-A helium.

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

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<sup>&</sup>lt;sup>7</sup>See Appendix C for definitions.

<sup>&</sup>lt;sup>8</sup>All domestic measured and indicated helium resources in the United States.

<sup>&</sup>lt;sup>9</sup>As constituted before December 1991.