

## HELIUM

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

**Domestic Production and Use:** During 1998, the estimated value of Grade-A (99.995% or better) helium extracted at the Bureau of Land Management's Exell Helium Plant was \$4 million; the estimated value of Grade-A helium extracted by private industry was about \$205 million. The total sales value for domestic consumption and exports was \$209 million. Eleven private industry plants and one Government facility purified helium. Of the privately owned plants, four were in Kansas, three were in Texas, two were in Colorado, and one each was in Utah, Oklahoma, and Wyoming. Crude helium was extracted from natural gas by an additional eleven private industry plants, and this helium was either stored in the Government's crude helium pipeline system or purified by one of the purification plants. Six of these crude helium plants were in Kansas, one was in Oklahoma, and four were in Texas. The major uses of the 1998 estimated domestic consumption of 78.2 million cubic meters (2.8 billion cubic feet) were primarily for cryogenic applications, 24%; for pressurizing and purging, 20%; for welding cover gas, 18%; for controlled atmospheres, 16%; and other uses, 22%.

**Salient Statistics—United States:**

|   | <u>1994</u> | <u>1995</u> | <u>1996</u> | <u>1997</u> | <u>1998<sup>e</sup></u> |
|---|-------------|-------------|-------------|-------------|-------------------------|
| Helium extracted from natural gas <sup>2</sup>                        | 112         | 101         | 103         | 116         | 118                     |
| Withdrawn from storage <sup>3</sup>                                   | (11.5)      | (5.2)       | (8.3)       | (9.3)       | (10)                    |
| Grade-A helium sales  | 100         | 96.1        | 94.7        | 107         | 108                     |
| Imports for consumption   | —           | —           | —           | —           | —                       |
| Exports <sup>4</sup>  | 25.0        | 27.7        | 22.8        | 29.5        | 29.7                    |
| Consumption, apparent <sup>4</sup>                                    | 75.4        | 68.1        | 67.1        | 77.4        | 78.2                    |
| Employment, plant, number <sup>e</sup>                                | 615         | 635         | 631         | 605         | 531                     |
| Net import reliance <sup>5</sup> as a percent of apparent consumption | E           | E           | E           | E           | E                       |

**Price:** The price of Grade-A gaseous helium was \$1.983 per cubic meter (\$55 per thousand cubic feet) f.o.b. Helium Operations facilities through March 1998, after which the facility stopped production. The Federal Government's price for bulk liquid helium was \$2.524 per cubic meter measured as gas (\$70 per thousand cubic feet), with additional charges for container services and rent. Private industry's price for gaseous helium was about \$1.514 per cubic meter (\$42 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 (1994-97):** None.

| <b>Tariff: Item</b> | <b>Number</b> | <b>Normal Trade Relations (NTR)</b> | <b>Non-NTR<sup>6</sup></b> |
|---------------------|---------------|-------------------------------------|----------------------------|
|                     |               | <u>12/31/98</u>                     | <u>12/31/98</u>            |
| Helium              | 2804.29.0010  | 3.7% ad val.                        | 25.0% 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:** The Federal Helium Reserve is an operation run pursuant to Public Law 104-273. During 1998, Helium Operations accepted over 33 million cubic meters (1,202 million cubic feet) of private helium for storage and redelivered over 29 million cubic meters (1,060 million cubic feet) for a net increase in privately owned storage of more than 3.9 million cubic meters (142 million cubic feet). As of September 30, 1998, 132 million cubic meters (4.8 billion cubic feet) was owned by private firms, which is the largest amount to date.

**Stockpile Status—9-30-98<sup>7</sup>**  
(in million cubic meters)

| <b>Material</b> | <b>Uncommitted inventory</b> | <b>Committed inventory</b> | <b>Authorized for disposal</b> | <b>Disposal plan FY 1998</b> | <b>Disposals FY 1998</b> |
|-----------------|------------------------------|----------------------------|--------------------------------|------------------------------|--------------------------|
| Helium          | 832.4                        | 16.6                       | 832.4                          | —                            | 7.4                      |

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**Events, Trends, and Issues:** A Grade-A helium plant in the southeastern Texas Panhandle began production in September, and a Grade-A helium plant in eastern Colorado began production near yearend. Three Grade-A facilities stopped production—one in Texas, the Bureau of Land Management's Helium Operations, and two in Colorado. One crude helium plant in Kansas began production. Helium Operations stopped the production and sale of refined helium in April 1998, as mandated by the Helium Privatization Act of 1996. Other parts of the Helium Program, such as operation of the helium storage system for private companies, operation of the Government's helium conservation system, and collection of helium royalties and fees, will continue.

It is estimated that in 1999 domestic production of helium will be over 110 million cubic meters (3.97 billion cubic feet) and that U.S. apparent consumption will be more than 78 million cubic meters (2.8 billion cubic feet). Exports from the United States are expected to increase slowly because of economic uncertainties in the Asian markets.

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

|                                   | Production |                   | Reserves <sup>9</sup> | Reserve base <sup>9</sup> |
|-----------------------------------|------------|-------------------|-----------------------|---------------------------|
|                                   | 1997       | 1998 <sup>e</sup> |                       |                           |
| United States                     | 116        | 118               | 6,000                 | <sup>10</sup> 11,100      |
| Algeria                           | 16         | 16                | NA                    | 2,100                     |
| Canada                            | NA         | NA                | NA                    | 2,100                     |
| China                             | NA         | NA                | NA                    | 1,100                     |
| Poland                            | 1.4        | 1.4               | 40                    | 280                       |
| Former Soviet Union <sup>11</sup> | 4.2        | 4.2               | 1,700                 | 6,700                     |
| Other countries                   | NA         | NA                | NA                    | 2,800                     |
| World total (rounded)             | 138        | 140               | NA                    | 26,200                    |

**World Resources:** The measured and indicated helium resources of the United States were estimated to be about 11.1 billion cubic meters (399 billion cubic feet) as of January 1, 1998. This includes 1 billion cubic meters (36 billion cubic feet) of helium stored in the Cliffside Field, 6 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 4.5 billion cubic meters (163 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 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, 6.7; Algeria, 2.1; Canada, 2.1; China, 1.1; and Poland, 0.8. As of January 1, 1998, Helium Operations had analyzed nearly 21,000 gas samples from 26 countries and the United States as part of a program to identify world helium resources.

**Substitutes:** 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 flammability 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.

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

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

<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.

<sup>7</sup>See appendix C for definitions.

<sup>8</sup>The author is Chief, Branch of Helium Resources, Bureau of Land Management, Amarillo Field Office (Helium Operations), Amarillo, TX.

<sup>9</sup>See Appendix D for definitions.

<sup>10</sup>All domestic measured and indicated helium resources in the United States.

<sup>11</sup>As constituted before December 1991.