

IODINE

(Data in thousand kilograms, elemental iodine, unless otherwise noted)

Domestic Production and Use: Iodine produced in 1998 from three companies operating in Oklahoma accounted for 100% of the elemental iodine value estimated at \$24 million. The operation at Woodward, OK, continued production of iodine from subterranean brines. A second company operated a miniplant in Kingfisher County, OK, using waste brine associated with oil production and reopened a world-class plant that was closed in 1993 because of low market prices for iodine. A third company continued production at Vici, OK, for domestic use and export to Germany. Of the consumers that participate in the annual survey, 29 plants reported consumption of iodine in 1997. Major consumers were located in the Eastern United States. Prices of crude iodine in drums, published for October, ranged between \$19.00 and \$21.00 per kilogram. Imports of iodine through September averaged \$16.45 per kilogram.

Establishing an accurate end-use pattern for iodine was difficult because intermediate iodine compounds were marketed before reaching their final end uses. The downstream uses of iodine were in animal feed supplements, catalysts, inks and colorants, pharmaceuticals, photographic equipment, sanitary and industrial disinfectants, stabilizers, and other uses.

| Salient Statistics—United States: | 1994 | 1995 | 1996 | 1997 | 1998^e |
|---|-------------|-------------|-------------|-------------|-------------------------|
| Production | 1,630 | 1,220 | 1,270 | 1,320 | 1,340 |
| Imports for consumption, crude content | 4,360 | 3,950 | 4,860 | 6,380 | 6,000 |
| Exports | 1,200 | 1,220 | 2,410 | 2,760 | 2,800 |
| Shipments from Government stockpile excesses | 218 | 133 | — | 204 | 291 |
| Consumption: | | | | | |
| Apparent | 4,780 | 3,540 | 3,700 | 5,140 | 4,800 |
| Reported | 3,690 | 3,680 | 3,920 | 4,500 | NA |
| Price, average c.i.f. value, dollars per kilogram, crude | 7.56 | 8.88 | 12.90 | 12.82 | 16.45 |
| Stocks, producer, yearend | NA | NA | NA | NA | NA |
| Employment, number | 35 | 35 | 40 | 40 | 40 |
| Net import reliance ¹ as a percent of apparent consumption | 66 | 90 | 66 | 74 | 72 |

Recycling: Small amounts of iodine were recycled, but no data are reported.

Import Sources (1994-97): Chile, 52%; Japan, 46%; and other, 2%.

| Tariff: Item | Number | Normal Trade Relations (NTR) | Non-NTR ² |
|----------------------------------|--------------|------------------------------|----------------------|
| | | 12/31/98 | 12/31/98 |
| Iodine, crude | 2801.20.0000 | Free | Free. |
| Iodide, calcium or of copper | 2827.60.1000 | Free | 25% ad val. |
| Iodide, potassium | 2827.60.2000 | 2.8% ad val. | 7.5% ad val. |
| Iodides and iodide oxides, other | 2827.60.5000 | 4.2% ad val. | 25% ad val. |

Depletion Allowance: 5% on brine wells (Domestic and Foreign); 14% on solid minerals (Domestic), 14% (Foreign).

Government Stockpile:

| Material | Stockpile Status—9-30-98 ³ | | | | |
|-----------------|---------------------------------------|---------------------|-------------------------|-----------------------|-------------------|
| | Uncommitted inventory | Committed inventory | Authorized for disposal | Disposal plan FY 1998 | Disposals FY 1998 |
| Stockpile-grade | 1,891 | 87 | 1,891 | 454 | 291 |

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Events, Trends, and Issues: Chile was the largest producer of iodine in the world. Japan was the second largest producer of iodine in the world. Production was primarily from underground brines associated with natural gas production. Six U.S. companies operated 17 plants with a total capacity of 9,000 tons per year. Production capacity of the plants was dependent upon the availability of brines with high iodine concentrations.

In February, the Defense National Stockpile Center (DNSC) of the Department of Defense, announced the award of 204,117 kilograms of crude iodine for a current market value of \$3.9 million. In April, the DNSC revised the Annual Materials Plan for fiscal 1998 from 204,117 kilograms to 453,593 kilograms. An industry meeting was held in June to discuss the impact of the increased amount on the market. In September, DNSC announced the award of 87,090 kilograms of stockpiled iodine to three companies for a current market value of \$1.5 million. DNSC also issued a solicitation for 1,000,000 kilograms of iodine with quarterly sales not to exceed 113,398 kilograms.

World Mine Production, Reserves, and Reserve Base:

| | Mine production | | Reserves⁴ | Reserve base⁴ |
|-----------------------|------------------------|--------------------------------|-----------------------------|---------------------------------|
| | <u>1997</u> | <u>1998^e</u> | | |
| United States | 1,320 | 1,340 | 550,000 | 550,000 |
| Azerbaijan | 300 | 300 | 170,000 | NA |
| Chile | 5,000 | 5,600 | 900,000 | 1,200,000 |
| China | 500 | 500 | 400,000 | 400,000 |
| Indonesia | 80 | 80 | 100,000 | 100,000 |
| Japan | 5,500 | 5,500 | 4,000,000 | 7,000,000 |
| Russia | 150 | 150 | NA | NA |
| Turkmenistan | <u>260</u> | <u>260</u> | <u>170,000</u> | <u>NA</u> |
| World total (rounded) | 13,100 | 13,700 | ⁵ 6,300,000 | NA |

World Resources: In addition to the fields listed in the reserve base, seawater contains 0.05 part per million iodine, or approximately 76 billion pounds. Seaweeds of the Laminaria family are able to extract and accumulate up to 0.45% iodine on a dry basis. Although not as economical as the production of iodine as a byproduct of gas, oil, and nitrate, the seaweed industry represented a major source of iodine prior to 1959 and is a large resource.

Substitutes: Bromine and chlorine could be substituted for most of the biocide, ink, and colorant uses of iodine, although they are usually considered less desirable than iodine. Antibiotics and mercurochrome also substitute for iodine as biocides. Salt crystals and finely divided carbon may be used for cloud seeding. There are no substitutes in some catalytic, nutritional, pharmaceutical, animal feed, and photographic uses.

^eEstimated. NA Not available.

¹Defined as imports - exports + adjustments for Government and industry stock changes.

²See Appendix B.

³See Appendix C for definitions.

⁴See Appendix D for definitions.

⁵Sum excludes countries for which data are not available.