## IODINE

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

<u>Domestic Production and Use</u>: Iodine produced in 2003 from three companies operating in Oklahoma accounted for 100% of the elemental iodine value estimated at \$19.7 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. A third company continued production at Vici, OK, for domestic use and export to Germany. Of the consumers that participate in the annual survey, 16 plants reported consumption of iodine in 2002. Major consumers were located in the Eastern United States. The average value of iodine imports through September was \$11.79 per kilogram. Establishing an accurate end-use pattern for iodine was difficult because intermediate iodine compounds were marketed before reaching their final end uses. Estimated world consumption of iodine was 19,600 metric tons.

Salient Statistics—United States:	<u> 1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	2003 <sup>e</sup>
Production	1,620	1,470	1,290	1,420	1,750
Imports for consumption, crude content	5,430	4,790	5,030	6,200	5,800
Exports	1,130	886	1,460	1430	1,150
Shipments from Government stockpile excesses	221	949	83	25	251
Consumption:					
Apparent	6,140	6,320	3,650	4,780	6,650
Reported	1,860	2,170	1,820	2,320	NA
Price, average c.i.f. value, dollars per kilogram,					
crude	16.15	14.59	13.94	12.71	11.79
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, number	40	30	30	30	30
Net import reliance <sup>1</sup> as a percentage					
of apparent consumption	74	77	74	77	74

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

Import Sources (1999-2002): Chile, 66%; Japan, 30%; Russia, 2%; and other, 2%.

<u>Tariff</u> : Item	Number	Normal Trade Relations 12/31/03
lodine, crude	2801.20.0000	Free.
lodide, calcium or of copper	2827.60.1000	Free.
lodide, potassium	2827.60.2000	2.8% ad val.
lodides and iodide oxides, other	2827.60.5000	4.2% ad val.

**Depletion Allowance:** 14% (Domestic and foreign).

<u>Government Stockpile</u>: In October, the Defense National Stockpile Center announced the fiscal year 2004 Annual Materials Plan would include sales of 454 tons (1,000,000 pounds) of crude iodine.

## Stockpile Status—9-30-03<sup>2</sup>

	Uncommitted	Committed	Authorized	Disposal plan	Disposals
Material	inventory	inventory	for disposal	FY 2003	FY 2003
Stockpile-grade	1,424	117	1,424	454	251

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<u>Events, Trends, and Issues</u>: Chile was the largest producer of iodine in the world. Production was a coproduct from surface mineral deposits used to produce nitrate fertilizer. Two of the largest iodine companies in the world are located in Chile. Japan was the second largest producer, and its production was associated with gas brines.

The United States and Chile signed a free trade agreement on June 6, 2003, that when fully implemented was expected to eliminate bilateral tariffs, to lower trade barriers, to promote economic integration, and to expand opportunities for the peoples of both countries. The agreement would allow iodine derivatives in the future to enter duty free.

The Defense National Stockpile Center issued Amendment No. 001 to Solicitation of Offers for DLA-lodine–004. The amendment solicits offers for the sale of 454 metric tons (1,000,000 pounds) of crude iodine in fiscal year 2004, with quarterly sales of approximately 113,400 kilograms (250,000 pounds).

The Nuclear Regulatory Commission (NRC) amended its emergency planning regulations to require that States consider including the prophylactic use of potassium iodide (KI) as a protective measure for the general public as a supplement to sheltering and evacuation. Subject to available funding, the NRC would provide an initial supply of KI for States that choose to incorporate it for the general public in their emergency plans. Iodine is necessary for the production of the hormone thyroxin, which regulates metabolism in animals. KI prevents radioactive iodine from entering the thyroid gland and causing cancer.

Test results announced by the U.S. Environmental Protection Agency (EPA) revealed that leafy vegetables grown with water irrigated by the Colorado River may be exposing consumers to a larger dose of perchlorate than is considered safe. Perchlorate impairs the thyroid's ability to absorb iodine. Iodine prevents goiters and produces hormones critical to proper fetal and infant brain development. EPA and the State of California were in the process of developing drinking water standards for perchlorate.

World Mine Production, Reserves, and Reserve Base: New information from China resulted in significant decreases in estimated reserves and reserve base for that country.

	Mine production		Reserves <sup>3</sup>	Reserve base <sup>3</sup>	
	<u>2002</u>	2003 <sup>e</sup>			
United States	1,420	1,750	250,000	550,000	
Azerbaijan	300	300	170,000	340,000	
Chile	11,400	11,650	9,000,000	18,000,000	
China	500	500	4,000	120,000	
Indonesia	75	75	100,000	200,000	
Japan	6,500	6,500	4,900,000	7,000,000	
Russia	300	300	120,000	240,000	
Turkmenistan	200	300	170,000	350,000	
Uzbekistan	2	2	NA	NA	
World total (rounded)	20,700	21,400	15,000,000	27,000,000	

<u>World Resources</u>: In addition to the fields listed in the reserve base, seawater contains 0.05 part per million iodine, or approximately 34 million tons. 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, nitrate, and oil, the seaweed industry represented a major source of iodine prior to 1959 and is a large resource.

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

<sup>&</sup>lt;sup>e</sup>Estimated. NA Not available.

<sup>&</sup>lt;sup>1</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>&</sup>lt;sup>2</sup>See Appendix B for definitions.

<sup>&</sup>lt;sup>3</sup>See Appendix C for definitions.