IODINE

(Data in thousand kilograms elemental iodine unless otherwise noted)

Domestic Production and Use: Iodine produced in 2005 from three companies operating in Oklahoma accounted for 100% of the elemental iodine value estimated to be about $19 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. Of the consumers that participate in the annual survey, 20 plants reported consumption of iodine in 2004. Major consumers were located in the Eastern United States. Strong demand increased the price of iodine as demand increased for liquid crystal display screens for computers and televisions. The average value of iodine imports through September was $16.11 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 25,500 metric tons.

Salient Statistics—United States:	2001	2002	2003	2004	2005[e]
Production	1,290	1,420	1,090	1,130	1,240
Imports for consumption, crude content	5,030	6,200	5,800	5,700	6,370
Exports	1,460	1,430	1,600	1,270	979
Shipments from Government stockpile excesses	83	25	361	245	444
Consumption:					
Apparent	4,730	6,520	5,240	5,560	7,080
Reported	3,560	4,540	3,930	4,070	NA
Price, average c.i.f. value, dollars per kilogram, crude	13.94	12.70	11.81	13.38	16.11
Stocks, producer, yearend	NA	NA	NA	NA	NA
Employment, number	30	30	30	30	30
Net import reliance[1] as a percentage of apparent consumption	74	77	81	81	82

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

Import Sources (2001-04): Chile, 66%; Japan, 31%; Netherlands, 1%; and other, 2%.

Tariff: Item	Number	Normal Trade Relations 12-31-05
Iodine, crude	2801.20.0000	Free.
Iodide, calcium or copper	2827.60.1000	Free.
Iodide, potassium	2827.60.2000	2.8% ad val.
Iodides and iodide oxides, other	2827.60.5000	4.2% ad val.

Depletion Allowance: 14% (Domestic and foreign).

Government Stockpile: In October, the Defense National Stockpile Center announced the fiscal year 2006 Annual Materials Plan would include sales of 454 tons (1,000,000 pounds) of crude iodine.

Stockpile Status—9-30-05[2]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2005	Disposals FY 2005
Stockpile-grade	680	—	680	454	444

Prepared by **Phyllis A. Lyday [(703) 648-7713, plyday@usgs.gov, fax: (703) 648-7757]**

IODINE

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

The Defense National Stockpile Center issued a DLA-IODINE-005 Basic Ordering Agreement (BOA) for crude iodine. The BOA solicits offers for the sale of 454 metric tons (1,000,000 pounds) of crude iodine in fiscal year 2006, with quarterly sales of approximately 113,400 kilograms (250,000 pounds). Awards were subject to the certification of the Drug Enforcement Administration. The iodine offered for sale was located at New Haven, IN, and was of Chilean, Japanese, and unknown origin.

Atacama Minerals planned to double iodine production at the Aguas Blancas Mine in northern Chile. The decision followed the company's 50% acquisition of Atacama Minerals Chile, its partner in the project, from ACF Minera, for $11.2 million. The mine currently produces 720 tons per year. The expansion was expected to cost about $10 million and to take between 16 to 18 months.[3]

Sociedad Química y Minera de Chile S.A. (SQM) forecasted that iodine demand will grow at 5% to 6% per year. A $350 million expansion was to be carried out during the next 3 years for iodine, nitrates, and lithium. This will result in an increase of 1,000 tons per year of iodine.[4]

Exposure to perchlorate, which inhibits iodine uptake, has the biologic potential to cause hypothyroidism and, in pregnant women, to severely damage the fetus and the newborn. Concern for perchlorate detected in ground water in many parts of the United States and recent detection in vegetable and dairy food products has resulted in studies of perchlorate that have yielded contradictory results. It was recommended that future studies should consider the genetic makeup of the participants, actual perchlorate exposure levels, and individual iodine uptake and excretion levels.[5]

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[6]	Reserve base[6]
	2004	2005[e]		
United States	1,130	1,240	250,000	550,000
Azerbaijan	300	300	170,000	340,000
Chile	15,600	16,200	9,000,000	18,000,000
China	550	550	4,000	120,000
Indonesia	75	75	100,000	200,000
Japan	6,500	7,200	4,900,000	7,000,000
Russia	300	300	120,000	240,000
Turkmenistan	250	300	170,000	350,000
Uzbekistan	2	2	NA	NA
World total (rounded)	24,700	26,200	15,000,000	27,000,000

World Resources: In addition to 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 remains a large resource.

Substitutes: 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 are also substitutes 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.

[e]Estimated. NA Not available.

[1]Defined as imports – exports + adjustments for Government and industry stock changes.

[2]See Appendix B for definitions.

[3]Mining Engineering, 2005, Atacama Minerals to double iodine production at Aguas Blancas: Mining Engineering, v. 57, no. 8, August, p. 17.

[4]Harris, Paul, 2005, SQM looks to future growth: Industrial Minerals, no. 448, January, p. 52-53.

[5]Scinicariello, Franco, Murray, H.E., Smith, Lester, Wilbur, Sharon, and Fowler, B.A., 2005, Review—2005, Individuals respond to perchlorate differently: Environmental Health Perspectives, v. 113, no. 11, November, 14 p.

[6]See Appendix C for definitions.