SULFUR

(Data in thousand metric tons of sulfur unless otherwise noted)

Domestic Production and Use: In 2004, elemental sulfur and byproduct sulfuric acid were produced at 114 operations in 30 States and the U.S. Virgin Islands. Total shipments were valued at about $300 million. Elemental sulfur production was 9.3 million tons; Louisiana and Texas accounted for about 46% of domestic production. Elemental sulfur was recovered at petroleum refineries, natural-gas-processing plants, and coking plants by 38 companies at 108 plants in 26 States and the U.S. Virgin Islands. Mining of elemental sulfur using the Frasch method ended in 2000. Byproduct sulfuric acid, representing about 7% of production of sulfur in all forms, was recovered at six nonferrous smelters in six States by six companies. Domestic elemental sulfur provided 70% of domestic consumption, and byproduct acid accounted for 6%. The remaining 24% of sulfur consumed was provided by imported sulfur and sulfuric acid. About 90% of sulfur was consumed in the form of sulfuric acid. Agricultural chemicals (primarily fertilizers) composed 60% of reported sulfur demand; petroleum refining, 25%; and metal mining, 3%. Other uses, accounting for 12% of demand, were widespread because a multitude of industrial products required sulfur in one form or another during some stage of their manufacture.

Salient Statistics—United States:	2000	2001	2002	2003	2004[e]
Production:					
Frasch[e]	900	—	—	—	—
Recovered elemental	8,590	8,490	8,500	8,920	9,300
Other forms	1,030	982	772	683	700
Total (may be rounded)	[e]10,500	9,470	9,270	9,600	10,000
Shipments, all forms	10,700	9,450	9,260	9,600	10,000
Imports for consumption:					
Recovered, elemental	2,330	1,730	2,560	2,870	2,800
Sulfuric acid, sulfur content	463	462	346	297	300
Exports:					
Recovered, elemental	762	675	687	742	620
Sulfuric acid, sulfur content	62	69	48	67	55
Consumption, apparent, all forms	12,700	10,900	11,400	12,000	12,400
Price, reported average value, dollars per ton of elemental sulfur, f.o.b., mine and/or plant	24.73	10.01	11.84	28.71	28.00
Stocks, producer, yearend	208	232	181	206	200
Employment, mine and/or plant, number	3,000	2,700	2,700	2,700	2,700
Net import reliance[1] as a percentage of apparent consumption	18	13	19	20	20

Recycling: Between 3 million and 5 million tons of spent sulfuric acid was reclaimed from petroleum refining and chemical processes.

Import Sources (2000-03): Elemental: Canada, 73%; Mexico, 19%; Venezuela, 6%; and other, 2%. Sulfuric acid: Canada, 49%; Mexico, 22%; Germany, 5%; Japan, 3%; and other, 21%. Total sulfur imports: Canada, 70%; Mexico, 19%; Venezuela, 5%; and other, 6%.

Tariff: Item	Number	Normal Trade Relations 12-31-04
Sulfur, crude or unrefined	2503.00.0010	Free.
Sulfur, all kinds, other	2503.00.0090	Free.
Sulfur, sublimed or precipitated	2802.00.0000	Free.
Sulfuric acid	2807.00.0000	Free.

Depletion Allowance: 22% (Domestic and foreign).

Government Stockpile: None.

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SULFUR

Events, Trends, and Issues: Total U.S. sulfur production was slightly higher in 2004 than it was in 2003 because sulfur recovered at natural-gas-processing facilities and oil refineries increased. Production of elemental sulfur from petroleum refineries will continue to grow steadily, supported by new facilities being installed to increase refining capacity and the capability of current operations to handle higher sulfur crude oil. Additional equipment will be installed at many refineries to reduce the sulfur in gasoline and diesel fuel to comply with the environmental regulations that were enacted in 2000 and 2001 and that will go into effect in 2006. Recovered sulfur from domestic natural gas processing is expected to decline as a result of the natural depletion of some large natural gas deposits and projects to reinject acid gas rather than produce recovered elemental sulfur. Byproduct sulfuric acid production decreased significantly since 2000 because four U.S. copper smelters have closed since then. It is unlikely that any of these will reopen. World sulfur production increased slightly because recovered sulfur production increased at natural-gas-processing plants, oil refineries, and nonferrous smelters in many countries.

Domestic phosphate rock consumption was slightly higher in 2004 than in 2003, with a slight increase in demand for sulfur to process the phosphate rock into phosphate fertilizers, although severe weather in late summer negatively affected the sulfur industry around the Gulf of Mexico. Increased worldwide sulfur demand drove prices higher, which encouraged expansion in world trade. Canadian sulfur stocks were remelted to meet increased demand for overseas trade.

World Production, Reserves, and Reserve Base:

	Production—All forms		Reserves and reserve base[2]
	2003	2004[e]	
United States	9,600	10,000	Previously published reserve and
Australia	923	900	reserve base data are outdated and
Canada	9,030	8,500	inadequate for this tabulation because
Chile	1,300	1,300	of changes in the world sulfur industry.
China	6,090	6,100	For this reason, specific country data
Finland	706	710	have been omitted from this report.
France	1,000	1,000	
Germany	2,360	2,400	Reserves of sulfur in crude oil, natural
India	1,020	1,100	gas, and sulfide ores are large.
Iran	1,360	1,400	Because most sulfur production is
Italy	684	700	a result of the processing of fossil fuels,
Japan	3,310	3,500	supplies should be adequate for the
Kazakhstan	1,930	2,500	foreseeable future. Because petroleum
Korea, Republic of	1,300	1,300	and sulfide ores can be processed long
Kuwait	714	720	distances from where they are
Mexico	1,610	1,650	produced, actual sulfur production may
Netherlands	527	550	not be in the country for which the
Poland	1,180	1,100	reserves were attributed. For instance,
Russia	6,600	6,800	sulfur reserves from Saudi Arabia
Saudi Arabia	2,400	2,400	actually may be recovered at oil
Spain	706	700	refineries in the United States.
United Arab Emirates	1,900	1,900	
Other countries	5,550	5,500	
World total (rounded)	61,800	63,000	

World Resources: Resources of elemental sulfur in evaporite and volcanic deposits and sulfur associated with natural gas, petroleum, tar sands, and metal sulfides amount to about 5 billion tons. The sulfur in gypsum and anhydrite is almost limitless, and some 600 billion tons is contained in coal, oil shale, and shale rich in organic matter, but low-cost methods have not been developed to recover sulfur from these sources. The domestic resource is about one-fifth of the world total. Elemental sulfur deposits have become marginal reserves even at deposits that are already developed. Sulfur from petroleum and metal sulfides may be recovered where it is refined, which may be in the country of origin or in an importing nation. The rate of sulfur recovery from refineries is dependent on the environmental regulations where refining is accomplished, most of which are becoming more stringent.

Substitutes: Substitutes for sulfur at present or anticipated price levels are not satisfactory; some acids, in certain applications, may be substituted for sulfuric acid.

[e]Estimated. — Zero.
[1]Defined as imports – exports + adjustments for Government and industry stock changes.
[2]See Appendix C for definitions.