

SODIUM SULFATE

(Data in thousand metric tons unless otherwise noted)

Domestic Production and Use: The domestic natural sodium sulfate industry consisted of two producers operating two plants, one each in California and Texas. Fourteen companies operating 17 plants in 14 States recovered byproduct sodium sulfate from various manufacturing processes or products, including ascorbic acid, battery reclamation, cellulose, rayon, and silica pigments. About one-half of the total output in 2005 was a byproduct of these plants. The total value of natural and synthetic sodium sulfate sold was an estimated \$65 million. Estimates of U.S. sodium sulfate consumption by end use were soap and detergents, 46%; pulp and paper, 13%; textiles, 12%; glass, 11%; carpet fresheners, 7%; and miscellaneous, 11%.

| Salient Statistics—United States: | <u>2001</u> | <u>2002</u> | <u>2003</u> | <u>2004</u> | <u>2005^e</u> |
|---|--------------------|--------------------|--------------------|--------------------|--------------------------------|
| Production, total (natural and synthetic) ¹ | 512 | 500 | 466 | 467 | 480 |
| Imports for consumption | 34 | 51 | 45 | 49 | 45 |
| Exports | 191 | 139 | 154 | 138 | 140 |
| Consumption, apparent (natural and synthetic) | 355 | 412 | 357 | 378 | 385 |
| Price, quoted, sodium sulfate (100% Na ₂ SO ₄), bulk, f.o.b. works, East, dollars per short ton | 114.00 | 114.00 | 114.00 | 134.00 | 134.00 |
| Employment, well and plant, number ^e | 225 | 225 | 225 | 225 | 225 |
| Net import reliance ² as a percentage of apparent consumption | E | E | E | E | E |

Recycling: There was some recycling of sodium sulfate by consumers, particularly in the pulp and paper industry, but no recycling by sodium sulfate producers.

Import Sources (2001-04): Canada, 90%; Mexico, 6%; and other, 4%.

| Tariff: | Item | Number | Normal Trade Relations <u>12-31-05</u> |
|----------------|-------------------|---------------|---|
| | Disodium sulfate: | | |
| | Saltcake (crude) | 2833.11.1000 | Free. |
| | Other: | 2833.11.5000 | 0.4% ad val. |
| | Anhydrous | 2833.11.5010 | 0.4% ad val. |
| | Other | 2833.11.5050 | 0.4% ad val. |

Depletion Allowance: Natural, 14% (Domestic and foreign); synthetic, none.

Government Stockpile: None.

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Events, Trends, and Issues: A major chemical company in China and in Indonesia completed construction of a natural sodium sulfate plant in Xishunhe, Hongze County, in Jiangsu Province. The facility's annual capacity was 200,000 tons of anhydrous sodium sulfate. Combined with an existing facility that is a joint venture between a Chinese and Spanish natural sodium sulfate producer, the total annual production capacity in Hongze County was 800,000 tons, establishing that region as the world's leading sodium sulfate location.

The powdered detergent market is the main use of sodium sulfate in the world. Sodium sulfate is a low-cost, inert, white filler in home laundry detergents. Although powdered home laundry detergents may contain as much as 50% sodium sulfate in their formulation, the market for liquid detergents, which do not contain any sodium sulfate, continued to grow. Asia and Latin America are major markets for sodium sulfate consumption because of the growing demand for packaged powder detergents. Sodium sulfate consumption in the domestic textile industry also has been declining because imports of less expensive textile products.

The outlook for sodium sulfate in 2006 is expected to be comparable with that of 2005, with detergents remaining the leading sodium-sulfate-consuming sector. If the winter of 2005-06 is relatively mild, byproduct recovery of sodium sulfate from automobile batteries may decline because fewer battery failures during mild winter weather reduce recycling. World production and consumption of sodium sulfate have been stagnant but are expected to grow in the next few years, especially in Asia and South America.

World Production, Reserves, and Reserve Base: Although data on mine production for natural sodium sulfate are not available, total world production of natural sodium sulfate is estimated to be about 4 million tons. Total world production of byproduct sodium sulfate is estimated to be between 1.5 million and 2.0 million tons.

| | Reserves³ | Reserve base³ |
|-----------------------|-----------------------------|---------------------------------|
| United States | 860,000 | 1,400,000 |
| Canada | 84,000 | 270,000 |
| Mexico | 170,000 | 230,000 |
| Spain | 180,000 | 270,000 |
| Turkey | 100,000 | NA |
| Other countries | <u>1,900,000</u> | <u>2,400,000</u> |
| World total (rounded) | 3,300,000 | 4,600,000 |

World Resources: Sodium sulfate resources are sufficient to last hundreds of years at the present rate of world consumption. In addition to the countries listed above with reserves, the following countries also contain identified resources of sodium sulfate: Botswana, China, Egypt, Italy, Mongolia, Romania, and South Africa. Commercial production from domestic resources is from deposits in California and Texas. The brine in Searles Lake, CA, contains about 450 million tons of sodium sulfate resource, representing about 35% of the lake's brine. In Utah, about 12% of the dissolved salts in the Great Salt Lake is sodium sulfate, representing about 400 million tons of resource. An irregular, 21-meter-thick mirabilite deposit is associated with clay beds 4.5 to 9.1 meters below the lake bottom near Promontory Point, UT. Several playa lakes in west Texas contain underground sodium-sulfate-bearing brines and crystalline material. Other economic and subeconomic deposits of sodium sulfate are near Rhodes Marsh, NV, Grenora, ND, Okanogan County, WA, and Bull Lake, WY. Sodium sulfate also can be obtained as a byproduct from the production of ascorbic acid, battery recycling, boric acid, cellulose, chromium chemicals, lithium carbonate, rayon, resorcinol, and silica pigments. The quantity and availability of byproduct sodium sulfate are dependent on the production capabilities of the primary industries and the sulfate recovery rates.

Substitutes: In pulp and paper, emulsified sulfur and caustic soda (sodium hydroxide) can replace sodium sulfate. In detergents, a variety of products can substitute for sodium sulfate. In glassmaking, soda ash and calcium sulfate have been substituted for sodium sulfate with less effective results.

⁰Estimated. E Net exporter. NA Not available.

¹Source: U.S. Census Bureau. Synthetic production data are revised in accordance with recent updated Census statistics.

²Defined as imports – exports + adjustments for Government and industry stock changes (if available).

³See Appendix C for definitions.