

## SODA ASH

(Data in thousand metric tons, unless otherwise noted)

**Domestic Production and Use:** Four companies in Wyoming with five plants, one company in California with one plant, and one company with one plant in Colorado comprised the U.S. soda ash (sodium carbonate) industry, which was the largest in the world. The six producers had a combined annual nameplate capacity of 14.5 million tons. Sodium bicarbonate, sodium sulfate, potassium chloride, potassium sulfate, borax, and other minerals were produced as coproducts from sodium carbonate production in California. Sodium bicarbonate, sodium sulfite, sodium tripolyphosphate, and chemical caustic soda were manufactured as coproducts at several of the Wyoming soda ash plants. Sodium bicarbonate was produced as a coproduct at the Colorado operation. The total estimated value of domestic soda ash produced in 2000 was \$680 million.<sup>1</sup>

Based on final 1999 data, the estimated 2000 reported distribution of soda ash by end use was glass, 51%; chemicals, 26%; soap and detergents, 11%; distributors, 5%; flue gas desulfurization, pulp and paper, and water treatment, 2% each; and other, 1%.

<b>Salient Statistics—United States:</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000<sup>e</sup></b>
Production <sup>2</sup>	10,200	10,700	10,100	10,200	10,200
Imports for consumption	107	101	83	92	90
Exports	3,840	4,190	3,660	3,620	3,800
Consumption: Reported	6,390	6,480	6,550	6,430	6,500
Apparent	6,470	6,620	6,560	6,740	6,500
Price: Quoted, yearend, soda ash, dense, bulk, f.o.b. Green River, WY, dollars per short ton	105.00	105.00	105.00	105.00	105.00
F.o.b. Searles Valley, CA, same basis	130.00	130.00	130.00	130.00	130.00
Average sales value (natural source), f.o.b. mine or plant, same basis	82.60	77.25	75.30	69.11	67.00
Stocks, producer, yearend	271	259	273	248	275
Employment, mine and plant, number	2,800	2,800	2,700	2,600	2,400
Net import reliance <sup>3</sup> as a percent of apparent consumption	E	E	E	E	E

**Recycling:** Producers do not recycle soda ash. Glass container producers, however, are using cullet glass, thereby reducing soda ash consumption.

**Import Sources (1996-99):** Canada, 99%; and other, 1%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12/31/00</b>
Disodium carbonate	2836.20.0000	1.2% ad val.

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

**Government Stockpile:** None.

**Events, Trends, and Issues:** On October 9, the newest U.S. soda ash company began operation at its \$250 million facility at Parachute, CO. This is the world's first natural soda ash plant that will use nahcolite (natural sodium bicarbonate) as feedstock instead of trona or sodium-carbonate-bearing brines. Hot water was injected into 26 production wells at the site, which is about 72 kilometers from the processing plant. The enriched solution will be transported through a buried insulated pipeline. The first soda ash product was scheduled for shipment in January 2001. The operation employed approximately 130 people, of which the majority were local residents.

The economic problems in Asia that began in late-1997 and continued into 2000 had basically subsided by midyear. Although U.S. soda ash exports began to rise by mid-2000, China continued to increase its soda ash production and exports to local Asian consumers.

In September, all domestic soda ash producers announced a \$5.00 per short ton price increase effective October 1 or as contracts permit. Because the majority of soda ash is sold on annual calendar-year contracts beginning in January, how much the price increased by yearend 2000 was uncertain.

A fully recyclable plastic beer bottle was introduced nationwide by a major national beer manufacturing company.

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The product had been test marketed since late 1998, and growing consumer and retailer demand for the container led to the decision to expand production lines for the new plastic bottle. Aside from its recyclability with other polyethylene terephthalate plastic containers, the new plastic bottle keeps beer as cold as glass containers and longer than aluminum cans, is one-seventh the weight of comparably sized glass containers, is resealable, and is unbreakable. Its unbreakability makes the plastic beer bottle more acceptable at places where glass bottles are prohibited, such as beaches and stadiums. Many baseball, basketball, football, and hockey stadiums have endorsed the plastic beer containers. The growing consumer acceptance for plastic beer bottles will reduce glass container production and, therefore, soda ash consumption.

World soda ash consumption is forecast to remain favorable into the next millennium because of growing demand for soda ash in developing nations, especially in the Far East and in South America. Exports will continue to be the most important market for increased U.S. soda ash sales. Consolidation within the U.S. soda ash industry will reduce the number of suppliers but should strengthen soda ash sales and prices. Soda ash consumption in glass containers will probably continue to decline as lightweight bottles and plastic containers displace the quantity of new raw materials for glass manufacture.

Notwithstanding the economic problems in certain areas of the world, the overall world demand for soda ash is expected to grow 1.5% to 2% per year in the early part of this century. Domestic demand is expected to be slightly higher in 2001.

### World Production, Reserves, and Reserve Base:

	Production		Reserves <sup>4 5</sup>	Reserve base <sup>4 5</sup>
	1999	2000 <sup>e</sup>		
Natural:				
United States	10,200	10,200	<sup>6</sup> 23,000,000	<sup>6</sup> 39,000,000
Botswana	196	190	400,000	NA
Kenya	240	225	7,000	NA
Mexico	—	—	200,000	450,000
Turkey	—	—	200,000	240,000
Uganda	NA	NA	20,000	NA
Other countries	—	—	<u>260,000</u>	<u>220,000</u>
World total, natural (may be rounded)	10,600	10,600	24,000,000	40,000,000
World total, synthetic (rounded)	22,300	20,400	—	—
World total (rounded)	32,900	31,000	—	—

**World Resources:** Soda ash is obtained from trona and sodium-carbonate-rich brines. The world's largest deposit of trona is in the Green River Basin of Wyoming. About 47 billion tons of identified soda ash resources could be recovered from the 56 billion tons of bedded trona and the 47 billion tons of interbedded or intermixed trona and halite that are in beds that are more than 1.2 meters thick. About 34 billion tons of reserve base soda ash could be obtained from the 36 billion tons of halite-free trona and the 25 billion tons of interbedded or intermixed trona and halite that are in beds that are more than 1.8 meters thick. Underground room-and-pillar mining, using a combination of conventional, continuous, and shortwall mining equipment, is the primary method of mining Wyoming trona ore. The method has an average 45% mining recovery, which is higher than the 30% average mining recovery from solution mining. Improved solution mining techniques, such as horizontal drilling to establish communication between well pairs, could increase this extraction rate and enable companies to develop some of the deeper economic trona. Wyoming trona resources are being depleted at the rate of about 15 million tons per year (8.3 million tons per year of soda ash). Searles Lake and Owens Lake in California contain an estimated 815 million tons of soda ash reserves. At least 62 identified natural sodium carbonate deposits are in the world; some have been quantified. Although soda ash can be manufactured from salt and limestone, both of which are practically inexhaustible, synthetic soda ash is more costly to produce and generates environmentally deleterious wastes.

**Substitutes:** Caustic soda can be substituted for soda ash in certain uses, particularly in the pulp and paper, water treatment, and certain chemical sectors. Soda ash, soda liquors, or trona can be used as feedstock to manufacture chemical caustic soda, which is an alternative to electrolytic caustic soda.

<sup>e</sup>Estimated. E Net exporter. NA Not available.

<sup>1</sup>Does not include values for soda liquors and mine waters.

<sup>2</sup>Natural only.

<sup>3</sup>Defined as imports - exports + adjustments for Government and industry stock changes.

<sup>4</sup>The reported quantities are sodium carbonate only. About 1.8 tons of trona yields 1 ton of sodium carbonate.

<sup>5</sup>See Appendix C for definitions.

<sup>6</sup>From trona, nahcolite, and dawsonite sources.