

2006 Minerals Yearbook

SODA ASH

Soda Ash

By Dennis S. Kostick

Domestic survey data and tables were prepared by Martha L. Jackson, statistical assistant, and the world production table was prepared by Glenn J. Wallace, international data coordinator.

Soda ash production (based on unrounded data), exports, and average annual value each reached a record high in 2006. Tight supplies and a strong export market prompted higher domestic and export prices for soda ash. The total value of U.S. soda ash was \$1.17 billion. To alleviate some of the supply shortages, FMC Wyoming Corp. brought some idled capacity back onstream at midyear.

Soda ash, also known as sodium carbonate (Na_2CO_3), is an alkali chemical refined from the mineral trona or naturally occurring sodium carbonate-bearing brines (both referred to as natural soda ash), the mineral nahcolite (referred to as natural sodium bicarbonate, from which soda ash can be produced), or manufactured from one of several chemical processes (referred to as synthetic soda ash).

Soda ash is an important industrial compound used to manufacture glass, chemicals, soaps and detergents, pulp and paper, and many other familiar consumer products. The United States has the world's largest natural deposit of trona and is the world's second ranked soda-ash-producing nation. U.S. natural soda ash is extremely competitive in world markets because the majority of the world output of soda ash is made synthetically, which is usually a more expensive process.

Legislation and Government Programs

In September, the U.S. Senate passed S. 203 that reduced the Federal royalty on soda ash to 2% from 6% for a 5-year period. Passage of the bill will provide royalty relief to the Wyoming soda ash industry to strengthen its position in the global marketplace. Similar bills had passed in the U.S. House of Representatives three separate times but had failed to pass in the Senate. The U.S. soda ash industry had been struggling to be competitive in the Asian markets since China became a major competitor in that region of the world (Thomas, 2006).

Production

Soda ash production and inventory data were collected by the U.S. Geological Survey (USGS) from monthly, quarterly, and annual voluntary surveys of the U.S. soda ash industry. A survey request was sent to each of the five soda ash companies, all of which responded, representing 100% of the total production data in this report (table 1).

For the fourth consecutive year, the United States was the world's second ranked soda-ash-producing nation. After more than a century of the United States leading in the world's production of soda ash, China overtook the United States in 2003, and it appeared that China would continue to be the world's leader for the foreseeable future. U.S. production of natural soda ash from California and Wyoming in 2006 was 11

million metric tons (Mt), which was virtually identical with that of 2004 and 2005. Based on about 14.5 million metric tons per year (Mt/yr) (16 million short tons per year) of total nameplate production capacity, the U.S. soda ash industry operated at 76% of total capacity. This capacity utilization rate appears to be low because it includes the full nameplate capacity of 900,000 metric tons per year(t/yr) (1 million short tons per year) for Solvay Chemicals, Inc.'s Parachute, CO, plant, which intentionally operated at reduced capacity during the year but was included in the industry total because nameplate capacity is based on the industry total as of December 31 of each year. In addition, the low capacity utilization rate resulted from idle capacity at OCI Chemical Corp. and FMC Corporation plants of 816,000 t/yr (900,000 short tons per year) and 726,000 t/yr (800,000 short tons per year), respectively. Approximately 2.45 Mt/yr of nameplate capacity (2.70 million short tons per year), which represented about 17% of total industry nameplate capacity, was idled in 2006. This available capacity could be brought back online when market conditions improve. Rather than using nameplate capacity, the U.S. soda ash industry uses the term "effective capacity" because it disregards all idled or mothballed capacity. This results in higher capacity utilization percentages. Individual effective capacity data are not publicly disclosed.

The U.S. soda ash industry consisted of five companies in 2006—four companies operating five plants in Wyoming that produced soda ash from underground trona ore and one in California that produced soda ash from sodium-carbonaterich brines. Solvay operated a plant in Wyoming and a plant in Colorado, which was mothballed in September 2004 but continued sodium bicarbonate production using soda ash feedstock from the company's Wyoming soda ash facility. Stating that demand for soda ash has increased, FMC had restarted its Granger, WY, plant in June 2005, which it had acquired from Tg Soda Ash, Inc. in 1999 and had idled in May 2001. The company brought back onstream 276,000 t/yr (250,000 short tons per year) of the 1.18 Mt/yr (1.3 million short tons per year) of total nameplate production capacity available. FMC brought online an additional 276,000 t/yr (250,000 short tons per year) in mid-2006 (Chemical Week, 2006b).

Consumption

The USGS collects soda ash consumption data by end use on a quarterly basis from the marketing and sales departments of each company. Every effort has been made to categorize company sales within the correct end-use sector. Quarterly reports are often revised in subsequent quarters because of customer reclassifications or other factors. All U.S. soda ash companies responded to the quarterly surveys; data represented 100% of the total reported consumption data found in this report.

In 2006, U.S. apparent consumption of soda ash was 6.10 Mt; reported consumption, however, was 6.11 Mt (table 1). Reported consumption and apparent consumption do not necessarily correspond because reported consumption is actual sales, whereas apparent consumption is the calculated quantity available for domestic consumption based on balancing supply (production, imports, and inventory adjustments) with external demand (exports).

In 2006, U.S. apparent consumption and reported consumption were virtually identical. The difference between these types of consumption is usually attributed to a discrepancy in the export data that were used to derive consumption statistics. The two sources for export data were the U.S. Census Bureau, which reports exports upon departure from U.S. ports, and the California and Wyoming soda ash producers, which consider shipments to be exported when their export association, American Natural Soda Ash Corp. (ANSAC), takes consignment of the product at the Wyoming plant sites. Transit times between the plant and port, which can be about 2 to 3 weeks before the cargo is actually exported, and carryover export inventories contribute to the discrepancy between reported and apparent consumption as well.

In the domestic market, large-volume buyers of soda ash were primarily the major glass container manufacturers whose purchases were seasonal (more beverage containers are made in the second and third quarters for summertime beverage consumption). Soda ash sales to the flat glass sector depended more on the state of the economy because the leading uses of flat glass were in automobile manufacture and in residential housing and commercial building construction. These two major industrial sectors were especially sensitive to changing economic conditions, and soda ash sales follow trends in the two sectors. The distribution of soda ash by end use in 2006 was glass, 50%; chemicals, 29%; soap and detergents, 9%; distributors, 4%; miscellaneous uses, 3%; flue gas desulfurization and water treatment, 2% each; and pulp and paper, 1%.

Glass.—Glass manufacture represented about 50% of domestic soda ash consumption: container, 48%; flat, 37%; fiber, 9%, and specialty, 5%. Glass containers are made for beverages (beer, carbonated, and noncarbonated drinks), chemical and household products, food, liquor, medical products, and toiletries and cosmetics. In 2006, about 35 billion glass containers were manufactured, of which 80% were for beverages (about 60% were beer bottles) and the remainder mostly were for food containers. Nearly 2.50 Mt, or 25%, of glass containers were recycled (Waste Age, 2007).

Chemicals.—Soda ash is used to manufacture many sodiumbase inorganic chemicals, including sodium bicarbonate, sodium chromates, sodium phosphates, and sodium silicates.

Soaps and Detergents.—Detergents were the third ranked use of soda ash. Soda ash was used as a builder to emulsify oil stains, to reduce the redeposition of dirt during washing and rinsing, to provide alkalinity for cleaning, and to soften laundry water. In addition, soda ash was a component of sodium tripolyphosphate (STPP), another major builder in detergent formulations. Soda ash consumption has been decreasing because phosphatic detergents can contribute to eutrophication, which is an environmental concern. Many regions of the Nation have adopted phosphate limitations or bans, affecting about 40% of the U.S. population. A strong U.S. economy boosted demand for industrial and institutional cleaners and automatic dishwashing detergents in the past several years. New technology incorporating enzymes in dishwashing detergents and a move toward liquid cleansers, however, may adversely affect STPP consumption in the future.

In response to the environmental concern that cardboard detergent packaging contributes to the volume of landfill waste, detergent manufacturers changed formulations to make compact and superconcentrated products. These reformulations required sodium silicates and synthetic zeolites, which are made from soda ash. Liquid detergents, which do not contain any soda ash, competed with powdered detergents and commanded about 50% of the household laundry detergent market in 2006.

Stocks

Yearend 2006 stocks of dense soda ash in domestic plant silos, warehouses, terminals, and on teamtracks amounted to 290,000 metric tons (t). Producers indicated that a potential supply problem could exist if inventories fell below 180,000 t. Most consumers of soda ash did not have the storage facilities to accommodate large quantities of soda ash and had to rely on suppliers to provide the material on a timely basis.

Prices

The average annual value for soda ash in 2006 was a record high, eclipsing the previous record set in 1981 that was \$100.52 per metric ton (\$91.19 per short ton). The average annual value for bulk, dense natural soda ash, free on board (f.o.b.) Green River, WY, and Searles Valley, CA, was \$106.53 per metric ton (\$96.64 per short ton), which was 21% more than that of 2005. The value is not a "price," but rather the value of the combined revenue of California and Wyoming bulk, dense soda ash sold on an f.o.b. plant basis at list, spot, or discount prices, on longterm contracts, and for export, divided by the quantity of soda ash sold. Only merchant soda ash is used to derive the annual value; therefore, no soda ash for value-added products or soda liquors is included. The list prices quoted in trade journals or by producers differed from the annual average values reported to and by the USGS.

High energy and transportation costs caused soda ash prices to soar during 2005 and continued through 2006. To help offset the escalating energy and transportation costs, the domestic soda ash industry was forced to consider raising prices in 2006. On May 18, FMC announced a \$15 per short ton off-list and list price increase effective July 1 or as contracts permit (FMC Corporation, 2006a). The list price, which had been \$155 per short ton for bulk, dense soda ash, f.o.b. Green River, WY, increased to \$170 per short ton. General Chemical (Soda Ash) Partners and OCI followed with a \$15 price increase effective May 1 and July 1, respectively, for list and off-list prices (General Chemical Industrial Products, 2006, OCI Chemical Corp., 2006). Solvay also increased its off-list price by \$15 but left the list price at \$155 per short ton (Chemical Week, 2006a). Some soda ash purchasers renegotiated their 2006 contracts in August 2005 and avoided this round of price increases. Many soda ash contracts are negotiated in November and December for the following year (Chemical Week, 2006d).

On September 8, FMC announced that, effective October 1 or as contracts permitted, it would increase off-list prices by \$10 per short ton for all grades of soda ash (FMC Corporation, 2006b). The energy surcharge and freight policy changes initiated in 2004 and 2005 would remain in full effect for 2006 and beyond. Searles Valley Minerals in California raised the f.o.b. list price from \$180 per short ton to \$195 per short ton for bulk, dense soda ash.

Because the price of natural gas remained high in 2006, all the producers maintained an energy surcharge on soda ash sales. Depending on the company, the surcharges were adjusted either monthly [based on the last quoted New York Mercantile Exchange (NYMEX) Henry Hub closing price for the next forward month] or quarterly (based on the 3-month forward average NYMEX gas price using the closing price as of the 15th of the month prior to the beginning of each calendar quarter). The surcharges would be in effect as long as the price of natural gas was between \$5.00 and \$8.00 per million British thermal units.

Foreign Trade

According to the U.S. Census Bureau, U.S. soda ash exports for 2006 were a record 4.82 Mt, which represented about 44% of U.S. soda ash production. In 2006, U.S. exports to 48 countries, on a regional basis, were as follows: North America, 27%; South America and Asia, 26% each; Europe, 11%; the Middle East, 4%; Oceania, 3%; Africa and Central America, 2% each; and the Caribbean, less than 1% (table 6). The average free alongside ship value was \$152.64 per metric ton in 2006 compared with \$136.75 per ton in 2005. Although the data in tables 1 and 6 are rounded to three significant digits, the unit values listed in table 6 are based on the unrounded statistics. The top 10 countries, representing 69% of total United States soda ash exports, in decreasing order and percentage of total were Mexico, 17%; Brazil and Canada, 10% each; Chile, 6%; Indonesia and Japan, 5% each; and Belgium, Taiwan, Thailand, and Venezuela, 4% each. About 47% of all United States soda ash exports went through the Columbia-Snake River customs district in Idaho, Oregon, and Washington; the Port Arthur, TX, customs district was the second ranked customs district with 20% of the total, and the Laredo, TX, customs district was third, with 15% of the total (table 5).

Imports of soda ash decreased slightly to 6,850 t. The majority of imports historically came from Canada, where General Chemical had operated a synthetic soda ash plant in Amherstburg, Ontario, until April 2001. The facility produced dense and light soda ash, the majority of which was light soda ash exported to the United States. In 2006, about 39% of soda ash imports was from the United Kingdom, and 28% was from Mexico. The remainder of imports was from Canada, China,

France, Germany, Hong Kong, India, and Japan. About 647 t of soda ash reportedly was imported from the Dominican Republic, which did not produce soda ash. [This material either was in the wrong category (mislabeled) or was transshipped from another source.] The average cost, insurance, and freight value of imported soda ash was \$333.86 per ton, and the customs value was \$254.63 per ton.

World Review

Soda ash is a mature commodity in which consumption tends to grow in proportion to population and gross domestic product growth rates. For this reason, the leading customers of soda ash were, for the most part, developed nations that have lower growth rates compared with developing countries. The developing nations tend to have higher soda ash demands and higher growth rates. Although the production and consumption quantities varied among the countries, the end-use patterns were basically the same: glass, chemicals, and detergents were the major sectors.

Nine countries produced more than 1 Mt annually. They were, in descending order: China, the United States, Russia, Germany, India, Poland, France, Italy, and the United Kingdom. Bulgaria, Romania, and Ukraine had production installations that were rated at about 1 Mt/yr; adverse economic conditions, however, caused these nations to produce below their facilities' design capacities. Recent acquisitions or joint ventures with major European soda ash producers that have soda ash manufacturing expertise are expected to reverse this situation in the next few years. In 2006, world soda ash production was estimated to be 42.4 Mt, which was a slight increase compared with that of 2005.

Egypt.—China National Chemical Engineering Corp. and the National Bank of Egypt signed an agreement in December to construct a soda ash plant in Egypt. Although the size of the facility was not released, the first phase of construction was estimated to be \$90 million (China Knowledge, 2006).

India.—Gujarat Heavy Chemicals Ltd. increased soda ash capacity to 1Mt/yr from 600,000 metric tons per year (t/yr) at its Sutrapada plant in Gujarat (Global Minerals Magazine, 2006).

Pakistan.—In 2005, ICI Pakistan, Ltd. announced it would invest \$15 million to increase soda ash production capacity at its Khewra facility. The plant would expand by 50,000 t/yr to 225,000 t/yr of soda ash. The facility accounted for about 75% of the country's soda ash requirements. In mid-2006, the company announced it would add an additional 65,000 t of capacity, raising the total to 340,000 t/yr of capacity by 2009 (Chemical Week, 2006c).

Romania.—In January, a month after Gujarat Heavy Chemicals Ltd. (GHCL) of India acquired for \$19.5 million a 65% share of Romanian synthetic soda ash producer SC Bega Upsom SA, cost reduction measures resulted in increasing production by 34% at the Romanian facility (Sify Ltd., 2006). The plant had production capacity of 250,000 t/yr dense soda ash, 230,000 t/yr light soda ash, and 15,000 t/yr sodium bicarbonate. GHCL acquired Romania's other synthetic soda ash producer, Uzinele Sodice Govora S.A., which operated a facility with production capacity of 200,000 t/yr (Industrial Minerals, 2000). GHCL also owned and operated a 525,000-t/yr synthetic soda ash plant in Sutrapada, India.

Uzbekistan.—In August, Chinese Citi Pacific Ltd. and UzKimyoSanoat (Uzbek Chemical Industry) formed a joint venture to construct the Kungrad Soda Plant for \$100 million. The facility will have production capacity of 100,000 t/yr that will supply most of the country's domestic consumption, which is between 60,000 to 70,000 t annually. Salt from the Barsakelmes deposit (with an estimated 131 Mt of reserves) and limestone from the Jamansay deposit in the Karakalpakstan Republic was to supply the raw materials to manufacture soda ash (Embassy of Uzbekistan in Belgium, 2006).

Outlook

After surpassing the United States as the world's leading soda ash producer for the fourth consecutive year, China continued to add new production capacity and increase existing capacity at several of its plants despite escalating production costs. China imported a large quantity of fuel to satisfy the energy requirements of many of its energy-intensive industries, one of which was its synthetic soda ash industry. Higher energy costs and the rising cost of importing salt caused the price of Chinese soda ash to rise in 2006, and that benefited the U.S. soda ash industry. Although China's soda ash consumption appeared to be stabilizing, it was unclear how long China would continue to increase production of soda ash. The United States soda ash industry may expect to continue to encounter intense competition from China in some of the Asian markets.

Three dominant groups have survived to become the world leaders in soda ash—Solvay S.A. of Belgium, ANSAC of the United States (which represents four of the five domestic producers), and Chinese producers. Because the glass container sector is the leading soda-ash-consuming sector, the demand for soda ash for glass containers may decline as consumers slowly accept their food and beverages packaged in the newer polyethylene terephthalate (PET) containers.

The outlook for United States soda ash production for the next 5 years is optimistic despite competition from Chinese soda ash producers. Domestic soda ash production is expected to increase by 0.5% per year, and growth in world consumption is forecast to range from 2.0% to 2.5% per year for the next several years. Asia and South America remain the likeliest areas for increased soda ash consumption in the near future.

References Cited

Chemical Week, 2006a, FMC and Solvay seek soda ash hike: Chemical Week, v. 168, no. 18, May 24, p. 9.

Chemical Week, 2006b, FMC brings on more soda ash production in Wyoming: Chemical Week, v. 168, no. 19, May 31/June 7, p. 18.

Chemical Week, 2006c, ICI Pakistan expands soda ash capacity: Chemical Week, v. 168, no. 17, May 12, p. 18.

Chemical Week, 2006d, Tight supply drives soda ash prices: Chemical Week, v. 168, no. 7, February 22/March 1, p. 26.

China Knowledge, 2006, CNCEC, National Bank of Egypt to build soda ash factory: China Knowledge, December 20. (Accessed December 20, 2006, at http://chinaknowledge.com/news/news-detail.aspx?id=5337.)

Embassy of Uzbekistan in Belgium, 2006, Chinese Citi Pacific Ltd., UzKimyoSanoat launch soda ash production: Embassy of Uzbekistan in Belgium press release, August 21. (Accessed August 21, 2006, at http://www.uzbekistan.be/press-releases/245-246.html.)

- FMC Corporation, 2006a, FMC increases soda ash prices: Philadelphia, PA, FMC Corporation news, May 16. (Accessed May 16, 2006, at http://phx.corporate-ir.net/phoenix.zhtml?c=117919&p=irol-newsArticle& ID=1003313&highlight=.)
- FMC Corporation, 2006b, FMC increases soda ash prices: Philadelphia, PA, FMC Corporation news, September 8. (Accessed September 12, 2006, at http://phx.corporate-ir.net/phoenix.zhtml?c=117919&p=irol-newsArticle& ID=903551&highlight=.)

General Chemical Industrial Products, 2006, [untitled]: General Chemical Industrial Products, May 1. (Accessed June 1, 2006, at http://www.genchem.com/pdf/price050106.pdf.

- Global Minerals Magazine, 2006, Gujarat buys up Romanian soda: Global Minerals Magazine, October, p. 2.
- Industrial Minerals, 2006, GHCL seeks Romanian sources and India's no. 1 spot: Industrial Minerals, no. 460, January, p. 7.
- OCI Chemical Corp., 2006, Soda ash list price schedule (effective July 1, 2006): OCI Chemical Corp. (Accessed August 15, 2006, at http://www.ocichemical.com/webapp/ociapp/products/listprice.jsp.)
- Sify Ltd., 2006, GHCL hikes capacity at Romanian facility: Sify Ltd., January 12. (Accessed January 12, 2006, at http://sify.com/finance/equity/ fullstory.php?id=14119040).

Thomas, C.L., 2006, Congress passes soda ash royalty relief: U.S. Senate. (Accessed October 3, 2006, at http://thomas.senate.gov/index.cfm? FuseAction=PressReleases.Print&PressRelease_id=635&suppresslay.html Waste Age, 2007, Glass containers: Waste Age, v. 38, no. 8, August, p. 56.

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Evaporites and Brines. Ch. in United States Mineral Resources, Professional Paper 820, 1973.

Soda Ash. Ch. in Mineral Commodity Summaries, annual. Soda Ash. Mineral Industry Surveys, monthly.

Other

Chemical and Engineering News.

Chemical Market Reporter.

Chemical Week.

Engineering and Mining Journal, commodities survey.

Industrial Minerals.

- Manufacture of Soda. American Chemical Society Monograph Series, 1942.
- Natural Soda Ash. Van Nostrand Reinhold, 1992.
- Proceedings of the First International Soda Ash Conference. Wyoming State Geological Survey, 1998.
- Soda Ash. Ch. in Industrial Minerals and Rocks, Society for Mining, Metallurgy, and Exploration Inc., 1994.
- Soda Ash. Mining Engineering, annual review of industrial minerals.
- Soda Ash and Sodium Sulfate. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.

TABLE 1 SALIENT SODA ASH STATISTICS¹

(Thousand metric tons and thousand dollars except average annual value)

	2002	2003	2004	2005	2006
United States:					
Production:					
Soda ash: ²					
Quantity	10,500	10,600	11,000	11,000	11,000
Value	784,000	765,000	770,000	968,000	1,170,000
Value, average annual:					
Per short ton	\$68.00	\$65.21	\$63.75	\$80.19	\$96.64
Per metric ton	\$74.96	\$71.88	\$70.27	\$88.39	\$106.53
Wyoming trona	15,100	15,500	16,500	17,000	16,700
Exports:					
Quantity	4,250	4,450	4,670	4,680	4,820
Value	500,000	515,000	514,000	640,000	736,000
Imports for consumption:					
Quantity	9	5	6	8	7
Value	2,000	1,510	1,880	2,460	2,290
Stocks, December 31, producers'	222	330	338	243	290
Consumption:					
Apparent	6,250	6,090	6,290	6,380	6,100
Reported	6,430	6,270	6,260	6,200	6,110
World, production ^e	37,200	38,400	40,600 r	42,000 ^r	42,400

^eEstimated. ^rRevised.

¹Data are rounded to no more than three significant digits, except average annual value.

²Natural only; soda liquors and purge liquors are withheld to avoid disclosing company proprietary data.

TABLE 2U.S. PRODUCERS OF SODA ASH IN 2006

(Million short tons unless otherwise noted)

	Plant nameplate		
Company	capacity	Plant location	Source of sodium carbonate
FMC Wyoming Corp.:			
Granger ¹	1.30	Granger, WY	Underground trona.
Green River ²	3.55	Green River, WY	Do.
General Chemical (Soda Ash) Partners ³	2.80	do.	Do.
OCI Chemical Corp. ⁴	3.10	do.	Do.
Searles Valley Minerals, Inc. ⁵	1.45	Trona, CA	Dry lake brine.
Solvay Chemicals, Inc.: ⁶			
Green River	2.80	Green River, WY	Underground trona.
Parachute ⁷	1.00	Parachute, CO	Underground nahcolite.
Total	16.00		
Total million metric tons	14.50		

¹Tg Soda Ash Inc. was sold to FMC Wyoming Corp. in July 1999.

²Formed joint venture (20%) in February 1996 with Sumitomo Corp. and Nippon Sheet Glass Co., Ltd., both of Japan.

³A joint venture between General Chemical Corp. (75%), Owens-Illinois, Inc. [acquired Australian Consolidated Industries International (ACI) in 1998] (25%). Tosoh Wyoming Inc. of Japan, which purchased part of ACI's 24% share in June 1992, sold its shares to General Chemical in August 2005.

⁴Rhône-Poulenc Basic Chemicals Co. of France sold its 51% share to DC Chemical Co., Ltd. [formerly Oriental Chemical Industries Chemical Corp. (OCI) of the Republic of Korea] on February 29, 1996; Anadarko Petroleum Corp. (acquired Union Pacific Resources Co. in 2000) owns 49%. An 800,000-short-ton expansion, brought onstream in November 1998, increased plant capacity to 3.1 million short tons per year; however, the company planned to take 900,000 short tons per year out of service temporarily for equipment refurbishment.

⁵IMC Global, Inc. acquired North American Chemical Co. in April 1998; operation sold in 2004 to Sun Capital Partners, Inc. (80.1%) with IMC retaining a 19.9% share.

⁶Solvay Soda Ash Joint Venture is owned by Solvay S.A. of Belgium (80%) and Asahi Glass Co. of Japan (20%), which became a partner in February 1990. Capacity increase of 272,000 metric tons per year (t/yr) (300,000 short tons per year) installed December 1995, and 454,000 t/yr (500,000 short tons per year), October 2000. Company name changed to Solvay Chemicals, Inc. in 2003.

⁷Came onstream October 2000. A joint venture with Williams Sodium Products Co., [a wholly owned subsidiary of The Williams Companies, Inc. (60%) and American Alkali, Inc. (40%)]. Operation sold to Solvay America, Inc. on September 10, 2003. Soda ash plant idled.

TABLE 3

REPORTED CONSUMPTION OF SODA ASH IN THE UNITED STATES, BY END USE, BY QUARTER¹

(Thousand	metric	tons)
-----------	--------	------	---

				2006		
		First	Second	Third	Fourth	
End use	2005	quarter	quarter	quarter	quarter	Total
Glass:			-		-	
Container	1,460	364	374	367	372	1,480
Flat	1,130	272	272	282	291	1,120
Fiber	284	65	67	66	65	263
Other	179	42	45	43	47	177
Total	3,050	744	758	759	775	3,040
Chemicals	1,680	464	453	454	415	1,790
Soaps and detergents	624	125	127	134	128	514
Pulp and paper	90	23	22	21	21	87
Water treatment ³	78	24	18	26	21	89
Flue gas desulfurization	141	33	25	37	33	128
Distributors	290	74	67	63	56	260
Other	241	50	49	61	47	207
Total domestic consumption ⁴	6,200	1,540	1,520	1,560	1,500	6,110
Exports ⁵	4,870	1,190	1,180	1,240	1,300	4,910
Canada	393	94	120	113	104	431
Total industry sales ⁶	11,100	2,720	2,700	2,790	2,800	11,000
Total sales from plants	11,200	2,690	2,760	2,720	2,780	10,900
Total production	11,000	2,700	2,690	2,740	2,830	11,000
	End use Glass: Container Flat Fiber Other Total Chemicals Soaps and detergents Pulp and paper Water treatment ³ Flue gas desulfurization Distributors Other Total domestic consumption ⁴ Exports ⁵ Canada Total industry sales ⁶ Total sales from plants Total production	End use2005Glass:1,460Flat1,130Fiber284Other179Total3,050Chemicals1,680Soaps and detergents624Pulp and paper90Water treatment ³ 78Flue gas desulfurization141Distributors290Other241Total domestic consumption ⁴ 6,200Exports ⁵ 4,870Canada393Total industry sales ⁶ 11,100Total production11,200	End use 2005 $quarter$ Glass:	End use Z005 First Second quarter Glass: -	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Standard industrial classification.

³Includes soda ash equivalent from soda liquors and purge liquors sold to powerplant for water treatment. Sales of mine water are excluded.

⁴Imports reported by the producer/importer have been distributed into appropriate end-use categories listed above.

⁵As reported by producers; includes Canada. Data may not necessarily agree with those reported by the U.S. Census Bureau for the same periods.

⁶Represents soda ash from domestic origin (production and inventory changes) and imports and exports. Includes soda ash sold by coproducers and distributed by purchasers into appropriate end-use categories.

TABLE 4SODA ASH YEAREND PRICES

(Dollars per short ton)

	2005	2006
Sodium carbonate (soda ash):		
Dense, 58% Na ₂ O 100-pound, paper bags, carlot, works, free on board	152.00-159.00	152.00-159.00
Bulk, carlot, same basis, tons	127.00-135.00	127.00-135.00
Light, 100-pound, paper bags, carlot same basis	188.00-215.00	188.00-215.00
Bulk, carlot, same basis, tons	176.00	176.00

Source: Current prices of chemicals and related materials, Chemical Market Reporter, January 9, 2006; August 28, 2006.

TABLE 5 REGIONAL DISTRIBUTION OF U.S. SODA ASH EXPORTS, BY CUSTOMS DISTRICTS, IN 2006¹

(Metric tons)

0 Percentage $\widehat{\mathbb{O}}$ $\widehat{\mathbb{O}}$ (2)20 50 4 9 9 9 9 ∞ \overline{O} -9 $\begin{array}{c} \hline 0 \end{array}$ 9 2 (2) (2) 3 100 XX of total 2,000948,000 30,600 55,500 8,050 16,700 702,000 6,660 4,430 538 318 304,000 13,600798 518 89,900 917 2,270,000 158 66 369,000 584 4,820,000 100 104 95 Total 7,270 Oceania ł ł ł ł ł. 1 125,000 ł ł ł ł ł 1 ł. ÷ ł ł ł 133,000 1 1,250,0001,250,000÷ 7 ÷ 1 ł 4 ÷ ÷ 1 ł 1 ł. ÷ 1 1 1 ÷ 1 26 Asia Africa 76,600 114 76.500 ł ł ÷ ÷ ł ÷ 1 ÷ 1 1 ÷ ÷ ÷ 126 158 Middle ł ł ł 176,000 605 ł ł ł ł. ÷ ł ł ł ł 177,000 East 1,650307,000 Europe 13846 507 172,000 51,400ł ł ł ł ł 36 ł ł ł 533,000 104ł Ξ 12,100 Caribbean : 1 10 Ł ł ÷ Ł ł 12,100 9 ł ÷ ł ł ł ÷ 1 ł ł 1 ł ł ÷ Data are rounded to no more than three significant digits; may not add to totals shown. 245,000 100 678,000 ł ł 1,260,000ł ł 31 ł 341,000 ł ł ł 1 ł 1 Ł 1 ł 1 ł 26 America South 9,880 67,700 78,000 ł ł America ł 63 318 ł ÷ ł ł ł ł 1 Central ł ÷ ł ł 1 ł 55,487 8,053 702,186 30,596 482 6,662 4,434 ł 13,560 66 798 16,691 89,923 1,298,143 ł ł ł ł ł 368,588 584 27 America North Columbia-Snake River, ID-OR-WA XX Not applicable. -- Zero. Customs districts Houston-Galveston, TX San Francisco, CA Los Angeles, CA Ogdensburg, NY Percentage of total Port Arthur, TX Great Falls, MT San Diego, CA Baltimore, MD New York, NY Cleveland, OH Pembina, ND Svannah, GA Portland, ME Norfolk, VA Seattle, WA North Central: Duluth, MN Buffalo, NY Nogales, AZ El Paso, TX Detroit, MI Laredo, TX Miami, FL Southwest: Northeast: Jnknown Atlantic: Pacific: Total Gulf:

Source: U.S. Census Bureau, as adjusted by the U.S. Geological Survey using data and information from the Journal of Commerce PIERS trade service and industry sources.

Less than 1/2 unit.

TABLE 6	
U.S. EXPORTS OF SODA ASH, BY COUNTR	۲Y

		2005		2006		
	Quantity			Quantity		
	(thousand	Value ²	Unit	(thousand	Value ²	Unit
Country	metric tons)	(thousands)	value	metric tons)	(thousands)	value
Argentina	166	\$24,600	\$148	96	\$16,600	173
Aruba	3	327	110	(3)	7	538
Australia	100	13,100	131	92	13,700	149
Bahrain				(3)	390	439
Belgium	150	18,600	124	181	24,500	135
Belize	(3)	8	276			
Brazil	450	69,200	154	489	80,800	165
Cameroon				(3)	60	526
Canada	441	50,800	115	469	63,400	135
Chile	234	31,500	134	276	42,400	154
China	. 95	12,000	126	111	13,800	124
Colombia	114	17,500	153	143	25,100	176
Costa Rica	. 17	2,790	169	21	4,120	196
Dominican Republic				12	2,190	182
Ecuador	10	1,350	142	16	2,290	143
Finland	(3)	19	284	(3)	22	431
France	32	3,970	123	45	6,250	139
Germany				(3)	138	435
Grenada	(3)	3	600	(3)	5	556
Guatemala	- 18	2,800	155	39	7.020	180
Hong Kong				(3)	25	833
India				(3)	5	102
Indonesia	266	38,200	144	240	38,500	161
Ireland	. (3)	27	108			
Italy	(3)	81	281	(3)	53	348
Jamaica				(3)	3	429
Japan	302	38,900	129	264	37.700	143
Korea, Republic of	188	27,100	144	168	27,600	164
Lithuania				18	2.730	152
Malaysia	. 114	17,300	151	86	15,500	181
Mexico	811	105,000	129	829	113.000	137
Netherlands	102	16,100	157	84	13,500	160
New Zealand	36	4,640	128	41	5,860	143
Nigeria				7	1.290	185
Pakistan	(3)	8	2,000			
Palau				(3)	5	294
Panama	6	876	146	8	1.580	197
Peru	- 33	4,780	147	41	6.210	151
Philippines	. 51	7,950	155	38	6.370	168
Poland	- (3)	41	171			
Portugal	14	1,760	122	41	5,130	125
Russia	- 2	251	113	(3)	69	113
Saudi Arabia	96	11.200	117	121	18,200	151
Salvador				10	1.450	145
South Africa	- 50	7,150	144	70	12.800	182
Spain	158	19,900	126	163	22.300	137
Sweden				(3)	,0	4.000
Taiwan	. 195	27.100	139	173	30.000	173
Thailand	142	21,600	152	172	29,500	172
United Arab Emirates	29	3,400	116	56	8.370	150
United Kingdom	. (3)	3	3.000	(3)	23	211
Venezuela	247	38,200	154	203	35 400	174
Vietnam		596	203			
Total	4.680	640.000	137	4.820	736.000	153
		,		,== 5	,	

-- Zero.

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Free alongside ship value.

³Less than ¹/₂ unit.

Source: U.S. Census Bureau, as adjusted by the U.S. Geological Survey using data and information from the Journal of Commerce Port Import-Export Reporting Service and industry sources.

TABLE 7

U.S. PRODUCTION OF SODIUM COMPOUNDS, BY MONTH¹

(Thousand metric tons)

	20)05	2006		
		Wyoming		Wyoming	
	Soda ash	trona ²	Soda ash	trona ²	
January	925	1,440	946	1,190	
February	858	1,350	801	1,270	
March	894	1,410	952	1,470	
April	928	1,360	874	1,290	
May	931	1,510	909	1,190	
June	932	1,550	910	1,340	
July	955	1,550	952	1,430	
August	893	1,380	926	1,500	
September	923	1,480	859	1,480	
October	898	1,320	955	1,560	
November	895	1,310	930	1,480	
December	922	1,360	946	1,490	
Total	11,000	17,000	11,000	16,700	

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes solution-mined trona.

TABLE 8

SODA ASH: ESTIMATED WORLD PRODUCTION, BY COUNTRY^{1, 2}

(Thousand metric tons)

Country ³	2002	2003	2004	2005	2006
Argentina				70	70
Australia	300	300	300	300	310
Austria	150	150	150	150	150
Bosnia and Herzegovina		12 4	11	11	11
Botswana ⁵	283 4	309 4	263 4	250	250
Brazil	200	200	200	200	200
Bulgaria	800	800	800	800	800
Canada	300	300	300	300	300
Chad	12	12	12	12	12
China	10,330 4	11,336 4	13,024 ^{r, 4}	14,210 4	14,500
Egypt	50	50	50	50	50
Ethiopia	4 4	4 4	6 4	8 4	8
France	1,000	1,000	1,000	1,000	1,000
Germany	1,512 ^{r, 4}	1,493 ^{r, 4}	1,438 ^{r, 4}	1,533 ^{r, 4}	1,515 4
India	1,500	1,500	1,500	1,500	1,500
Iran	120	120	130	130	140
Italy	1,000	1,000	1,000	1,000	1,000
Japan	410	400	400	400	400
Kenva ⁵	304 4	353 4	354 4	360 4	374 4
Korea, Republic of	310	310	310	310	310
Mexico	290	290	290	290	290
Netherlands	400	400	400	400	400
Pakistan	240	240	240	260	250
Poland	1,054 4	1,110 4	1,167 4	1,115 4	1,110
Portugal	150	150	150	150	150
Romania	454	407	401	410	400
Russia	2,400	2,400	2,600	2,600	2,800
Spain	500	500	500	500	500
Taiwan	140	140	140	140	140
Turkey	825 4	835 4	846 4	850	850
Ukraine	678	650	650	700	700
United Kingdom	1,000	1,000	1,000	1,000	1,000
United States ⁵	10,500 4	10,600 4	11,000 4	11,000 4	11,000 4
Total	37,200	38,400	40,600 r	42,000 r	42,400

^rRevised. -- Zero.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown. ²Table includes data available through April 23, 2007. Synthetic unless otherwise specified.

³In addition to the countries listed, Tanzania may produce soda ash for local consumption; available general information is inadequate for the formulation of reliable estimates of output levels.

⁴Reported figure.

⁵Natural only.