



# 2013 Minerals Yearbook

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**SODA ASH [ADVANCE RELEASE]**

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# SODA ASH

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The United States (U.S.) soda ash industry continued a trend of increased production in 2013 and set a new record for soda ash production and nearly set a record for the amount of soda ash exported as well. In 2013, the demand for soda ash recovered as overseas demand more than compensated for nearly flat domestic demand. The annual average unit value of soda ash decreased in 2013 after setting a record high in 2012. Lower priced exports helped to keep U.S. soda ash competitive in world markets as soda ash exports increased for the 4th consecutive year and accounted for 56% of total production. Record U.S. soda ash production was 11.5 million metric tons (Mt) valued at \$1.68 billion in 2013 (table 1). World soda ash production was estimated at 51.3 Mt, an increase from 50.7 Mt in 2012 (table 7).

Soda ash, also known as sodium carbonate ( $\text{Na}_2\text{CO}_3$ ), is an alkali chemical refined from the mineral trona, or from naturally occurring sodium-carbonate-bearing brines (the soda ash from both is referred to as natural soda ash) or manufactured from one of several chemical processes (the soda ash from this process is referred to as synthetic soda ash).

Soda ash is an important industrial compound used to manufacture chemicals, glass, pulp and paper, soaps and detergents, 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 most of the world output of soda ash is made synthetically, which is usually a more expensive process.

## Legislation and Government Programs

Economic distress experienced by the U.S. soda ash industry in 2004, caused partially by the emergence of China as a competitor in the export market to Asia, led to the passage of the Soda Ash Royalty Reduction Act of 2006. Passage of the legislation lowered the Federal royalty rate of 6% to 2% for a 5-year period for holders of Federal sodium leases prior to the legislation's expiration date of October 11, 2011. Legislative efforts have continued since 2011 for a similar royalty rate reduction and in May 2013, the U.S. House Natural Resource Committee voted in favor of "The American Soda Ash Competitiveness Act," which would return the Federal royalty rate to 2% (Cheyenne News Staff, 2013). Later in the year the U.S. Senate passed the Helium Stewardship Act of 2013, which contained the provision "the royalty rate on the quantity of gross value of the output of sodium compounds and related products at the point of shipment to market from Federal land in the 2-year period beginning on the date of enactment of this Act shall be 4 percent," and the bill was enacted into law on October 2, 2013 (Balloon Council, The, 2013). Although the royalty rate dropped to 4% and not the 2% originally sought, "the royalty

rate relief will provide much needed support to a Wyoming industry that is currently engaged in a pitched battle with Chinese state-owned companies that are heavily subsidized" (Spiering, 2013).

## 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 U.S. soda ash companies, all of which responded, representing 100% of the total production data in this report (table 1).

The United States remained the world's second ranked soda ash-producing nation in 2013 behind China. U.S. production of natural soda ash from California and Wyoming was 11.5 Mt in 2013. 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 79% of total capacity. Approximately 2.5 Mt/yr of nameplate capacity (2.7 million short tons per year), which represented about 17% of total industry nameplate capacity, was idled in 2013. This capacity utilization rate appears to be low because it is calculated partially based on the full nameplate capacity of all operations, some of which included nameplate capacity idled since 2009 (FMC Corp., 2011a, b).

The U.S. soda ash industry used the term "effective capacity" to minimize the effect that "mothballed capacity" had on operating rates. This resulted in higher capacity utilization percentages. Individual effective capacity data are not publicly disclosed. Producers use nameplate capacities to determine export allocations set by a U.S. export association, the American Natural Soda Ash Corp. (ANSAC).

The U.S. soda ash industry consisted of five companies in 2013. Four companies operated five plants in Wyoming that produced soda ash from underground trona ore and one plant in California produced soda ash from sodium-carbonate-rich brines (table 3). One company operated a mine and a plant in Wyoming and a plant in Colorado, which produced sodium bicarbonate using soda ash feedstock from the company's Wyoming soda ash facility.

Each of the U.S. companies is either wholly owned or partially owned by foreign soda ash-producing companies or foreign soda ash consumers. The U.S. soda ash industry was 57% foreign owned and 43% domestically owned. At yearend, the countries and their percentage of ownership of U.S. soda ash producers were India, 22%; Belgium, 19%; the Republic of Korea, 10%; and Japan, 6%.

In January 2013, Houston, Texas-based Natural Resources Partners L.P. (NRP) acquired Anadarko Petroleum Corp.'s 48.51% share of OCI Wyoming LLC for \$295.5 million. NRP

reported that OCI Wyoming is the world's fifth-largest producer of soda ash with a trona ore mining operation and a soda ash refinery in Green River, Wyoming (National Resources Partners, 2013).

In March, Nippon Sheet Glass Co. Ltd. (Nippon) announced plans to sell its 6.25% share in FMC Wyoming Corp. back to FMC Corp. (FMC) for \$80 million. Nippon had originally invested with FMC in 1995 to better secure supplies of soda ash for its glass manufacturing operations in Japan (Reuters, 2013).

## Consumption

The USGS collects consumption data by end use for soda ash 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 2013, U.S. apparent consumption was virtually unchanged from that of 2012. Apparent consumption of soda ash was 4.99 Mt; reported consumption was 5.12 Mt (table 1). Reported consumption and apparent consumption do not necessarily correspond because reported consumption is sales reported by producers, whereas apparent consumption is calculated by subtracting exports from production plus imports and making adjustments for changes in inventories.

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 increased beverage consumption during the summer). 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 residential housing and commercial building construction. These two major industrial sectors are especially sensitive to changing economic conditions, and soda ash sales follow trends in the two sectors. The distribution of soda ash for domestic consumption by end use in 2013 was glass, 48%; chemicals, 28%; soap and detergents, 8%; distributors, 6%; flue gas desulfurization and other, 4% each; pulp and paper, 1%; and water treatment, 1% (table 4).

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

**Glass.**—Glass manufacture represented about 48% of domestic soda ash consumption as follows: container, 50%; flat, 39%; fiber, 6%; and other glass, 5%. Glass containers are made for beverages (beer, carbonated and noncarbonated drinks, and liquor), chemical and household products, food, medical products, and toiletries and cosmetics.

**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 for STPP detergents has been decreasing because phosphatic detergents can contribute to eutrophication, which is an environmental concern.

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 require sodium silicates and synthetic zeolites, which are made from soda ash. Liquid detergents, which do not contain any soda ash, compete with soda ash-containing powdered detergents and are estimated to have commanded about 50% of the household laundry detergent market in 2013.

## Stocks

Yearend 2013 stocks of dense soda ash in domestic plant silos, terminals, warehouses, and on teamtracks (small railroad siding or spur tracks) amounted to 348,000 metric tons (t) (table 1). Producers indicated that a potential supply problem could exist if inventories decreased to less than 180,000 t. Most consumers of soda ash did not have the storage facilities to accommodate large quantities of soda ash and needed to rely on suppliers to provide the material on a timely basis.

## Prices

The annual average value in 2013 for bulk, dense natural soda ash, free on board (f.o.b.) Green River, WY, and Searles Valley, CA, was \$146.81 per metric ton (\$133.18 per short ton), which was a 6% decrease from that of the previous year (table 1). The value is not a "price," but rather it is the sum 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 long-term 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 differ from the annual average values reported to and by the USGS.

On April 8, 2013 ANSAC announced a soda ash price increase of \$30 per metric ton effective immediately or as contracts allowed for all grades of soda ash and for bulk and packaged products. ANSAC cited increased demand that necessitated infrastructure upgrades related to loading and shipping at their Pacific Northwest terminal (ANSAC, 2013). On June 17, FMC followed with a price increase of \$15 per short ton effective July 1, 2013, or as contracts allowed for all grades of soda ash and for both bulk and packaged products. The company stated that the increase was necessary to "recover cost increases and to support continued investment in the business." The FMC list prices for bulk, dense soda ash remain unchanged and ranged from \$275 to \$290 per short ton (FMC Corp., 2013).

## Foreign Trade

Most U.S. soda ash exports were controlled by ANSAC, which is involved exclusively in the export trade of soda ash, defined as an alkali product designated by the chemical formula  $\text{Na}_2\text{CO}_3$ , whether manufactured by brine evaporation and purification, Solvay process, trona refining, or any other

means. Under the Treaty of Rome agreement (1958), ANSAC is not permitted to ship soda ash to the countries of the European Union (EU); however, the members of the U.S. soda ash industry formed another organization for shipping to this region. It is the American-European Soda Ash Shipping Association, Inc. (AESSA) that is engaged solely in storage, transportation, and other related logistical and technical support activities to promote and further its members' individual commerce in soda ash being shipped to the countries of the EU. Both ANSAC and AESSA were formed as Webb-Pomerene export associations under the authority of the U.S. Federal Trade Commission.

According to the U.S. Census Bureau, U.S. exports of soda ash for 2013 were 6.47 Mt, which represented about 56% of U.S. soda ash production. For comparison, exports accounted for only 5% of U.S. production in 1970, 13% in 1980, 26% in 1990, and 38% in 2000. In 2013, the regional distribution of U.S. soda ash exports to 56 countries were Asia, 29%; South America, 27%; North America, 20%; Europe, 10%; Africa, 5%; the Middle East and Oceania, 4% each; Central America, 1%; and the Caribbean, less than 0.5% (table 5). The average free alongside ship value was \$187 per metric ton in 2013 compared with \$202 per ton in 2012. In 2013, the 10 leading countries, representing 66% of total U.S. soda ash exports were, in decreasing order and percentage of total, Mexico, 15%; Brazil, 13%; Indonesia, 10%; Canada and Chile, 5% each; Australia, the Netherlands, and the Republic of Korea, 4% each; Japan and Venezuela, 3% each (table 6). About 45% of all U.S. soda ash exports went through the Columbia-Snake River customs district in Idaho, Oregon, and Washington; the Port Arthur, TX, customs district ranked second with 25% of the total; and the Laredo, TX, customs district was third with 12% of the total (table 5).

The quantity of imports of soda ash in 2013 was unchanged from 2012 remaining at about 13,000 t and came from 20 countries according to U.S. Census Bureau data. In 2013, 86% of soda ash imports were from Italy (33%), Germany (28%), the United Kingdom (13%), and Mexico (12%). The remaining 14% of imports was from Bulgaria, Canada, China, Denmark, France, Hong Kong, India, Japan, Poland, Romania, Switzerland, Turkey, and the United Arab Emirates. Canada, Denmark, Hong Kong, Switzerland, and the United Arab Emirates were listed as sources; however, none of these countries are thought to produce soda ash. It is possible that the entry was erroneous or that the product was transshipped from another location, such as imports from Canada (which no longer produces soda ash) that may have originated from the United Kingdom. The imports from China were thought to be sodium carbonate peroxohydrate, which is the active ingredient in algaecides and fungicides. The average cost, insurance, and freight value of imported soda ash was \$258.58 per ton, and the customs value was \$205.93 per ton.

## World Review

Soda ash is a mature commodity for which consumption tends to increase in proportion to population and gross domestic product rates of growth. For this reason, the leading consumers of soda ash were, for the most part, developed nations with lower rates of growth compared with those of developing

countries. The developing nations tend to use less soda ash than developed nations but have higher rates of growth. 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.

In 2013, world soda ash production was estimated to be 51.3 Mt, which was a slight increase from that of 2012 (table 7). Of the 23 countries that reported production of natural and synthetic soda ash, the largest producer was China (46%) and the United States was the world's second-ranked producer (22%). Only Botswana, China, Ethiopia, Kenya, Turkey, and the United States produce soda ash from natural sources; the remaining 17 nations manufacture soda ash through various chemical processes, primarily the Solvay process. China produces soda ash using both natural sources and synthetic processes.

Eight countries produced 1 Mt/yr or more of soda ash. They were, in descending order, China, the United States, Russia, Germany, Turkey, India, Poland, and France. These nations accounted for 92% of world production in 2013. 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.

**Australia.**—Penrice Soda Holdings Ltd. announced the end of soda ash production at its Adelaide chemical facility in June 2013. Instead Penrice formed a joint venture with SASS Australia to import soda ash from ANSAC. The Adelaide plant will continue to manufacture a range of sodium bicarbonate products and lime (Kean, 2013).

**Belarus.**—Belarus and China reached an agreement to implement a joint venture to construct a soda ash plant. The plant will produce soda ash from domestic raw materials and the soda ash will be used by the expanding glass industry in Belarus (National Center of Legal Information for the Republic of Belarus, 2013).

**India.**—Demand for soda ash increased by about 10%, led by growing demand from the detergent and chemical segments. Much of the increase in demand was met by imports, which increased by nearly 20%. Domestic producers struggled to compete with soda ash from China and Europe. The Government of India placed antidumping duties on some importers (Vora, 2013).

**Japan.**—Central Glass Co., Ltd. announced that soda ash production at the company's Ube plant, which began in 1940, would cease by the end of 2015. It was determined that there would be no prospect for improvement in profitability and so operations will end. The company plans to transfer sales of soda ash and calcium chloride to a joint venture with Tokuyama Corp. beginning in October 2014 (Central Glass Co., Ltd., 2013).

**Tanzania.**—Efforts continued to persuade investors to develop a \$500 million soda ash facility at Lake Natron in the Longido and Monduli districts. Environmental concerns about the habitat of the lesser flamingo, which nests in large numbers in the area, have hampered development in recent years. Reserves are estimated to be 300 Mt and are considered some of the richest in the world (Philemon, 2013).

**Turkey.**—Turkey’s Star-Kazan Soda Elektrik announced plans to build a soda ash complex in Ankara’s Kazan district. The plant would have a capacity of 2.7 Mt/yr and is projected to start production in 2017. Funding and engineering services will be provided by joint owner Tianchen Engineering Corporation of China, and additional funding will be provided by the other partner, Ciner Group, which owns 74% of Turkish soda ash producer Eti Soda A.Ş. (Glass International, 2013).

## Outlook

The domestic and foreign industries that consume soda ash continued recovering from the global economic downturn that began in 2008. U.S. soda ash producers increased production and exports in 2013 but unit values retreated from the record high set in 2012. Three groups dominate production and have become the world’s leading suppliers of soda ash—ANSAC of the United States (which represented three of the five domestic producers in 2013), China’s producers, and Solvay S.A. of Belgium. It is very likely that some smaller soda ash facilities throughout the world may close because of energy and environmental considerations and competition from the major producers.

With the continued economic recovery in the United States and throughout the world, U.S. soda ash production is expected to increase in 2014 and 2015, causing domestic soda ash production to increase slightly. U.S. exports, which started to increase in 2010 and have continued the trend, now exceed domestic consumption. It is projected that U.S. suppliers will continue to achieve higher sales prices by competing with the more expensive foreign synthetic soda ash. Global economic conditions are expected to improve slowly over the next few years and stimulate world soda ash consumption. The United States likely will continue to compete with producers in China in the Far East markets. Asia and South America remain the most likely areas for increased soda ash consumption in the near future.

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TABLE 1  
SALIENT SODA ASH STATISTICS<sup>1</sup>

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

|   | 2009                | 2010                | 2011                | 2012                | 2013      |
|---|---------------------|---------------------|---------------------|---------------------|-----------|
| United States:                              |                     |                     |                     |                     |           |
| Production:                                 |                     |                     |                     |                     |           |
| Soda ash:                                   |                     |                     |                     |                     |           |
| Quantity                                    | 9,310               | 10,600              | 10,700              | 11,100              | 11,500    |
| Value                                       | 1,330,000           | 1,360,000           | 1,580,000           | 1,740,000           | 1,680,000 |
| Value, average annual:                      |                     |                     |                     |                     |           |
| Per short ton                               | \$129.88            | \$116.47            | \$133.57            | \$141.90            | \$133.18  |
| Per metric ton                              | \$143.17            | \$128.39            | \$147.24            | \$156.42            | \$146.81  |
| Wyoming trona                               | 15,100              | 15,900              | 16,500              | 17,100              | 17,400    |
| Exports:                                    |                     |                     |                     |                     |           |
| Quantity                                    | 4,410               | 5,390               | 5,470               | 6,110               | 6,470     |
| Value                                       | 838,000             | 886,000             | 1,040,000           | 1,240,000           | 1,210,000 |
| Imports for consumption:                    |                     |                     |                     |                     |           |
| Quantity                                    | 6                   | 20                  | 27                  | 13                  | 13        |
| Value                                       | 2,350               | 5,770               | 5,660               | 3,360               | 3,470     |
| Stocks, December 31, producers <sup>2</sup> | 217                 | 220                 | 282                 | 338                 | 348       |
| Consumption:                                |                     |                     |                     |                     |           |
| Apparent                                    | 4,950               | 5,200               | 5,220               | 4,980               | 4,990     |
| Reported                                    | 5,020               | 5,270               | 5,150               | 5,060               | 5,120     |
| World, production <sup>c</sup>              | 42,100 <sup>r</sup> | 45,800 <sup>r</sup> | 48,900 <sup>r</sup> | 50,700 <sup>r</sup> | 51,300    |

<sup>c</sup>Estimated. <sup>r</sup>Revised.

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

TABLE 2  
U.S. PRODUCTION OF SODIUM COMPOUNDS, BY MONTH<sup>1</sup>

(Thousand metric tons)

|           | 2012     |                            | 2013     |                            |
|-----------|----------|----------------------------|----------|----------------------------|
|           | Soda ash | Wyoming trona <sup>2</sup> | Soda ash | Wyoming trona <sup>2</sup> |
| January   | 929      | 1,520                      | 941      | 1,570                      |
| February  | 833      | 1,410                      | 892      | 1,440                      |
| March     | 964      | 1,560                      | 979      | 1,560                      |
| April     | 861      | 1,380                      | 894      | 1,440                      |
| May       | 833      | 1,330                      | 985      | 1,460                      |
| June      | 952      | 1,470                      | 962      | 1,360                      |
| July      | 933      | 1,320                      | 1,020    | 1,450                      |
| August    | 1020     | 1,460                      | 998      | 1,410                      |
| September | 892      | 1,130                      | 857      | 1,400                      |
| October   | 982      | 1,540                      | 1,000    | 1,430                      |
| November  | 969      | 1,570                      | 957      | 1,380                      |
| December  | 966      | 1,440                      | 968      | 1,490                      |
| Total     | 11,100   | 17,100                     | 11,500   | 17,400                     |

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

<sup>2</sup>Includes solution-mined trona.

TABLE 3  
U.S. PRODUCERS OF SODA ASH IN 2013

(Million short tons unless otherwise noted)

| Company                            | Partner(s)  | Plant nameplate capacity | Plant location  | Source of sodium carbonate |
|------------------------------------|---|--------------------------|-----------------|----------------------------|
| FMC Wyoming Corp.:                 |   |                          |                 |                            |
| Granger                            | None  | 1.30                     | Granger, WY     | Underground trona.         |
| Green River                        | Joint venture with Sumitomo Corp. (6%)                        | 3.55                     | Green River, WY | Do.                        |
| OCI Wyoming LLC                    | OCI Co., Ltd. (51%) and Natural Resources Partners L.P. (49%) | 3.25                     | do.             | Do.                        |
| Searles Valley Minerals, Inc.      | None  | 1.45                     | Trona, CA       | Dry lake brine.            |
| Solvay Chemicals, Inc.:            |   |                          |                 |                            |
| Green River                        | Joint venture with Asahi Glass Co. (20%)                      | 2.80                     | Green River, WY | Underground trona.         |
| Parachute                          | do.   | 1.00                     | Parachute, CO   | Underground nahcolite.     |
| Tata Chemicals (Soda Ash) Partners | Joint venture with Owens-Illinois, Inc. (25%)                 | 2.80                     | Green River, WY | Underground trona.         |
| Total                              |   | 16.00                    |                 |                            |
| Total                              | million metric tons   | 14.50                    |                 |                            |

Do., do. Ditto.

TABLE 4  
REPORTED CONSUMPTION OF SODA ASH IN THE UNITED STATES, BY END USE, BY QUARTER<sup>1</sup>

(Thousand metric tons)

| NAICS <sup>2</sup><br>code | End use                                 | 2013   |             |            |            | Total |             |
|----------------------------|---|--------|-------------|------------|------------|-------|-------------|
|                            |   | 2012   | 1st quarter | 2d quarter | 3d quarter |       | 4th quarter |
| 3272                       | Glass:                                  |        |             |            |            |       |             |
| 327213                     | Container                               | 1,260  | 290         | 319        | 319        | 303   | 1,230       |
| 327211                     | Flat                                    | 928    | 226         | 243        | 241        | 242   | 952         |
| 327993                     | Fiber                                   | 117    | 36          | 34         | 35         | 42    | 147         |
| 327212                     | Other                                   | 110    | 32          | 28         | 25         | 25    | 111         |
|                            | Total                                   | 2,420  | 584         | 624        | 620        | 613   | 2,440       |
| 32518                      | Chemicals                               | 1,480  | 343         | 361        | 361        | 384   | 1,450       |
| 325611                     | Soaps and detergents                    | 392    | 101         | 91         | 98         | 94    | 384         |
| 322                        | Pulp and paper                          | 81     | 18          | 19         | 19         | 19    | 75          |
| 221310                     | Water treatment <sup>3</sup>            | 62     | 15          | 16         | 16         | 14    | 61          |
| 56221                      | Flue gas desulfurization                | 164    | 47          | 47         | 66         | 57    | 217         |
| 422                        | Distributors                            | 281    | 77          | 70         | 71         | 68    | 285         |
|                            | Other                                   | 185    | 49          | 46         | 55         | 53    | 202         |
|                            | Total domestic consumption <sup>4</sup> | 5,060  | 1,230       | 1,280      | 1,310      | 1,300 | 5,120       |
|                            | Exports <sup>5</sup>                    | 5,930  | 1,580       | 1,600      | 1,380      | 1,630 | 6,190       |
|                            | Canada                                  | 242    | 69          | 61         | 59         | 58    | 246         |
|                            | Total industry sales <sup>6</sup>       | 11,000 | 2,810       | 2,880      | 2,690      | 2,930 | 11,300      |
|                            | Total sales from plants                 | 11,100 | 2,810       | 2,870      | 2,850      | 2,930 | 11,500      |
|                            | Total production                        | 11,100 | 2,810       | 2,840      | 2,880      | 2,930 | 11,500      |

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

<sup>2</sup>North American Industry Classification System.

<sup>3</sup>Includes soda ash equivalent from soda liquors and purge liquors sold to powerplants for water treatment. Sales of mine water are excluded.

<sup>4</sup>Imports reported by the producer and (or) importer have been distributed into appropriate end-use categories.

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

<sup>6</sup>Represents 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 5  
REGIONAL DISTRIBUTION OF U.S. SODA ASH EXPORTS, BY CUSTOMS DISTRICTS, IN 2013<sup>1</sup>  
(Metric tons)

| Customs districts              | North America   |               |           | Middle East |         |         | Africa    |         |           | Asia          |                 |           | Oceania |      |      | Total     | Percentage of total |
|--------------------------------|-----------------|---------------|-----------|-------------|---------|---------|-----------|---------|-----------|---------------|-----------------|-----------|---------|------|------|-----------|---------------------|
|                                | Central America | South America | Caribbean | Europe      | East    | West    | Africa    | Asia    | Oceania   | South America | Central America | Caribbean | Europe  | East | West |           |                     |
| Atlantic:                      |                 |               |           |             |         |         |           |         |           |               |                 |           |         |      |      |           |                     |
| Charleston, SC                 | --              | --            | 708       | --          | --      | --      | 577       | --      | --        | --            | --              | --        | --      | --   | --   | 1,290     | (2)                 |
| Miami, FL                      | 108             | 619           | 334       | 242         | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 970       | (2)                 |
| New York, NY                   | --              | --            | 334       | --          | 801     | --      | --        | 233     | --        | --            | --              | --        | --      | --   | --   | 1,370     | (2)                 |
| Norfolk, VA                    | --              | --            | --        | --          | 709     | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 709       | (2)                 |
| Philadelphia, PA               | --              | --            | --        | --          | 116     | 37      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 153       | (2)                 |
| Savannah, GA                   | --              | --            | --        | --          | --      | 25      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 25        | (2)                 |
| Gulf:                          |                 |               |           |             |         |         |           |         |           |               |                 |           |         |      |      |           |                     |
| Houston-Galveston, TX          | 842             | 207,000       | 742       | 10,100      | 59      | 223     | 1,510     | --      | --        | --            | --              | --        | --      | --   | --   | 221,000   | 3                   |
| New Orleans, LA                | --              | 532           | --        | 80          | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 612       | (2)                 |
| Port Arthur, TX                | 5,010           | 735,000       | 8,700     | 549,000     | --      | 333,000 | --        | --      | --        | --            | --              | --        | --      | --   | --   | 1,630,000 | 25                  |
| North-central:                 |                 |               |           |             |         |         |           |         |           |               |                 |           |         |      |      |           |                     |
| Chicago, IL                    | --              | --            | --        | --          | 112     | --      | --        | 30      | --        | --            | --              | --        | --      | --   | --   | 142       | (2)                 |
| Cleveland, OH                  | 12              | --            | --        | --          | --      | --      | --        | 240     | --        | --            | --              | --        | --      | --   | --   | 251       | (2)                 |
| Detroit, MI                    | 172,000         | --            | --        | --          | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 172,000   | 3                   |
| Duluth, MN                     | 21,800          | --            | --        | --          | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 21,800    | (2)                 |
| Great Falls, MT                | 35,700          | --            | --        | --          | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 35,700    | (2)                 |
| Pembina, ND                    | 5,030           | --            | --        | --          | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 5,030     | (2)                 |
| Northeast:                     |                 |               |           |             |         |         |           |         |           |               |                 |           |         |      |      |           |                     |
| Boston, MA                     | --              | --            | --        | --          | --      | --      | --        | 11      | --        | --            | --              | --        | --      | --   | --   | 11        | (2)                 |
| Buffalo, NY                    | 53,200          | --            | --        | --          | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 53,200    | (2)                 |
| Ogdensburg, NY                 | 674             | --            | --        | --          | --      | --      | --        | --      | --        | --            | --              | --        | --      | --   | --   | 674       | (2)                 |
| Pacific:                       |                 |               |           |             |         |         |           |         |           |               |                 |           |         |      |      |           |                     |
| Columbia-Snake River, ID-OR-WA | 56,300          | 500,000       | --        | 56,500      | 240,000 | --      | 1,830,000 | 248,000 | 2,930,000 | 45            |                 |           |         |      |      |           |                     |
| Los Angeles, CA                | --              | 254,000       | --        | 32,400      | 870     | --      | 61,900    | 117     | 349,000   | 5             |                 |           |         |      |      |           |                     |
| San Diego, CA                  | 62,000          | 16,300        | --        | 6,000       | --      | --      | --        | --      | 84,300    | 1             |                 |           |         |      |      |           |                     |
| San Francisco, CA              | --              | 1,230         | --        | 40          | 4,820   | --      | 43        | --      | 6,130     | (2)           |                 |           |         |      |      |           |                     |
| Seattle, WA                    | 19,400          | --            | --        | --          | --      | --      | 12,200    | --      | 31,600    | (2)           |                 |           |         |      |      |           |                     |
| Southwest:                     |                 |               |           |             |         |         |           |         |           |               |                 |           |         |      |      |           |                     |
| El Paso, TX                    | --              | --            | --        | --          | --      | --      | --        | --      | 116,000   | 2             |                 |           |         |      |      |           |                     |
| Laredo, TX                     | 806,000         | --            | --        | --          | --      | --      | --        | --      | 806,000   | 12            |                 |           |         |      |      |           |                     |
| Nogales, AZ                    | 8               | --            | --        | --          | --      | --      | --        | --      | 8         | (2)           |                 |           |         |      |      |           |                     |
| Unknown                        | 946             | --            | --        | --          | --      | --      | --        | --      | 946       | (2)           |                 |           |         |      |      |           |                     |
| Total                          | 1,290,000       | 62,300        | 1,720,000 | 9,680       | 656,000 | 245,000 | 334,000   | 248,000 | 6,470,000 | 100           |                 |           |         |      |      |           |                     |
| Percentage of total            | 20              | 1             | 27        | (2)         | 10      | 4       | 5         | 29      | 100       | XX            |                 |           |         |      |      |           |                     |

XX Not applicable. --Zero.

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

<sup>2</sup>Less than 1/2 unit.

Source: U.S. Census Bureau.



TABLE 6  
U.S. EXPORTS OF SODA ASH, BY COUNTRY<sup>1</sup>

| Country              | 2012                                  |                                   |               | 2013                                  |                                   |               |
|----------------------|---------------------------------------|-----------------------------------|---------------|---------------------------------------|-----------------------------------|---------------|
|                      | Quantity<br>(thousand<br>metric tons) | Value <sup>2</sup><br>(thousands) | Unit<br>value | Quantity<br>(thousand<br>metric tons) | Value <sup>2</sup><br>(thousands) | Unit<br>value |
| Argentina            | 119                                   | \$24,500                          | \$206         | 91                                    | \$17,600                          | \$193         |
| Australia            | 162                                   | 35,600                            | 220           | 227                                   | 45,900                            | 202           |
| Belgium              | 96                                    | 12,800                            | 133           | 144                                   | 20,700                            | 144           |
| Brazil               | 688                                   | 139,000                           | 201           | 849                                   | 158,000                           | 186           |
| Canada               | 289                                   | 56,100                            | 194           | 308                                   | 60,800                            | 197           |
| Chile                | 362                                   | 77,700                            | 215           | 348                                   | 71,500                            | 206           |
| Colombia             | 168                                   | 31,500                            | 188           | 138                                   | 26,800                            | 194           |
| Costa Rica           | 18                                    | 4,010                             | 223           | 14                                    | 2,700                             | 193           |
| Ecuador              | 27                                    | 5,890                             | 218           | 27                                    | 5,550                             | 205           |
| El Salvador          | 10                                    | 2,020                             | 202           | 10                                    | 1,900                             | 190           |
| France               | 36                                    | 5,400                             | 150           | 20                                    | 2,580                             | 129           |
| Guatemala            | 42                                    | 9,100                             | 217           | 28                                    | 5,980                             | 214           |
| Indonesia            | 639                                   | 134,000                           | 210           | 644                                   | 119,000                           | 184           |
| Japan                | 247                                   | 48,900                            | 198           | 209                                   | 33,100                            | 158           |
| Korea, Republic of   | 193                                   | 43,500                            | 225           | 254                                   | 44,900                            | 177           |
| Lithuania            | 42                                    | 5,420                             | 129           | 20                                    | 2,870                             | 143           |
| Malaysia             | 61                                    | 13,500                            | 221           | 91                                    | 17,400                            | 191           |
| Mexico               | 1,080                                 | 238,000                           | 221           | 984                                   | 225,000                           | 228           |
| Netherlands          | 272                                   | 44,000                            | 162           | 251                                   | 39,000                            | 155           |
| New Zealand          | 42                                    | 9,650                             | 230           | 21                                    | 4,570                             | 217           |
| Peru                 | 92                                    | 20,400                            | 221           | 61                                    | 13,200                            | 216           |
| Philippines          | 53                                    | 11,800                            | 222           | 72                                    | 13,200                            | 183           |
| Portugal             | 27                                    | 3,720                             | 138           | 5                                     | 763                               | 153           |
| Saudi Arabia         | 101                                   | 21,000                            | 207           | 154                                   | 25,700                            | 167           |
| South Africa         | 153                                   | 22,900                            | 150           | 134                                   | 20,200                            | 151           |
| Spain                | 45                                    | 7,240                             | 161           | 127                                   | 19,700                            | 155           |
| Taiwan               | 184                                   | 38,800                            | 211           | 198                                   | 32,800                            | 166           |
| Thailand             | 186                                   | 41,900                            | 225           | 173                                   | 32,400                            | 187           |
| Tunisia              | 173                                   | 30,000                            | 173           | 199                                   | 29,100                            | 146           |
| United Arab Emirates | 64                                    | 13,100                            | 205           | 90                                    | 15,500                            | 172           |
| United Kingdom       | --                                    | --                                | --            | 59                                    | 10,800                            | 183           |
| Venezuela            | 172                                   | 43,300                            | 252           | 201                                   | 47,000                            | 234           |
| Vietnam              | 56                                    | 11,700                            | 209           | 106                                   | 18,700                            | 176           |
| Other                | 210                                   | 29,800                            | 142           | 208                                   | 27,900                            | 134           |
| Total                | 6,110                                 | 1,240,000                         | 202           | 6,470                                 | 1,210,000                         | 187           |

-- Zero.

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

<sup>2</sup>Free alongside ship value.

Source: U.S. Census Bureau.

TABLE 7  
SODA ASH: ESTIMATED WORLD PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Thousand metric tons)

| Country <sup>3</sup>         | 2009                | 2010                | 2011                | 2012                 | 2013               |
|------------------------------|---------------------|---------------------|---------------------|----------------------|--------------------|
| Australia                    | 310                 | 310                 | 310                 | 300 <sup>r</sup>     | 310                |
| Botswana <sup>4</sup>        | 215 <sup>5</sup>    | 241 <sup>5</sup>    | 230                 | 225                  | 235                |
| Brazil                       | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>      | NA                 |
| Bulgaria                     | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>      | NA                 |
| Chad                         | 12                  | 12                  | 13                  | 13                   | 13                 |
| China <sup>5</sup>           | 19,450              | 20,350              | 22,940              | 24,010 <sup>r</sup>  | 24,290             |
| Egypt                        | 50                  | 50                  | 50                  | 50                   | 50                 |
| Ethiopia <sup>6</sup>        | 4 <sup>r,5</sup>    | 4 <sup>r,e</sup>    | 4 <sup>r,e</sup>    | 3 <sup>r,e</sup>     | 3                  |
| France                       | 1,000               | 1,000               | 1,000               | 1,000                | 1,000              |
| Germany <sup>5</sup>         | 2,291               | 2,539               | 2,668               | 2,627                | 2,650              |
| India                        | 1,400 <sup>r</sup>  | 1,500               | 1,400 <sup>r</sup>  | 1,500                | 1,600              |
| Italy                        | 500                 | 500                 | 500                 | 500                  | 500                |
| Japan                        | 400                 | 410 <sup>r</sup>    | 430 <sup>r</sup>    | 450 <sup>r</sup>     | 450                |
| Kenya <sup>4</sup>           | 405 <sup>5</sup>    | 474 <sup>5</sup>    | 499 <sup>5</sup>    | 440 <sup>r</sup>     | 500                |
| Korea, Republic of           | --                  | --                  | --                  | -- <sup>r</sup>      | --                 |
| Mexico                       | 290                 | 290                 | 290                 | 290                  | 290                |
| Netherlands                  | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>      | NA                 |
| Pakistan                     | 260                 | 378 <sup>r,5</sup>  | 335 <sup>r,5</sup>  | 410                  | 400                |
| Poland                       | 890                 | 1,010 <sup>5</sup>  | 1,061 <sup>5</sup>  | 1,116 <sup>r,5</sup> | 1,052 <sup>5</sup> |
| Portugal                     | 150                 | 150                 | 150                 | 150                  | 150                |
| Romania                      | 400                 | 350                 | 420                 | 430 <sup>r</sup>     | 450                |
| Russia                       | 2,322 <sup>5</sup>  | 2,670 <sup>5</sup>  | 2,822 <sup>5</sup>  | 2,807 <sup>r,5</sup> | 2,810              |
| Spain                        | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>     | NA <sup>r</sup>      | NA                 |
| Taiwan                       | 140                 | 140                 | 140                 | 140                  | 150                |
| Turkey                       | 1,079 <sup>5</sup>  | 1,623 <sup>5</sup>  | 1,749 <sup>5</sup>  | 1,853 <sup>r,5</sup> | 1,900              |
| Ukraine                      | 680                 | 707 <sup>5</sup>    | 700                 | 720                  | 720                |
| United Kingdom               | 500                 | 500                 | 500                 | 500                  | 350                |
| United States <sup>4,5</sup> | 9,310               | 10,600              | 10,700              | 11,100               | 11,500             |
| Total                        | 42,100 <sup>r</sup> | 45,800 <sup>r</sup> | 48,900 <sup>r</sup> | 50,700 <sup>r</sup>  | 51,300             |

<sup>e</sup>Estimated. <sup>r</sup>Revised. NA Not available. -- Zero.

<sup>1</sup>World total, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes data available through May 6, 2014. Synthetic unless otherwise specified.

<sup>3</sup>In addition to the countries listed, Bosnia and Herzegovina, Brazil, Bulgaria, Iran, Netherlands, Spain, and Tanzania produced soda ash; available information is inadequate for the formulation of reliable estimates of output levels.

<sup>4</sup>Natural only.

<sup>5</sup>Reported figure.

<sup>6</sup>Data for the Ethiopian calendar year ending July 7 of the year listed.