



2009 Minerals Yearbook

SALT

SALT

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The United States had been the world's leading salt producing nation until 2005, when China surpassed the United States to become the leading producing country in the world. Total U.S. salt production in 2009 decreased by 4% to 46 million metric tons (Mt) compared with that of 2008 (table 1). According to U.S. Geological Survey (USGS) data for 2009, 27 companies operated 60 salt-producing plants in 16 States. Of these, 10 companies and 14 plants produced more than 1 Mt each and accounted for 92% and 69%, respectively, of total U.S. production and accounted for 89% and 44%, respectively, of total value. Several companies and plants produced more than one type of salt. In 2009, 11 companies (25 operations) produced salt brine; 11 companies (15 operations), rock salt; 10 companies (13 operations), solar-evaporated salt; and 7 companies (17 operations), vacuum pan salt.

The five leading States were, in descending order of total salt sold or used, Louisiana with 31%; Texas, 21%; New York, 14%; Kansas, 6%; and Utah, 5%. Other Eastern States (Alabama, Michigan, Ohio, Tennessee, Virginia, and West Virginia) accounted for 20% of the domestic total salt sold or used. Other Western States (Arizona, California, Nevada, New Mexico, and Oklahoma) represented 3% (table 5).

Salt, also known as sodium chloride, comprises the elements sodium and chlorine. Sodium is a silver-colored metal that is so unstable that it reacts violently in the presence of water; chlorine is a greenish-colored gas that is dangerous and may be lethal. Yet combined, these two elements form sodium chloride, which is a white-colored compound essential to life itself. Virtually every person in the world has some direct or indirect contact with salt daily. People routinely add salt to their food as a flavor enhancer or apply rock salt to walkways to remove ice in the winter. Salt is used as feedstock for chlorine and caustic soda manufacture. These two inorganic chemicals are used to make many consumer-related end-use products, such as polyvinyl chloride (PVC), a plastic made from chlorine, and paper-pulping chemicals manufactured from sodium hydroxide (caustic soda).

Production

U.S. production and sales data for salt are developed by the USGS from an annual voluntary survey of U.S. salt-producing sites and company operations (table 2). Production refers to the quantity of salt mined or manufactured that is available for sale. Salt sold or used is the quantity of salt that was sold directly to customers or used by the salt producer, which usually is a chloralkali (chlorine and sodium hydroxide) manufacturer. The data in table 2 are rated capacities for mines and refineries as of December 31, 2009. Rated capacity is defined as the maximum quantity of product that can be produced in a period of time on a normally sustainable long-term operating rate, based on the physical equipment of the plant, and given acceptable routine

operating procedures involving energy, labor, maintenance, and materials.

Of the 27 companies to which a canvass form was sent, 26 responded, representing 91% of the totals shown in this report. Data for the nonrespondent was estimated based on its prior responses to previous annual surveys, the 2009 production estimate survey, or brine production capabilities for chloralkali manufacture based upon published chlorine production capacities [1.75 metric tons (t) of salt required per ton of chlorine capacity].

The structure of the U.S. salt industry has changed throughout the years. In 1970, 50 companies operated 95 salt-producing plants in the United States. Market competition, increased energy and labor costs, less expensive imports, fluctuations in currency exchange rates, and an excess of production capacity (resulting in the downsizing of the industry through mergers and acquisitions) reduced the number of operations in the industry to 27 companies and 60 plants by 2009.

The four types of salt that are surveyed are classified according to the method of recovery as follows: rock salt, from the surface or underground mining of halite deposits; solar salt, from the solar evaporation of seawater, landlocked bodies of saline water, or primary or byproduct brines; vacuum pan salt, from the mechanical evaporation of a purified brine feedstock; and brine, from the solution mining of underground halite deposits. Data for brine production and consumption represent the anhydrous salt content only and not the weight of the water.

Mechanical Evaporation.—Vacuum pan salt is not mined but is a type of salt produced using mechanical evaporation technology. Vacuum pan salt production was 4.03 Mt in 2009, which was a 4% decrease compared with the 2008 revised total of 4.20 Mt. The mechanical evaporation of salt by the vacuum pan process is dependent on the number and size of the vacuum crystallizers operating in series. Rated capacities in table 2 are usually easier to establish because of the proven design performance of the equipment.

Although rock salt, solar salt, and salt brine may be used to make vacuum pan salt, virtually all domestic vacuum pan salt is obtained from solution mining of underground salt formations. Vacuum pan salt is obtained by dehydrating brine using heat alone or in combination with a vacuum. The grainer or open pan process uses open, rectangular pans with steam-heated immersion coils to evaporate the water in the brine. The final product is usually flake shaped rather than the typical cubic form. Flake salt is preferred for the production of baked goods, butter, and cheese. The Alberger process is a modified grainer operation that produces cubic salt with some flake salt.

In July 2008, the Dow Chemical Co. purchased Rohm and Haas Co. of Philadelphia, PA, for \$18 billion. The sale included Morton International Inc., with its salt subsidiary Morton Salt

Co. In September 2009, with the approval of the U.S. Federal Trade Commission, Dow sold off the salt business to K+S Aktiengesellschaft (formerly Kali und Salz GmbH) of Germany, establishing K+S as the leading salt producer in the world. The net cash payment for the acquisition was \$1.576 billion (CBS Interactive Business Network, 2009; K+S Group, 2009).

Rock Salt.—Rock salt is mined by the room-and-pillar method, which is similar to that used in coal and trona mining. Additional information about rock salt mining can be found in the salt chapter in Minerals Yearbook 2006.

Because the majority of rock salt was used for deicing, the operating rate of rock salt facilities fluctuated with the demand for deicing salt, again dependent on the severity of winter weather conditions. During periods of strong demand, production levels often achieve, or exceed in certain situations, the rated capacities. Full mine capacity generally is a function of the hoisting capabilities of the mine. Assuming that the work week is 5 days (250 workdays per year), two working shifts and one maintenance shift per day, and at least one short-term planned turnaround for the mine and mill per year, table 2 lists the production capacities for domestic rock salt operations. In 2009, rock salt mining was 20.3 Mt, a 3% decrease compared with the 2008 revised total of 20.9 Mt.

Solar Evaporation.—Solar salt production was 3.88 Mt in 2009, which was a 5% decrease from the revised 2008 total of 4.07 Mt. Solar evaporation uses the wind and the sun to evaporate the water and is an effective method of producing solar salt in areas of high evaporation and low precipitation. Additional information about solar salt production can be found in the 2006 salt Minerals Yearbook chapter.

Because evaporation rates must exceed the precipitation rates, the climatic conditions and geographic locations of solar evaporation facilities are critical to the successful production and harvesting of solar salt. Therefore, rated capacities in table 2 generally are based on the historical evaporation patterns within a region and vary depending on the location and the surface acres of the evaporation ponds. Only unpredictable seasonal precipitation and market conditions usually affect the production rates of the facilities.

Solution Mining.—U.S. salt brine production in 2009 was 17.8 Mt, which was about 6% less than the 2008 total of 18.9 Mt. This was the second consecutive year that total brine production did not exceed rock salt production. The brine capacities for table 2 are difficult to derive because they are based on the variabilities of the injection rate of the solvent and the solubility rates of the underground salt bodies, both of which determine the quantity of brine produced. In turn, these production levels are usually dependent on the demand for the products that the brine is being used to manufacture. Brine capacity is assumed to be equal to the amount of annual brine production. In order to avoid revealing company proprietary data, individual company brine capacities are not included in table 2.

Solution mining is used to obtain a sodium chloride feedstock for vacuum pan salt production and for chlorine, caustic soda, and synthetic soda ash (excluding the United States) manufacture. The quantity of underground salt dissolved and recovered as brine to make vacuum pan salt usually is not

reported as primary salt production; only the quantity of vacuum pan salt manufactured is reported. The quantity of brine used to make chloralkali chemicals is reported as either the amount of captive brine used or brine sold. The chemical industry is the leading consumer of salt brine worldwide. Additional information about salt brine production can be found in the 2006 salt Minerals Yearbook chapter.

Consumption

In 2009, apparent consumption (salt sold or used plus imports minus exports) was 56.4 Mt, whereas reported consumption (sales or use as reported by the salt companies, including their imports and exports) was 45 Mt. Although these two measures of consumption are not necessarily expected to be identical, they normally are similar. Apparent consumption normally is greater than reported consumption because apparent consumption includes additional quantities of salt imported and exported by nonsalt-producing companies, such as some chloralkali operations and salt distributors. Reported consumption statistics are those reported only by the domestic salt producing companies.

The direct and indirect uses of salt number about 14,000 according to industry sources. The USGS annually surveys eight major categories comprising 29 end uses. The 2009 reported percentage distribution of salt by major end use was chemicals, 40%; ice control, 38%; distributors (grocery and other wholesalers and retailers, and so forth), 8%; agricultural and food processing, 4% each; and general industrial, other uses combined with exports, and primary water treatment, 2% each; (table 6). Distributors represented a substantial share of salt sales by the salt industry; all this salt is ultimately resold to many different end users. For a more complete analysis of end-use markets, specific sectors of distribution in table 6 can be combined, such as agricultural and water treatment with agricultural and water conditioning distribution, respectively.

Aside from the different types of salt, there are various distinctions in the packaging and applications of salt. Salt for human consumption is packaged in different sized containers for several specialized purposes. Table salt may contain 0.01% potassium iodide as an additive, which provides a source of iodine that is essential to the oxidation processes in the body. Kosher salt, sea salt, condiment salt, and salt tablets are special varieties of salt.

Agricultural Industry.—Barnyard and grazing livestock need supplementary salt rations to maintain proper nutrition. In 2009, 1.21 Mt of salt was sold to the agricultural industry. Animal feed and water conditioning salt are made into 22.7-kilogram (50-pound) pressed blocks. Iodine, sulfur, trace elements, and vitamins are occasionally added to salt blocks to provide nutrients not found naturally in the diet of certain livestock. Salt is also compressed into pellets that are used for water conditioning.

Chemical Industry.—For most years, the leading consumer of salt, primarily as salt brine, is the chemical industry. Salt brine is extracted from natural underground saline sources or solution-mined halite deposits (salt beds or salt domes) or produced through the dissolution of solar salt. Within this industry, the chloralkali sector remains the major consumer of

salt for manufacturing chlorine, coproduct sodium hydroxide (caustic soda), and synthetic soda ash. Since 1986, when the last domestic synthetic soda ash plant was closed because of high production costs and competition with less expensive natural soda ash, no synthetic soda ash has been manufactured in the United States; many countries, however, still produce synthetic soda ash and use vast quantities of salt brine as feedstock. Total salt sold or used by the chemical industry was 17.9 Mt, in 2009 of which 16.7 Mt was for chloralkali manufacture and 1.24 Mt was for other chemical uses (table 6).

Salt is used as the primary raw material in chlorine manufacture because it is an inexpensive and widely available source of chlorine ions. For sodium hydroxide production, salt is the main source of sodium ions. Chlorine and caustic soda are considered to be the first generation of products made from salt. These two chemicals are further used to manufacture other materials, which are considered to be the second generation of products made from salt. Although most salt brine is produced by the same companies that use it, many chloralkali manufacturers now purchase brine from independent brine supply companies. In certain cases, brine is produced by a chemical company that uses some of it and sells the excess to neighboring competitors. According to industry sources, about 48% of the salt used to manufacture chlorine was captive (produced by the chloralkali companies) and 31% was purchased brine; domestically purchased solar salt and rock salt made up 12% of the supply, and imported rock, solar, and vacuum pan salt, 9%.

In 2009, according to the U.S. Census Bureau, 8.52 Mt of chlorine and 6.57 Mt of sodium hydroxide (caustic soda or lye) were produced in the United States (U.S. Census Bureau, 2010). Based on the industry average ratio of 1.75 t of salt required to produce 1.0 t of chlorine and 1.1 t of coproduct sodium hydroxide, the chlorine and caustic soda industry consumed about 14.9 Mt of salt for feedstock. Reported consumption of total domestic and imported salt for chlorine manufacture was 16.7 Mt (table 6). Typically, the difference between the calculated and reported quantities was the amount of salt not reported to the USGS from imports or captive brine production of chloralkali producers, although in 2009, the difference was about 2 Mt. This difference may be because of unreported chlorine production data.

Salt is also used as a feedstock in chemical plants that make sodium chlorate, metallic sodium, and other downstream chemical products. In powdered soaps and detergents, salt is used as a bulking agent and a coagulant for colloidal dispersion after saponification. In pharmaceuticals, salt is a chemical reagent and is used as the electrolyte in saline solutions. It is used with sulfuric acid to produce sodium sulfate and hydrochloric acid. The “Other chemical” subsector is relatively small, representing about 7% of domestic salt sales for the entire chemical sector and only 3% of total domestic salt consumption.

The consumption of salt for metallic sodium has declined during the past several years. E.I. du Pont de Nemours and Co. was the sole manufacturer of metallic sodium in the United States. The domestic market for metallic sodium decreased because sodium metal was no longer needed for the production of leaded gasoline. The leading use of sodium was

for sodium borohydride production, which is the feedstock for sodium dithionite that is used as a reductive bleaching agent by the pulp and paper industry. Sodium metal also is used to manufacture sodium azide, which is used in automotive air bags. Other potential uses of sodium metal are in the remediation of chemical weapons, chlorofluorocarbons, pesticides, and polychlorinated biphenyls.

Distributors.—A large amount of salt is marketed through various distributors, some of which specialize in agricultural and water treatment services—two sectors in which the salt companies also have direct sales (table 6). Distributor sales also include grocery wholesalers and (or) retailers, institutional wholesalers, U.S. Government resale, and other wholesalers and retailers. Total salt sold to distributors was 3.91 Mt in 2009.

Food Processing.—Every person uses some quantity of salt in food. The salt is added to the food by the food processor or by the consumer as a flavor enhancer, preservative, binder, fermentation-control additive, texture-control agent, and color developer. This major category is subdivided, in descending order of salt consumption, into other food processing, meat packers, canning, baking, dairy, and grain mill products. Total salt sold for food processing was 1.72 Mt in 2009.

In meat packing, salt is added to processed meats to promote color development in bacon, ham, and other processed meat products. As a preservative, salt inhibits the growth of bacteria, which would lead to spoilage of the product. Salt acts as a binder in sausages to form a binding gel made up of meat, fat, and moisture. Salt also acts as a flavor enhancer and as a tenderizer.

In the dairy industry, salt is added to cheese as a color-, fermentation-, and texture-control agent. The dairy subsector includes companies that manufacture creamery butter, condensed and evaporated milk, frozen desserts, ice cream, natural and processed cheese, and specialty dairy products.

In canning, salt is primarily added as a flavor enhancer and preservative. It also is used as a carrier for other ingredients, dehydrating agent, enzyme inhibitor, and tenderizer.

In baking, salt is added to control the rate of fermentation in bread dough. It also is used to strengthen the gluten (the elastic protein-water complex in certain doughs) and as a flavor enhancer, such as a topping on baked goods.

The food-processing category also contains grain mill products. These products consist of milling flour and rice and manufacturing cereal breakfast food and blended or prepared flour.

In the “other food processing” category, salt is used mainly as a seasoning agent. This category includes miscellaneous establishments that make food for human consumption (such as potato chips and pretzels) and for domestic pet consumption (such as cat and dog food).

General Industrial.—The industrial uses of salt are diverse. They include, in descending order of quantity consumed, other industrial applications, oil and gas exploration, textiles and dyeing, pulp and paper, metal processing, tanning and leather treatment, and rubber manufacture. Total salt sold to these sectors was 792,000 t in 2009.

In oil and gas exploration, salt is an important component of drilling fluids in well drilling. It is used to flocculate and

increase the density of the drilling fluid to overcome high downwell gas pressures. Whenever a drill hits a salt formation, salt is added to the drilling fluid to saturate the solution and to minimize the dissolution within the salt stratum. Salt is also used to increase the set rate of concrete in cemented casings.

In textiles and dyeing, salt is used as a brine rinse to separate organic contaminants, to promote “salting out” of dyestuff precipitates, and to blend with concentrated dyes to standardize them. One of its main roles is to provide the positive ion charge to promote the absorption of negatively charged ions of dyes.

In metal processing, salt is used in concentrating uranium ore into uranium oxide (yellow cake). It also is used in processing aluminum, beryllium, copper, steel, and vanadium.

In the pulp and paper industry, salt is used to bleach wood pulp. It also is used to make sodium chlorate, which is added along with sulfuric acid and water to manufacture chlorine dioxide, an excellent oxygen-based bleaching chemical. The chlorine dioxide process, which originated in Germany after World War I, is becoming more popular because of environmental pressures to reduce or eliminate chlorinated bleaching compounds.

In tanning and leather treatment, salt is added to animal hides to inhibit microbial activity on the underside of the hides and to attract moisture back into the hides. In rubber manufacture, salt is used to make buna, neoprene, and white types. Salt brine and sulfuric acid are used to coagulate an emulsified latex made from chlorinated butadiene.

Ice Control and Road Stabilization.—In 2009, U.S. consumption of salt for this application was 16.9 Mt, which was about 25% less than that of 2008. This decrease was attributed to the reduction of municipal inventories from those of 2008. Additional imports of rock salt by the salt companies were available if needed during 2009.

Salt is an inexpensive, widely available, and effective ice control agent. It does, however, become less effective as the temperature decreases below about 6.5° C to 9.5° C (15° F to 20° F). At lower temperatures, more salt must be applied to maintain higher brine concentrations to provide the same degree of melting. Most winter snowstorms and ice storms happen when temperatures are between 4° C and 0° C (25° F and 32° F), the range in which salt is most effective.

In highway deicing, salt has been associated with corrosion of bridge decks, motor vehicles, reinforcement bar and wire, and unprotected steel structures used in road construction. Surface runoff, vehicle spraying, and windblown actions also affect soil, roadside vegetation, and local surface water and groundwater supplies. Although evidence of environmental loading of salt has been found during peak usage, the spring rains and thaws usually dilute the concentrations of sodium in the area where salt was applied.

The quantity of salt consumed for road deicing each year is directly related to the severity of the winter weather conditions. Long-range forecasting of salt consumption in this application is extremely difficult because of the complexities in long-range forecasting of the weather.

Salt also is added to stabilize the soil and to provide firmness to the foundation on which highways are built. The salt acts

to minimize the effects of shifting caused in the subsurface by changes in humidity and traffic load.

During the winter of 2008–09, many municipalities across the nation reported apparent shortages of rock salt and significant increases in rock salt prices compared with those of the previous winter. In late 2009, the situation had reversed itself when supplies became more available at lower prices (WFMJ, 2009).

Questions raised in 2008 regarding the shortage of salt and the high prices of rock salt concerned several State government officials, who were skeptical and initiated various investigations of potential price-fixing by suppliers. One extensive investigation by the office of the Illinois Attorney General found no evidence of price fixing or illegal conduct by the road salt suppliers but rather procedural problems with their procurement process (Hilkevitch, 2009). Many municipalities waited until the summer months to solicit bids from the salt suppliers for the upcoming winter. As a result, some municipalities found themselves without any salt because other transportation departments had submitted their requests earlier so the salt companies could have the necessary time to schedule production and delivery times. For 2009, many State and local agencies sought bids as early as March to guarantee their requests would be received in plenty of time for the next winter (Farkas, 2009).

Water Treatment.—Many areas of the United States have hard water, which contains excessive calcium and magnesium ions that contribute to the buildup of a scale or film of alkaline mineral deposits in household and industrial equipment and pipes. Commercial and residential water-softening units use salt to remove the ions that cause the hardness. The sodium ions captured on a resin bed are exchanged for the calcium and magnesium ions. Periodically, the water-softening units must be recharged because the sodium ions become depleted. Salt is added and dissolved, and brine replenishes the lost sodium ions. In 2009, 1.01 Mt of salt was sold for primary water treatment and an additional 469,000 t was sold for water conditioning distribution.

Stocks

Because bulk salt is stored at many different locations, such as plants, ports, terminals, and warehouses, data on the quantity of salt stockpiled by the salt industry are not reliable enough to formulate accurate inventory totals; however, yearend stocks of producers were estimated to be 2 Mt, and consumer inventories also were estimated to be high. Most of these inventories were imported rock salt and solar salt. Many salt distributors, municipalities, road deicing contractors, salt producers, and States stockpiled additional quantities of salt in anticipation of adverse weather conditions. Deicing salt inventories were reduced by yearend 2009 because of moderately severe winter weather during late 2009. For the reasons discussed above, salt stocks are assumed to be the difference between salt production and salt sold or used in calculating apparent consumption.

Transportation

Because the locations of the salt supplies are not often near consumers, transportation may be an important cost. Pumping salt brine through pipelines is an economic means

of transportation but cannot be used for dry salt. Large bulk shipments of dry salt in ocean freighters or river barges are low in cost but are restricted in points of origin and consumption. River and lake movement of salt in winter is often severely curtailed because of frozen waterways. As salt is packaged, handled, and shipped in smaller units, the costs increase and are reflected in higher selling prices.

Transportation costs significantly add to the price of salt. In some cases, shipping costs are higher than the actual value of the salt. Ocean vessels can transport greater quantities of salt than barge, rail, or truck shipments. Transoceanic imports of salt have been increasing in some areas of the United States because they are more cost competitive than salt purchased from domestic suppliers using barge, rail, or truck transportation. One important factor that often determines the quantity of salt that can be imported is the depth of the channels and the ports; many ports are not deep enough to accommodate larger ships.

Prices

The four types of salt that are produced have unique production, processing, and packaging factors that determine the selling prices. Generally, salt sold in bulk is less expensive than salt that has been packaged, pelletized, or pressed into blocks. Salt in brine is the least expensive salt sold because mining and processing costs are less. Vacuum pan salt is the most expensive because of the higher energy costs involved in processing and the purity of the product.

Price quotations are not synonymous with average values reported to the USGS. The quotations do not necessarily represent prices at which transactions actually took place or bid and asked prices. The average annual values, as collected by the USGS and listed in table 8, represent a national average value for each of the types of salt and the various product forms.

Foreign Trade

Under Harmonized Tariff Schedule of the United States (HTS) nomenclature, imports are aggregated under one category named "Salt (including table and denatured salt) and pure sodium chloride, whether or not in aqueous solution, seawater." The same classification also applies to exports. The HTS code for salt is 2501.00.0000. The trade tables in this report list the previous and current identification codes for salt. Although several other HTS codes pertain to various salt classifications, the United States aggregates shipments under one code because the sums of individual subclassifications fail to meet the minimum dollar requirements necessary for individual listings.

Based on U.S. Census Bureau data for 2009, the United States exported 1.45 Mt of salt; this was a 40% increase compared with that of 2008 (table 9). In 2009, the majority of exports (94%) were to Canada. Salt was shipped to 86 countries through 21 customs districts; the Detroit, MI, district exported the most and represented 83% of the U.S. total (table 10). Based on U.S. Census Bureau statistics, the United States imported 14.7 Mt of salt from 48 countries in 2009, which was 7% more than was imported during 2008 (table 11). Canada was the leading source of imports, representing about 40% of total imports, followed closely by Chile (35%). Table 12 lists the imports

of salt by customs districts. Of the 39 customs districts that imported salt in 2009, the New York, NY, customs district was the largest in terms of tonnage, accounting for about 18% of the total, followed by Detroit, MI (13%); Boston, MA (11%); Milwaukee, WI (10%); Chicago, IL (8%); Philadelphia, PA (8%); and Portland, ME (6%). The quantity of imported salt was about 10 times that of exports. Net salt imports also represented about 26% of U.S. apparent consumption. This indicates the magnitude of the U.S. reliance on salt imports. The majority of imported salt was brought into the country by foreign subsidiaries of major U.S. salt producers. Generally, imported salt can be purchased and delivered to many U.S. customers at prices lower than the comparable domestic product because production costs are lower abroad, currency exchange rates may favor the price of imported salt rather than the price of domestic salt, and ocean freight rates are less expensive than overland rail or truck rates.

World Review

Table 13 lists world salt production statistics for 113 nations based on reported and estimated information. In 2009, the total estimated world production increased to about 276 Mt. The United States remained a leading salt-producing country, representing 17% of total world output. China has rapidly increased its production. In 2009, estimated salt production in China was about 58 Mt, making it the leading salt producer in the world, or about 21% of total world output.

Most countries possess some form of salt production capability, with production levels set to meet their own domestic demand requirements and with additional quantities available for export to other countries. Many developing nations tend to develop their agricultural resources to feed their population first. Utilization of easily extractable mineral resources follows, and salt is one of the first mineral commodities to be mined. Some countries, such as the United States, import a substantial amount of salt to meet total demand requirements because of economic factors, as previously discussed.

Djibouti.—At Lake Assal between the cities of Tadjoura and Yoboki, Salt Investment S.A. built a new salt plant to serve the markets in eastern Africa. The country had provided Ethiopia with salt until Ethiopia imposed a 53% tariff on imports on salt from Djibouti in 2004 which affected salt production. Trade relations improved between the nations in 2006. The new salt project was expected to begin in mid-2010 (Industrial Minerals, 2009).

Outlook

The U.S. salt industry continued to be an important leader in terms of increased production, consumption, and world trade in salt. Despite the closing and idling of some chlorine plants since 2007 and the Nation's economic problems, the remaining chlorine facilities ran at lower capacity utilization rates, thereby reducing chlorine and caustic soda production as well as salt brine production and consumption. Because the chloralkali industry is energy intensive, any increase in energy prices is likely to reduce chlorine manufacture as well as salt brine usage. Solar salt and vacuum pan salt production and consumption

have been constant and are expected to remain stable. U.S. salt production is expected to remain at the 2009 level through 2015. Rock salt production and consumption are heavily dependent on the severity of winter weather. Although the severity of the weather is virtually impossible to accurately forecast far in advance, the supplies of salt, from either domestic or imported sources, are more than adequate to meet any anticipated increase in demand.

Because salt is a relatively low-value commodity, the shipping cost for oceanic, rail, or truck transportation can be an important determining factor when attempting to secure supply sources from either domestic or foreign locations. If energy prices increase, one mode of transportation may be more cost-effective than others. Excluding deicing salt, domestic salt consumption may fluctuate but is likely to continue to increase in accordance with population growth. U.S. total salt production is expected to be an estimated 46 Mt in 2010.

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GENERAL SOURCES OF INFORMATION

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TABLE 1
SALIENT SALT STATISTICS¹

(Thousand metric tons and thousand dollars)

	2005	2006	2007	2008	2009
United States:					
Production: ²					
Brine	19,900	19,800	19,700	18,900	17,800
Rock	17,700	16,500	16,800	20,900 ^r	20,300
Solar	3,430	3,640	3,650	4,070 ^r	3,880
Vacuum and open pans	4,170	4,450	4,420	4,200 ^r	4,030
Total	45,100	44,400	44,500	48,000 ^r	46,000
Sold or used by producers:					
Quantity	45,000	40,600	45,500	47,400 ^r	43,100
Value	1,310,000	1,310,000	1,520,000	1,690,000 ^r	1,750,000
Exports:					
Quantity	879	973	833	1,030	1,450
Value	51,800	54,900	59,600	65,900	74,100
Imports for consumption:					
Quantity	12,100	9,490	8,640	13,800	14,700
Value	180,000	163,000	171,000	282,000	337,000
Consumption:					
Apparent ³	56,200	49,100	53,300	60,200 ^r	56,400
Reported	53,100	42,400	53,200	53,100	45,000
World, production	249,000 ^r	259,000 ^r	259,000 ^r	264,000 ^r	276,000

^rRevised.

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

²Excludes Puerto Rico.

³Sold or used plus imports minus exports.

TABLE 2
U.S. SALT COMPANIES BY PRODUCTION CAPACITY, LOCATION, AND TYPE IN 2009

(Thousand short tons)

Company	Rock	Solar	Vacuum and	
			Open Pans	Brine
American Rock Salt Co., Hampton Corners, NY	4,500	--	--	--
Cargill, Inc.:				
Akron, OH	--	--	350	(1)
Avery Island, LA	2,700	--	--	(1)
Breux Bridge, LA	--	--	200	--
Cleveland, OH	4,000	--	--	--
Freedom, OK	--	300	--	--
Lake Point, UT	--	800	--	--
Lansing, NY	2,400	--	--	--
Hutchinson, KS	--	--	450	--
Newark, CA	--	750	150	(1)
St. Clair, MI	--	--	425	--
Watkins Glen, NY	--	--	450	--
Corpus Christi Brine Services, Inc., Benavides, TX	--	--	--	(1)
Detroit Salt Co. LLC, Detroit, MI	1,500	--	--	--
Dow Chemical Co., The:				
Freeport, TX	--	--	--	(1)
Plaquemine, LA	--	--	--	(1)
E.I. duPont de Nemours, New Johnsonville, TN	--	--	230	--
Huck Salt Co., Fallon, NV	20	--	--	--
Hutchinson Salt Co., Hutchinson, KS	750	--	--	--
Independent Salt Co., Kanapolis, KS	750	--	--	--
Key Energy Services, LLC, Hobbs, NM ²	--	--	--	(1)
Lyons Salt Co., Lyons, KS	600	--	--	--
Moab Salt, Inc., Moab, UT	--	250	--	--
Morton International, Inc.:				
Fairport, OH	2,000	--	--	--
Glendale, AZ	--	150	--	--
Grand Saline, TX	400	--	150	--
Grantsville, UT	--	500	--	--
Manistee, MI	--	--	360	--
Rittman, OH	--	--	600	--
Silver Springs, NY	--	--	375	(1)
South Hutchinson, KS	--	--	350	--
Weeks Island, LA	1,800	--	--	(1)
The Mosaic Co., Hersey, MI ³	--	--	300	--
New Mexico Salt and Mineral Corp., Loving, NM	--	100	--	--
North American Salt Co. ⁴				
Cote Blanche, LA	3,500	--	--	--
Lyons, KS	--	--	425	--
Ogden, UT ⁵	--	1,500	--	--
Occidental Chemical Corp., Wichita, KS ⁶	--	--	--	(1)
Olin Corp., McIntosh, AL	--	--	--	(1)
PPG Industries, Inc.:				
Lake Charles, LA	--	--	--	(1)
New Martinsville, WV	--	--	--	(1)

See footnotes at end of table.

TABLE 2—Continued
 U.S. SALT COMPANIES BY PRODUCTION CAPACITY, LOCATION, AND TYPE IN 2009

(Thousand short tons)

Company	Rock	Solar	Vacuum and	
			Open Pans	Brine
Redmond Clay & Salt Co., Inc., Redmond, UT	150	--	--	--
Searles Valley Minerals, Inc., Trona, CA ⁷	--	200	--	--
South Bay Salt Works, Chula Vista, CA ⁸	--	125	--	--
Tetra Technologies, Inc., Amboy, CA	--	75	--	--
Texas Brine Corp.:				
Beaumont, TX	--	--	--	(1)
Chacahoula, LA	--	--	--	(1)
Clemville, TX	--	--	--	(1)
Corpus Christi, TX	--	--	--	(1)
Dale, NY	--	--	--	(1)
Houston, TX	--	--	--	(1)
LaPorte, TX	--	--	--	(1)
Napoleonville, LA	--	--	--	(1)
Wyoming, NY	--	--	--	(1)
US Salt L.L.C., Watkins Glen, NY	--	--	335	(1)
Union Texas Products Corp., Plaquemine, LA	--	--	--	(1)
United Salt Corp.:				
Baytown, TX	--	--	400	(1)
Carlsbad, NM	--	400	--	--
Hockley, TX	150	--	--	--
Saltville, VA	--	--	200	--
Total Production Capacity	25,200	5,150	5,750	19,700

-- Zero.

¹Includes brine for sale and for captive use. Individual brine capacity is assumed to be equal to the quantity of annual brine production, and therefore, considered company proprietary data. Brine producers include those chloralkali producers that produce captive brine and companies that supply brine for chloralkali manufacture, oil field chemicals, etc. Total brine production capacity is the quantity of brine produced for the year.

²Formerly Rowland Trucking Co., Inc.; then became Yale E. Key, Inc.

³Sells salt to North American Salt Co.

⁴Owned by Compass Minerals, Inc.

⁵Owned by Compass Minerals; operated by Great Salt Lake Minerals Corp.

⁶Formerly Vulcan Chemical Co.

⁷Formerly Pacific Salt and Chemical Co.

⁸Formerly Western Salt Co.

Source: U.S. Geological Survey.

TABLE 3
SALT PRODUCED IN THE UNITED STATES, BY TYPE AND PRODUCT FORM¹

(Thousand metric tons)

Product form	Vacuum and				Total
	open pans	Solar	Rock	Brine	
2008:					
Bulk	1,010 ^r	3,280 ^r	20,400 ^r	18,900	43,600 ^r
Compressed pellets	1,290	323	XX	XX	1,610
Packaged	1,770 ^r	396	294	XX	2,460 ^r
Pressed blocks	144	73	161	XX	379
Total	4,200 ^r	4,070 ^r	20,900 ^r	18,900	48,000 ^r
2009:					
Bulk	934	2,990	19,600	17,800	41,400
Compressed pellets	1,220	330	XX	XX	1,550
Packaged	1,730	465	522	XX	2,720
Pressed blocks	140	91	156	XX	387
Total	4,030	3,880	20,300	17,800	46,000

^rRevised. XX Not applicable.

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

TABLE 4
SALT SOLD OR USED IN THE UNITED STATES, BY TYPE AND PRODUCT FORM^{1,2}

(Thousand metric tons and thousand dollars)

Product form	Vacuum and open pans		Solar		Rock		Brine		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
2008:										
Bulk	984 ^r	109,000 ^r	1,920 ^r	73,000 ^r	20,600	624,000	18,800	151,000 ^r	42,400 ^r	956,000 ^r
Compressed pellets	1,290	215,000	393	54,100	XX	XX	XX	XX	1,680	269,000
Packaged:										
Less-than-5-pound units	183 ^r	NA	10	NA	21	NA	XX	XX	214 ^r	XX
More-than-5-pound units	1,520 ^r	NA	892	NA	280	NA	XX	XX	2,700 ^r	XX
Total	1,710 ^r	307,000 ^r	902	79,600	301	32,900	XX	XX	2,910 ^r	420,000 ^r
Pressed blocks:										
For livestock	93	NA	115	NA	150	NA	XX	XX	358	XX
For water treatment	47	NA	2	NA	3	NA	XX	XX	51	XX
Total	140	17,900	117	13,800	153	16,100	XX	XX	410	47,800
Grand total	4,120 ^r	649,000 ^r	3,330 ^r	221,000 ^r	21,100	673,000	18,800	151,000 ^r	47,400 ^r	1,690,000 ^r
2009:										
Bulk	763	83,200	1,690	63,900	17,600	595,000	17,800	140,000	37,800	882,000
Compressed pellets	1,200	215,000	403	60,700	XX	XX	XX	XX	1,600	276,000
Packaged:										
Less-than-5-pound units	358	NA	1	NA	36	NA	XX	XX	395	XX
More-than-5-pound units	1,510	NA	921	NA	457	NA	XX	XX	2,890	XX
Total	1,870	385,000	922	92,700	493	56,100	XX	XX	3,280	534,000
Pressed blocks:										
For livestock	116	NA	129	NA	151	NA	XX	XX	396	XX
For water treatment	16	NA	1	NA	3	NA	XX	XX	20	XX
Total	132	18,800	130	18,000	154	17,200	XX	XX	416	53,900
Grand total	3,960	702,000	3,140	235,000	18,200	668,000	17,800	140,000	43,100	1,750,000

^rRevised. NA Not available. XX Not applicable.

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

²As reported at salt production locations, the term “sold or used” indicates that some salt, usually salt brine, is not sold but is used for captive purposes by plant or company. Because data do not include salt imported, purchased, and (or) sold from inventory from regional distribution centers, salt sold or used by type may differ from totals shown in tables 5 and 6, which are derived from company totals.

TABLE 5
SALT SOLD OR USED BY PRODUCERS IN THE UNITED STATES,
BY STATE^{1,2}

(Thousand metric tons and thousand dollars)

State	2008		2009	
	Quantity	Value	Quantity	Value
Kansas	3,010	178,000	2,710	188,000
Louisiana	14,600	231,000	13,200	229,000
New York	7,660	431,000	6,240	426,000
Texas	9,080	157,000	8,910	164,000
Utah	2,150	139,000	2,000	152,000
Other Eastern States ³	9,460 ^r	455,000 ^r	8,680	480,000
Other Western States ⁴	1,370 ^r	103,000 ^r	1,380	107,000
Total	47,400 ^r	1,690,000 ^r	43,100	1,750,000
Puerto Rico ^c	45	1,500	45	1,500

^cEstimated. ^rRevised

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

²The term “sold or used” indicates that some salt, usually salt brine, is not sold but is used for captive purposes by plant or company.

³Includes Alabama, Michigan, Ohio, Tennessee, Virginia, and West Virginia.

⁴Includes Arizona, California, Nevada, New Mexico, and Oklahoma.

TABLE 6
DISTRIBUTION OF DOMESTIC AND IMPORTED SALT BY PRODUCERS IN THE UNITED STATES, BY END USE AND TYPE^{1,2}

(Thousand metric tons)

End use	Standard industrial classification	Vacuum and open pans		Solar		Rock		Brine		Total ³	
		2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Chemical:											
Chloralkali producers	2812	100	82	332 ^r	306	614	527	15,700	15,700	16,800	16,700
Other chemical	28 (excludes 2812, 2899)	255	205	262	200	1,350	832	1	6	1,860	1,240
Total		355	287	594 ^r	506	1,960	1,360	15,700	15,800	18,600	17,900
Food-processing industry:											
Meat packers	201	209	205	50	42	24	24	--	--	283	271
Dairy	202	117	120	9	11	6	5	--	--	132	136
Canning	2091, 203	130	157	28	28	32	30	--	--	190	215
Baking	205	128	308	4	3	13 ^r	12	--	--	144	324
Grain mill products	204 (excludes 2047)	84	85	6	5	17	9	--	--	107	100
Other food processing	206–208, 2047, 2099	714	493	80	103	73	77	1	1	869 ^r	674
Total		1,380	1,370	177	193	164	158	1	1	1,720	1,720
General industrial:											
Textiles and dyeing	22	42	15	32	30	4	3	(4)	(4)	78	48
Metal processing	33, 34, 35, 37	8	4	18	11	16	8	(4)	(4)	42	24
Rubber	2822, 30 (excludes 3079)	3	2	(4)	(4)	2	2	(4)	(4)	6	5
Oil	13, 29	65	62	118	162	55	80	47	11	286	314
Pulp and paper	26	16	9	38	31	23	18	--	--	77	58
Tanning and (or) leather	311	2	1	9	8	26	22	--	--	37	32
Other industrial	XX	107	120	94	87	634	104	(4)	(4)	834	312
Total		243	213	308	329	759	238	48 ^r	12	1,360	792
Agricultural:											
Feed retailers and (or) dealers mixers	5159	378	384	399	381	480	547	(4)	--	1,260	1,310
Feed manufacturers	2048	28	42	90	84	286	252	--	--	405	377
Direct-buying end user	02	5	3	8	8	12	10	--	--	25	21
Total		411	429	498	472	778	809	(4)	--	1,690	1,710
Water treatment:											
Government (Federal, State, local)	2899	21 ^r	41	333	297	55	68	2	2	412	409
Commercial or other	2899	123	123	278	341	518 ^r	128	2	9	922	602
Total		145	164	611	638	574	197	4	11	1,330	1,010
Ice control and (or) stabilization:											
Government (Federal, State, local)	9621	2	4	472	482	18,200	13,800	1	--	18,600	14,200
Commercial or other	XX	43	39	335	323	3,600	2,290	--	--	3,980	2,650
Total		45	43	807	805	21,800	16,000	1	--	22,600	16,900
Distributors:											
Agricultural distribution	5191	96	72	130	135	209	151	--	--	436	357
Grocery wholesalers and (or) retailers	514, 54	539	493	268	230	185	89	--	--	992	812
Institutional wholesalers and end users	58, 70	126	121	63	64	230	156	(4)	(4)	418	342
Water-conditioning distribution	7399	120	136	315	315	28	16	1	1	464	469
U.S. Government resale	9199	(4)	(4)	1	(4)	(4)	1	--	--	1 ^r	1
Other wholesalers and (or) retailers	5251	801	769	994	904	374	258	(4)	(4)	2,170	1,930
Total		1,680	1,590	1,770	1,650	1,030	671	1	2	4,480	3,910
Other ⁵		70	50	184	164	506	557	528	292	1,290	1,060
Grand total		4,330	4,150	4,950 ^r	4,760	27,500	20,000	16,300	16,100	53,100	45,000

See footnotes at end of table.

TABLE 6—Continued

DISTRIBUTION OF DOMESTIC AND IMPORTED SALT BY PRODUCERS IN THE UNITED STATES, BY END USE AND TYPE^{1,2}

¹Revised. -- Zero. XX Not applicable.

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

²The quantity of imports included in the total for each type of salt is the amount reported by the U.S. salt industry, not the quantity reported by the U.S. Census Bureau that appears in tables 1, 11, and 12.

³Because data include salt imported, produced, and (or) sold from inventory from regional distribution centers, data for salt sold or used by type may differ from totals shown in tables 1, 3, and 4, which are derived from plant reports at salt production locations. Data may differ from totals shown in table 6 because of changes in inventory and (or) incomplete data reporting.

⁴Less than ½ unit.

⁵Includes exports.

TABLE 7
DISTRIBUTION OF DOMESTIC AND IMPORTED EVAPORATED AND ROCK SALT IN THE UNITED STATES, BY DESTINATION^{1,2}

(Thousand metric tons)

Destination	2008				2009			
	Evaporated			Total	Evaporated			Total
	Vacuum and open pans	Solar	Rock		Vacuum and open pans	Solar	Rock	
Alabama	50	5	67	123	42	7	52	101
Alaska	3	3	--	6	3	2	--	5
Arizona	11	105	1	118 ^r	12	110	1	123
Arkansas	51	5	74	130	46	6	56	108
California	206	715 ^r	2	922 ^r	196	754	6	956
Colorado	12	71	8	91	11	66	10	87
Connecticut	14	109	140	263	16	115	115	245
Delaware	10	11	3	25	11	10	2	23
District of Columbia	(3)	16	4	20	(3)	33	2	35
Florida	75	208	3	286	71	215	4	291
Georgia	113	68	33	214	103	55	36	195
Hawaii	(3)	1	--	2	13	55	(3)	69
Idaho	20	127	1	147 ^r	8	39	(3)	48
Illinois	307	132	3,230	3,670	318	99	2,170	2,590
Indiana	249	116	1,110	1,470 ^r	249	121	729	1,100
Iowa	131	111	938	1,180	127	99	434	659
Kansas	88	59	987	1,130	76	44	1,140	1,260
Kentucky	68	8	875	951	64	7	830	900
Louisiana	61	4	437	502	66	4	235	306
Maine	11	9	225	245	15	8	148	172
Maryland	66	131	17	214	77	167	20	264
Massachusetts	28	8	321	357	32	48	302	382
Michigan	274	42	2,980	3,300	268	42	1,950	2,260
Minnesota	126	305	880	1,310	114	223	635	973
Mississippi	22	2	239	263	21	4	174	198
Missouri	155	78	585	818	119	71	414	604
Montana	1	53	(3)	54	1	68	(3)	69
Nebraska	56	42	38	135	56	39	23	118
Nevada	4	239 ^r	(3)	244 ^r	4	211	19	235
New Hampshire	15	37	216	269	15	108	53	176
New Jersey	97	155	78	330	104	118	112	334
New Mexico	17	81	(3)	98	20	133	(3)	153
New York	295	71	4,180	4,540	179	35	3,060	3,280
North Carolina	134	62	81	276	113	97	74	283
North Dakota	24	14	6	45	16	15	6	37
Ohio	419	45	3,510	3,970	426	40	2,090	2,550
Oklahoma	33	26	76	134	30	27	62	119
Oregon	19	43	1	63	19	39	1	59
Pennsylvania	166	58	2,340	2,560	172	76	1,920	2,170
Rhode Island	3	190	1	195	3	227	1	231
South Carolina	44	9	1	54	44	9	2	55
South Dakota	21	56	18	94 ^r	23	54	9	86
Tennessee	110	6	423	539	123	6	366	495
Texas	277	167	172	616	278	158	208	646
Utah	14	503	1	518	14	307	10	331
Vermont	6	2	296	303	5	1	218	225
Virginia	87	60	87	233	88	77	117	281

See footnotes at end of table.

TABLE 7—Continued
DISTRIBUTION OF DOMESTIC AND IMPORTED EVAPORATED AND ROCK SALT IN THE UNITED STATES, BY DESTINATION^{1,2}

(Thousand metric tons)

Destination	2008				2009			
	Evaporated		Rock	Total	Evaporated		Rock	Total
	Vacuum and open pans	Solar			Vacuum and open pans	Solar		
Washington	26	126	1	154	25	134	1	159
West Virginia	16	49	261	326	20	7	147	173
Wisconsin	220	189	2,120	2,520	199	158	1,520	1,870
Wyoming	1	37	(3)	38	1	47	(3)	49
Other ⁴	78	182	457	718	86	164	555	804
Total ⁵	4,330	4,950 ^r	27,500	36,800	4,150	4,760	20,000	28,900

^rRevised. -- Zero.

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

²Each salt type includes domestic and imported quantities. Brine is excluded because brine is not shipped out of State.

³Less than ½ unit.

⁴Includes shipments to overseas areas administered by the United States, Puerto Rico, exports, and some shipments to unspecified destinations.

⁵Because data include salt imported, purchased, and (or) sold from inventory from regional distribution centers, data for evaporated and rock salt distributed by State may differ from totals shown in tables 1 and 3, which are derived from plant reports at salt production locations. Data may differ from totals shown in table 5 because of changes in inventory and (or) incomplete data reporting.

TABLE 8
AVERAGE VALUE OF SALT, BY PRODUCT FORM AND TYPE^{1,2}

(Dollars per metric ton)

Product form	Vacuum and			
	open pans	Solar	Rock	Brine
2008:				
Bulk	110.73 ^r	38.06 ^r	30.25	7.99 ^r
Compressed pellets	166.74	137.72	XX	XX
Packaged	180.03 ^r	88.25	109.46	XX
Average ³	158.59 ^r	64.33 ^r	31.39	7.99 ^r
Pressed blocks	128.31	118.66	104.78	XX
2009:				
Bulk	109.05	37.84	33.90	7.85
Compressed pellets	180.00	150.42	XX	XX
Packaged	206.27	100.56	113.74	XX
Average ³	178.67	72.09	36.08	7.85
Pressed blocks	142.57	138.06	111.79	XX

^rRevised. XX Not applicable.

¹Net selling value, free on board plant, excluding container costs.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Salt value data reported prior to 1984 were an aggregate value per metric ton of bulk, compressed pellets, and packaged salt. For time series continuity, an average of these three types of product forms is presented that is based on the aggregated values and quantities of the product form for each type of salt listed in table 3.

TABLE 9
U.S. EXPORTS OF SALT, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2008		2009	
	Quantity	Value ²	Quantity	Value ²
Canada	896	42,200	1,360	50,200
China	6	878	1	528
Colombia	2	409	2	341
Costa Rica	2	303	2	362
Dominican Republic	1	359	1	393
Germany	1	271	1	475
Honduras	4	515	1	332
Japan	9	2,230	3	1,560
Malaysia	3	558	3	826
Mexico	36	6,030	45	7,560
Netherlands	31	2,190	1	704
Panama	1	145	1	133
Saudi Arabia	5	1,230	4	1,190
Singapore	3	190	1	543
Other	25 ^r	8,410 ^r	20	8,950
Total	1,030	65,900	1,450	74,100

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown. (The Harmonized Tariff Schedule of the United States code for salt is 2501.00.0000.)

²Free alongside ship value at U.S. ports.

Source: U.S. Census Bureau.

TABLE 10
U.S. EXPORTS OF SALT, BY CUSTOMS DISTRICT¹

(Thousand metric tons and thousand dollars)

District	2008		2009	
	Quantity	Value ²	Quantity	Value ²
Anchorage, AK	2	358	(3)	27
Buffalo, NY	34	6,680	30	5,850
Cleveland, OH	(3)	107	1	163
Detroit, MI	719	22,100	1,200	30,900
El Paso, TX	1	169	1	360
Great Falls, MT	1	445	2	644
Houston, TX	43	4,100	9	3,200
Laredo, TX	27	4,960	36	5,700
Los Angeles, CA	26	4,810	5	3,400
Miami, FL	4	1,380	3	1,410
Mobile, AL	(3)	75	(3)	36
New York, NY	9	3,470	1	192
Nogales, AZ	1	305	4	1,270
Norfolk, VA	1	551	1	594
Ogdensburg, NY	21	3,440	23	3,940
Pembina, ND	3	883	5	1,080
San Diego, CA	6	580	3	251
San Francisco, CA	3	596	3	995
Seattle, WA	8	1,620	5	1,440
St. Albans, VT	6	726	4	710
Other ⁴	116	8,560	119	11,900
Total	1,030	65,900	1,450	74,100

¹Data are rounded to no more than three significant digits; may not add to totals shown. (The Harmonized Tariff Schedule of the United States code for salt is 2501.00.0000.)

²Free alongside ship value at U.S. ports.

³Less than ½ unit.

⁴Unknown but assumed to be rail and (or) truck shipments to Canada through various points of departure. Also includes minor shipments through 15 other customs districts.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF SALT, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2008		2009	
	Quantity	Value ²	Quantity	Value ²
Australia	2	187	1	175
Bahamas, The	578	7,510	811	12,600
Belgium	2	709	4	840
Brazil	393	9,500	168	3,060
Canada	4,740	107,000	5,940	131,000
Chile	4,680	67,100	5,170	107,000
China	13	2,150	9	1,390
Colombia	4	650	5	825
Egypt	620	5,770	291	5,560
France	82	13,400	17	6,790
Germany	2	1,260	9	1,340
Israel	11	1,930	9	3,840
Italy	62	3,440	70	3,830
Korea, Republic of	4	981	1	864
Mexico	1,180	31,900	1,260	33,400
Netherlands	100	4,690	217	6,410
Netherlands Antilles	154	2,970	28	1,010
New Zealand	2	178	(3)	65
Pakistan	15	575	2	627
Peru	587	6,270	408	4,150
South Africa	2	1,210	4	1,300
Spain	30	3,470	65	3,660
Tunisia	101	1,720	54	589
United Kingdom	497	5,890	67	2,690
Other	20 ^r	1,790 ^r	81	3,040
Total	13,900	282,000	14,700	337,000

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown. (The Harmonized Tariff Schedule of the United States code for salt is 2501.00.0000.)

²Customs value only.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12
U.S. IMPORTS OF SALT, BY CUSTOMS DISTRICT¹

(Thousand metric tons and thousand dollars)

District	2008		2009	
	Quantity	Value ²	Quantity	Value ²
Anchorage, AK	21	1,330	3	167
Baltimore, MD	1,170	25,400	850	27,600
Boston, MA	1,480	18,300	1,630	25,400
Buffalo, NY	29	924	5	583
Charleston, SC	103	2,060	82	1,610
Chicago, IL	1,050	16,800	1,170	18,200
Cleveland, OH	190	6,790	246	4,710
Columbia-Snake, OR	165	5,340	145	4,880
Dallas-Fort Worth, TX	2	415	(3)	81
Detroit, MI	1,550	33,000	1,890	33,300
Duluth, MN	56	4,860	36	3,230
Great Falls, MT	8	702	2	226
Los Angeles, CA	164	5,130	116	4,610
Miami, FL	2	412	1	336
Milwaukee, WI	1,090	16,300	1,470	20,400
Minneapolis, MN	144	2,560	277	4,110
New Orleans, LA	1,120	23,500	484	13,200
New York, NY	2,010	33,900	2,600	55,000
Norfolk, VA	71	1,470	47	866
Ogdensburg, NY	382	20,800	749	45,000
Pembina, ND	5	851	4	795
Philadelphia, PA	930	13,200	1,150	24,400
Portland, ME	1,290	20,400	854	14,400
Providence, RI	227	3,450	235	5,500
San Diego, CA	6	1,010	4	1,150
San Francisco, CA	1	1,080	3	1,230
San Juan, PR	4	674	5	883
Savannah, GA	56	2,260	39	2,230
Seattle, WA	16	1,630	119	5,670
St. Albans, VT	6	747	2	278
St. Louis, MO	48	3,220	(3)	79
Tampa, FL	367	6,410	356	6,900
Wilmington, NC	113	5,320	119	4,490
Other ⁴	3	1,890	6	5,280
Total	13,900	282,000	14,700	337,000

¹Data are rounded to no more than three significant digits; may not add to totals shown. (The Harmonized Tariff Schedule of the United States code for salt is 2501.00.0000.)

²Customs value only.

³Less than ½ unit.

⁴Includes imports through 6 other customs districts.

Source: U.S. Census Bureau.

TABLE 13
SALT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country ³	2005	2006	2007	2008	2009 ^e
Afghanistan, rock salt ^e	12	12	12	12	12
Albania ^e	25	25	25	25	25
Algeria, brine and sea salt	197	260	183	202	200
Angola ^e	30	35	35	35	35
Argentina	1,846	1,918	2,358	1,681 ^r	1,700
Armenia	35	37	35	37	37
Australia, salt and marine salt	12,444	11,424	10,855	11,160 ^r	11,000
Austria, rock and brine	1,024	807	742	1,134 ^r	1,000
Azerbaijan	11	12	7	8 ^r	5 ⁴
Bahamas, The	1,270	1,152	8,823 ^r	10,244 ^r	10,000
Bangladesh, marine salt ^{e,5}	350	350	360	360 ^r	350
Belarus ^e	1,839 ⁴	1,900	2,000	2,000	2,000
Bolivia	1	1	2	1 ^r	2 ⁴
Bosnia and Herzegovina	392	416	502	555 ^r	550
Botswana ^{e,6}	210 ⁴	210	210	210	210
Brazil:					
Brine salt	5,520	5,122	5,365 ^r	5,370 ^{r,e}	5,370
Rock salt	1,559	1,624	1,621 ^r	1,650 ^{r,e}	1,650
Total	7,079	6,746	6,986 ^r	7,020 ^{r,e}	7,020
Bulgaria	1,900	2,000	2,000 ^e	2,100 ^{r,e}	2,100
Burkina Faso ^e	5	5	5	5	5
Burma, brine salt	117	84	71	54	133 ⁴
Cambodia	--	59 ^r	77 ^r	78 ^r	78
Canada	13,643	14,389	11,862	14,386	14,566 ⁴
Cape Verde ^e	2	2	2	2	2
Chile	6,068	4,580	4,404	6,431	8,382 ⁴
China	46,610	56,630	59,760	59,520	58,450 ⁴
Colombia:					
Marine salt	429	390	310	178 ^r	150
Rock salt	216	248	204	43 ^r	100
Total	645	638	514	221 ^r	250
Costa Rica, marine salt ^e	20	20	20	-- ^r	--
Croatia	37	30	33	33 ^e	32
Cuba	351	266	141 ^r	157 ^r	160
Denmark, sales ^e	610	600	600	600	600
Djibouti ^e	53	78	98	118	118
Dominican Republic, marine salt ^e	50	50	50	50	50
Ecuador ^e	75	75	75	75	75
Egypt ^e	1,200	1,200	227 ^{r,4}	271 ^{r,4}	300
El Salvador, marine salt ^e	31	30	30	30	30
Eritrea, marine salt ^e	63	60	60	60	60
Ethiopia, rock salt ⁵	87	218	240	260	281 ⁴
France, all sources ⁷	6,730	8,718	6,140	6,100 ^r	6,100
Georgia ^e	30	30	30	30	30
Germany:					
Industrial brines	9,904	9,590	10,395 ^r	9,084 ^r	9,000
Rock salt and other	8,834	9,663	7,819	5,855 ^r	5,500
Salt, evaporated, includes marine salt	594	593	592 ^r	580 ^r	550
Total	19,333	19,846	18,806 ^r	15,519 ^r	15,100
Ghana ^e	250	123 ^r	124 ^r	150 ^r	150
Greece ^e	150	150	150	150	150

See footnotes at end of table.

TABLE 13—Continued
SALT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country ³	2005	2006	2007	2008	2009 ^e
Guadeloupe ^e	49	49	49	49	49
Guatemala ^e	60	50	50	50	50
Guinea ^e	15	15	15	15	15
Honduras ^e	42	40	40	40	40
Iceland ^e	5	5	5	5	5
India: ^e					
Marine salt	15,500	15,500	16,000	16,000	16,500
Rock salt	3	3	3	3	3
Total	15,500	15,500	16,000	16,000	16,500
Indonesia ^e	680	700	700	700	720
Iran ^{e, 8}	2,009 ⁴	2,000	2,565 ^{r, 4}	2,000	2,000
Iraq ^e	25	25	153 ^r	109 ^r	150
Israel	406	434	400	421 ^r	420
Italy, all sources ⁹	3,476	3,438	2,214	2,200 ^e	2,200
Jamaica ^e	19	19	19	NA ^r	NA
Japan	1,227	1,166	1,190 ^e	1,200 ^e	1,200
Jordan	30	29	17	29	30
Kazakhstan, salt and sodium chloride	178	417	228	225 ^e	213 ⁴
Kenya, crude salt ¹⁰	27 ^r	35 ^r	12 ^r	24 ^r	24
Korea, North ^e	500	500	500	500	500
Korea, Republic of	379 ^r	286 ^r	250 ^r	348 ^r	350
Kuwait ^e	8	13	14	14 ^r	14
Laos, rock salt ^e	34 ⁴	35	35	35	35
Lebanon ^e	4	4	4	4	4
Libya ^e	40	40	40	40	40
Madagascar ^e	65	75	75	75	75
Mali ^e	6	6	6	6	6
Malta, marine salt ^e	(11)	(11)	(11)	(11)	(11)
Martinique ^e	200	200	200	200	200
Mauritania	(11) ^e	(11)	(11)	1	1 ⁴
Mauritius	8	9	8	8 ^e	8
Mexico	9,508	8,371	8,400 ^e	8,809	7,445 ⁴
Mongolia, mine output	2	1	1	(11) ^r	1
Montenegro, sea water evaporate	15 ¹²	5	20 ^e	25 ^e	17
Morocco, marine and rock salt	254	250	250 ^e	250 ^e	250
Mozambique, marine salt ^e	140 ^r	150 ^r	110 ^r	110 ^r	110
Namibia, marine salt	573	604	811 ^r	732 ^r	700
Nepal ^{e, 13}	2	--	2 ^r	2 ^r	2
Netherlands ^e	5,000	5,000	5,000	5,000	5,000
Netherlands Antilles ^e	500	500	500	500	500
New Zealand ^e	100	100	100	100	100
Nicaragua, marine salt ^e	30	30	30	30	30
Niger ^e	1 ⁴	1	1	1	1
Oman	11	11	10	10	11
Pakistan: ⁵					
Marine salt ^e	14	13	13	13	13
Rock salt	1,648	2,008	1,620	1,700 ^r	1,750
Total	1,662	2,021	1,633	1,713 ^r	1,760
Panama, marine salt ^e	18	18	18	18	18
Peru	1,255	1,253	1,185	1,276	15,668 ⁴
Philippines, marine salt	421	418	438	510 ^r	500

See footnotes at end of table.

TABLE 13—Continued
SALT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country ³	2005	2006	2007	2008	2009 ^e
Poland:					
Rock salt	1,123	1,130	591	618 ^r	620
Recovered from brine	2,900 ^r	2,899 ^r	2,931 ^r	2,900 ^{r,e}	2,900
Portugal, rock salt	598	586	591 ^r	560 ^r	560 ^{p,4}
Total	4,023 ^r	4,029 ^r	3,522 ^r	3,518 ^r	3,520
Romania:					
Rock salt	46	47	51	50 ^e	50
Other	2,374	2,574	2,425	2,400 ^{r,e}	2,400
Total	2,420	2,621	2,476	2,450 ^{r,e}	2,450
Russia	2,700	2,900	2,200	2,200 ^e	2,200
Saudi Arabia	1,738	1,752	1,507 ^r	1,600 ^r	1,600
Senegal	134	199	212	241 ^r	200
Serbia	35 ^{e,12}	30	30	30 ^r	29 ⁴
Slovakia	100 ^r	99 ^r	101 ^r	100 ^{r,e}	100
Slovenia	803	803	803 ^e	803 ^e	803
South Africa	399	465	412	416	425 ⁴
Spain:					
Marine and other evaporated salt	1,350	1,469 ^r	1,500 ^r	1,500 ^{r,e}	1,500 ^p
Rock salt	3,200	2,834 ^r	2,850 ^r	2,850 ^{r,e}	2,850 ^p
Total	4,550	4,303 ^r	4,350 ^r	4,350 ^{r,e}	4,350 ^p
Sri Lanka ^e	80	88	70	70	72
Sudan	30 ^e	12	23	23 ^e	23
Switzerland ^e	300	300	300	300	300
Syria	110	133	81	81 ^e	78 ⁴
Tanzania	135	35	35	36 ^e	36
Thailand:					
Rock salt	1,074	1,008	1,135 ^r	1,212 ^r	1,200
Other ^e	100	100	100	100	100
Total	1,174	1,108	1,235 ^r	1,312 ^r	1,300
Tunisia, marine salt	1,132	1,127	933	1,063 ^r	1,000
Turkey	2,253	2,800	1,500	1,500 ^e	1,500
Turkmenistan ^e	215	215	215	215	215
Uganda ^e	5	5	5	5	5
Ukraine	4,811	5,996	5,548	4,425 ^r	4,400
United Kingdom: ^e					
Brine salt ^{14,15}	2,800	2,800	2,800	2,800	2,800
Rock salt	2,000	2,000	2,000	2,000	2,000
Other salt ¹⁵	1,000	1,000	1,000	1,000	1,000
Total	5,800	5,800	5,800	5,800	5,800
United States, including Puerto Rico:					
United States:					
Brine	19,900	19,800	19,700	18,900	17,800 ⁴
Rock salt	17,700	16,500	16,800	20,900 ^r	20,300 ⁴
Solar salt	3,430	3,640	3,650	4,070 ^r	3,880 ⁴
Vacuum and open pan	4,170	4,450	4,420	4,200 ^r	4,030 ⁴
Puerto Rico ^e	45	45	45	45	45
Total	45,200	44,500	44,600	48,100 ^r	46,100 ⁴
Venezuela ^e	350	350	350	350	350
Vietnam	898	842 ^r	857 ^r	847 ^r	850
Yemen ^e	90	100 ⁴	100	100	100
Grand total	249,000 ^r	259,000 ^r	259,000 ^r	264,000 ^r	276,000

^eEstimated. ^pPreliminary. ^rRevised. -- Zero. NA not available.

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

TABLE 13—Continued
SALT: WORLD PRODUCTION, BY COUNTRY^{1,2}

²Table includes data available through July 16, 2010.

³Salt is produced in many other countries, but quantities are relatively insignificant and reliable production data are not available. Some salt brine production data for manufacture of chlorine, caustic soda, and soda ash are not reported because of incomplete data reporting by many countries.

⁴Reported figure.

⁵Year ending June 30 of that stated.

⁶From natural soda ash production.

⁷Includes marine and rock salt and salt solution.

⁸Year beginning March 21 of that stated.

⁹Includes marine salt.

¹⁰Production by Magadi Soda Ash Ltd. Only.

¹¹Less than ½ unit.

¹²Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

¹³Does not include production from Sardinia and Sicily, which is estimated to be 200,000 metric tons per year.

¹⁴Year ending July 15 of that stated.

¹⁵Data captioned “Brine salt” for the United Kingdom are the quantities of salt obtained from the evaporation of brine; that captioned “Other salt” are for salt content of brines used for purposes other than production of salt.