SALT

By Dennis S. Kostick

Salt, also known as sodium chloride, an important commodity, has many end uses. Virtually every person in the world has some daily contact with salt either directly or indirectly. 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 in the manufacture of caustic soda. These two important inorganic chemicals are used to make a multitude of consumer-related end-use products, such as polyvinyl chloride (PVC) plastic made from chlorine and paper pulping chemicals manufactured from caustic soda.

Production

U.S. production data for salt are developed by the U.S. Geological Survey (USGS) from an annual voluntary survey of U.S. salt-producing sites and of company operations. Of the 28 companies to which a survey request was sent, all but one responded, representing 97% of the total production shown in this report. Data for the one company were estimated on the basis of its prior responses to previous annual surveys, the 1996 production estimate survey, or brine production capabilities for chloralkali manufacture based upon chlorine production capacities.

Total U.S. salt production increased slightly in 1996 compared with the previous year. Rock salt production decreased 4%; however, domestic inventories of rock salt rose because imports increased in anticipation of adverse winter weather. The lower level of rock salt production, as compared with previous years' levels, also was a result of losing the Akzo Nobel Salt Inc.'s rock salt mine that normally produced nearly 3.6 million metric tons of salt per year. Solar salt production declined 8%, mainly in the bulk salt category. According to the USGS canvass for 1996, 28 companies operated 64 salt-producing plants in 14 States. Two of the plants had closed but continued to sell from inventory during 1996. Seven of the companies and 12 of the plants produced more than 1 million tons each and accounted for 87% and 62%, respectively, of the U.S. total production and 94% and 31%, respectively, of total value. Several companies and plants produced more than one type of salt. In 1996, 12 companies (16 operations) produced solar-evaporated salt; 5 companies (16 operations), vacuum pan salt; 10 companies (13 operations), rock salt; and 13 companies (27 operations), salt brine. *(See tables 1, 2, and 3.)*

The five leading States in terms of total salt sold or used were Louisiana, 33%; Texas, 24%; New York, 11%; Kansas, 7%; and Utah, 4%. Although Louisiana, New York, and Ohio were major rock salt-producing States, a substantial amount of salt was produced in Alabama, Kansas, Louisiana, New York, Ohio, Texas, Utah, and West Virginia as brine for the chemical industry. *(See table 4.)*

U.S. salt production accounted for about 22% of total world production. Production and trade of salt remained about the same as that of 1995. Total world production of all types of salt was essentially the same as the previous year. The depressed market for chlorine and environmental problems associated with emissions of chlorinated compounds may affect the short-term status of the world chloralkali industry, which is the largest single consumer of salt.

Akzo Nobel Salt Inc. sold its Manistee, MI, vacuum pan salt facility to Ambar Inc., which is based in Lafayette, LA. Ambar will convert the plant and produce 300,000 tons per year of calcium chloride. Brine feedstock will be supplied by Martin Marietta Magnesia located nearby (Industrial Minerals, 1996).

Akzo Nobel NV, the parent company of Akzo Nobel Salt Inc., announced on April 22 that it would not construct a new rock salt mine at Hampton Corners, NY, because the project did not meet its financial criteria. About $120 million to $140 million would had to have been invested in the project, which would have produced rock salt for the unpredictable deicing market. Akzo retained the Retsof location as a salt distribution center that would be supplied by its Cleveland, OH, mine (Akzo Nobel, 1996).

Almost 4 months later on August 15, Cargill Inc. of Minneapolis, MN, and Akzo Nobel NV of the Netherlands announced that Cargill would purchase the North American (excluding the flooded Retsof mine and distribution center) and Caribbean salt operations from Akzo's U.S. subsidiary, Akzo Nobel Salt Inc. Akzo had annual U.S. sales of about $450 million, while Cargill's annual sales were estimated between $150 million to $200 million. The transaction included Akzo's corporate offices in Clarks Summit, PA; rock salt mines at Cleveland, OH, and Avery Island, LA; vacuum salt plants in St. Clair, MI, Watkins Glen, NY, and Akron, OH; and solar salt facilities in Timpie, UT, and on the island of Bonaire in the Netherlands Antilles in the Caribbean. Solar salt terminals in Port Newark, NJ, and Cape Canaveral, FL, were also includedin the transaction. These operations will be added to Cargill's assets which include solar salt plants at Amboy, CA, Newark, CA, Redwood City, CA, Freedom, OK, and Port Hedland, Australia; vacuum pan salt plants at Newark, CA, Hutchinson, KS, Breaux Bridge, LA, and Watkins Glen, NY; and a rock salt mine in Lansing, NY. After the acquisition, Cargill will have a worldwide annual production capacity of 8 million tons of rock salt, 2 million tons of vacuum pan salt, and 2.5 million tons of solar salt (Chemical Marketing Reporter, 1996a).

United Salt Corp. and Market Hub Partners Limited Partnership formed a joint venture to solution mine the salt deposit near Tioga, PA. United planned to construct an evaporated salt facility that would have an annual capacity of about 450,000 tons, the majority of which would be marketed in the region in 1998. Market Hub Partners planned to use the resulting caverns to store hydrocarbons. (Chemical Marketing Reporter, 1996b)

Consumption

A record 52.8 million tons of domestic and imported salt was consumed in the United States in 1996, based on the annual survey of the U.S. salt producers. This represented an increase of 14% compared with that of the previous year. The 1996 reported percent distribution of salt by major end use was chemicals, 42%; ice control, 33%; distributors, 9%; food and agricultural, 3% each; industrial, 7%, primary water treatment, 1%; and other combined with exports, 2%. Distributors represent a substantial share of salt sales by the salt industry; however, all the salt ultimately is resold to many end users. Some customers have specific uses for salt. For a more complete analysis of end-use markets, specific sectors of distribution in table 5 can be combined, such as agricultural and water conditioning with agricultural and water conditioning distribution, respectively.

The chemical industry consumes the majority of the salt produced, primarily salt brine. Although most salt brine is captively produced by chemical producers, many chloralkali manufacturers now purchase brine from independent brine supply companies. In certain cases, brine is captively produced by one chemical company, and any excess brine is sold to neighboring competitors. About 48% of the salt used to manufacture chlorine was captive and 31% was purchased brine. Rocks salt, solar salt, and vacuum pan salt are also used to manufacture many chemicals. *(See tables 5 and 6.)*

According to the Bureau of the Census data, 11.5 million tons of chlorine and 10.7 million tons of sodium hydroxide were produced in 1996 (Bureau of the Census, 1997). Based on the industry average ratio of 1.75 tons of salt required to produce 1.0 ton of chlorine and 1.1 tons of coproduct sodium hydroxide, the chlorine and caustic soda industry consumed about 20 million tons of salt for feedstock. Reported consumption of total domestic and imported salt for chlorine manufacture was 19.7 million tons, as shown in table 5. The difference between the calculated and reported quantities was the amount of salt unreported to the USGS from imports or captive brine production of chloralkali producers.

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 that provides a source of iodine that is essential to the oxidation processes in the body. Kosher salt, seasalt, condiment salt, and salt tablets are special varieties of salt.

Water conditioning and animal feed salt are made into 22.7-kilogram (50-pound) pressed blocks. Sulfur, iodine, trace elements, and vitamins are occasionally added to salt blocks to provide missing nutrients not found naturally in the diet of certain livestock. Salt is also compressed into pellets and used for water conditioning.

There are reportedly about 14,000 different direct and indirect uses of salt. The USGS annually surveys 8 major categories comprising 29 separate end uses.

Chemical.—The greatest quantity of salt used in the chemical industry is by the chloralkali sector. Traditionally, the chloralkali sector included salt consumed for chlorine, coproduct sodium hydroxide (also known as caustic soda and lye), and synthetic soda ash. Since 1986 when the last synthetic soda ash plant 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; however, many countries still produce synthetic soda ash and use vast quantities of salt brine as feedstock.

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 the sodium ions. About 98% of the domestic chlorine and sodium hydroxide produced is obtained from the electrolysis of salt brine feedstock using three different cell technologies. The types of cells and percent chlorine manufactured by them are diaphragm, 78%; mercury, 14%; and membrane, 6%.

It takes about 1.75 tons of salt to make 1.0 ton of chlorine and 1.1 tons of coproduct caustic soda. The electrolytic process ionizes the sodium chloride compound and selectively allows the ions to migrate through special membranes. Chlorine gas forms at the anode while sodium ions bond with water molecules at the cathode to form sodium hydroxide with hydrogen gas evolving.

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 second generation products from salt. Salt is also used as a feedstock in chemical establishments that make sodium chlorate (by the electrolysis of an acidified salt brine using hydrochloric acid adjusted to a pH of 6.5), metallic sodium (by the electrolysis of a molten salt mixture containing 33.2% sodium chloride and 66.8% calcium chloride, which is added to reduce the melting temperature of salt), and other downstream chemical operations. In powdered soaps and detergents, salt is used as a bulking agent and as 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 also used as a cofeedstock with sulfuric acid to produce sodium sulfate and hydrochloric acid. This subsector is relatively small, representing only 5% of domestic salt sales for the entire chemical sector and only 2% of total domestic salt consumption.

The consumption of salt for metallic sodium has declined over the past several years. Since the 1970s, the number of producers has decreased from three to one; Ethyl Corp. and RMI Titanium Corp. exited the market in about 1985 and 1992,

respectively, leaving E.I. du Pont de Nemours & Co. as the sole manufacturer of metallic sodium in the United States. The domestic market was about 126,000 tons in 1978; whereas in 1992, it shrunk to only 30,000 tons. The phasing out of tetraethyl lead and tetramethyl lead gasoline additives were the main reasons for the decline in consumption. Sodium usage in gasoline represented about 80% of the domestic market in 1978. The largest use of sodium in 1992 was for sodium borohydride production, which is the feedstock for sodium dithionite, which is used as a reductive bleaching agent by the pulp and paper industry. Sodium for sodium borohydride manufacture accounts for about 33% of metallic sodium consumption (Chemical Marketing Reporter, 1996c).

Food Processing.—Every person uses some quantity of salt in their food. The salt is either added to the food by the food processor or by the consumer through free choice. Salt is added to food as a flavor enhancer, preservative, binder, fermentation control additive, texture aid, and color developer. This major category is subdivided into six applications, in descending order of salt consumption: meat packers, canning, other food processing, grain mill products, baking, and dairy.

In meatpacking, salt is added to processed meats to promote the 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. Early pioneers used to store their perishables in salt barrels for protection and preservation. Salt acts as a binder in sausages to form a binding gel comprising meat, fat, and moisture. Salt also acts as a flavor enhancer and a tenderizer.

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

In the "other food processing" category, salt is used mainly as a seasoning agent. Other food processing includes miscellaneous establishments that make food for human consumption (i.e., potato chips, pretzels) and domestic pet consumption (i.e., dog and cat food). 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 is grain mill products, which consists of milling flour and rice, manufacturing cereal breakfast food, and blended or prepared flour.

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

General Industrial.—The industrial uses of salt are diverse. They include, in descending order of salt usage, oil and gas exploration; other industrial; textiles and dyeing; metal processing; pulp and paper; tanning and leather treatment; and rubber manufacture.

In oil and gas exploration, salt is an important component of drilling fluids in well drilling. It is used to flocculate and to increase the density of the drilling fluid in order to overcome high down-well gas pressures. Whenever drilling activities encounter salt formations, salt is added to the drilling fluid to saturate the solution and minimize the dissolution within the salt strata. Salt is also used to increase the set rate of concrete in cemented casings. In metal processing, salt is used in concentrating uranium ore into uranium oxide (yellow cake). It is also used in processing aluminum, beryllium, copper, steel, and vanadium.

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 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-base bleaching chemical. Although the chlorine dioxide process originated in Germany after World War I, it 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 replace some of the moisture in the hides. In rubber manufacture, salt is used to make buna rubber, neoprene rubber, and white rubber. Salt brine and sulfuric acid are used to coagulate an emulsified latex made from chlorinated butadiene.

Agricultural Industry.—Since prehistoric times, humankind has noticed that animals satisfied their salt hunger by locating salt springs, salt licks, or playa lake salt crusts. Barnyard and grazing livestock need supplementary salt rations to maintain proper nutrition. Veterinarians advocate adding loose salt in commercially mixed feeds or in block forms sold to farmers and ranchers. Salt also acts as an excellent carrier for trace elements not found in the vegetation consumed by grazing livestock. Sulfur, selenium, and other essential elements are commonly added to salt licks, or salt blocks, for free-choice feeding.

Water Treatment.—Approximately 1.2 trillion liters (325 billion gallons) of water is used daily in the United States for residential and commercial uses. 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. Commercial and residential water-softening units use salt to remove the ions causing water 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 the brine replenishes the lost sodium ions.

Ice Control and Road Stabilization.—The second largest end use of salt is for highway deicing. The developer of the Fahrenheit temperature scale (° F), discovered that salt mixed with ice (at a temperature below the freezing point) creates a solution with a lower freezing point than water by itself. The brine forms below the surface of the ice and snow and prevents

the water from freezing into ice and bonding with the road surface. Therefore, salt causes snow and ice to melt. Salt is an inexpensive, widely available, and effective ice control agent. It does, however, become less effective as the temperature decreases below about -9.4° C to -6.7° C (15° F to 20° F). At lower temperatures, more salt would have to be applied to maintain higher brine concentrations to provide the same degree of melting. Most winter snowstorms and ice storms occur between -3.9° C to 0° C (25° F and 32° F), a range in which salt is most effective. An anticaking agent, such as ferric ferrocyanide (Prussian Blue) or sodium ferrocyanide (Yellow Prussiate of Soda), is used to prevent the salt from agglomerating. Both additives are nontoxic and harmless to humans. In fact, sodium ferrocyanide is approved for use in food-grade salt by the Federal Food and Drug Administration.

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

Salt is also 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 by changes in humidity and traffic load in the subsurface.

Distributors.—A tremendous amount of salt is marketed through various distributors, some of which specialize in certain markets such as agricultural and water-treatment services. In addition to these two categories, distributor sales include grocery wholesalers and/or retailers, institutional wholesalers, U.S. Government resale, and other wholesalers and retailers.

Stocks

Because bulk salt is stored at many different locations, such as at the plants, warehouses, ports, and terminals, data on the quantity of salt stockpiled by the salt industry is not reliable enough to formulate accurate inventory totals; however, yearend stocks of producers were estimated to be 3.0 million tons. Most of these inventories were imported rock salt and solar salt. Many salt producers, States, municipalities, distributors, and road-deicing contractors stockpiled additional quantities of salt in anticipation of adverse weather conditions. Deicing salt inventories were extremely large by yearend because the mild winter in the domestic snow belt did not require as much salt as had been stockpiled. 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

The locations of the salt supplies often are not in proximity of the consumers location, and transportation can become 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 curtained because of frozen waterways. As salt is packaged, handled, and shipped in smaller units, the costs are increased and are reflected in higher selling prices.

Oceanborne imports of salt have been increasing in some areas of the United States because they are less expensive with respect to transportation costs than what could be purchased from domestic suppliers using rail transportation.

Prices

The four types of salt that are produced each 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. 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 occurred, nor do they represent bid and asked prices. They are quoted here to serve only as a reference to yearend price levels. Yearend prices were quoted in Chemical Marketing Reporter, as shown in table 7. The average annual values, as collected by the USGS are shown in table 8 and represent a national average value for each of the types of salt and the various product forms. *(See tables 7 and 8.)*

Foreign Trade

Under the Harmonized Tariff Schedule nomenclature, imports are aggregated under one category classified as "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 Harmonized System code for salt is 2501.00.0000. The trade tables in this report list the previous and current identification codes for salt. Although there are several other HS codes that pertain to various salt classifications, the United States aggregates the shipments under one code because the total of individual subclassifications fail to meet the minimum dollar requirements necessary for individual listings.

Based on Bureau of the Census statistics, the United States in 1996 exported 869,000 tons, a 30% increase compared with 1995. Salt was shipped to 67 countries through 33 U.S. customs districts; Cleveland, OH, district exported the most and represented 48% of the U.S. total. In 1996, the majority of exports, or 82% of the total, was to Canada. The Journal of Commerce's Port Import/Export Reporting Service (PIERS) which reports only ocean commerce (no rail or truck traffic between borders with Canada and Mexico) reported that seven

domestic salt-producing companies accounted for 87% of the 484,000 metric tons exported in 1996. The companies, in descending order of shipments, were Akzo Nobel Salt Inc., Cargill Salt Co., Morton Salt Co., Western Salt Co., United Salt Co., North American Salt Co, and Redmond Minerals. Therefore, the remaining 13% of exports was by companies that do not produce salt.

The United States imported salt from 37 countries for a record 10.6 million tons in 1996, which was 50% more than was imported during the previous year. The large quantity of imports was to counter the shortage of rock salt supplies resulting from the September 1995 closure of Akzo's rock salt mine. The quantity of imports was about 12 times more than the quantity of salt that was exported. Although this would indicate that the United States is import reliant on salt to meet its salt requirements, 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 customers at costs lower than the comparable domestic product because production costs are lower abroad, currency exchange rates are more favorable, and ocean freight rates are less expensive than overland rail or truck rates.

The PIERS service reported that 9.87 million tons of salt was imported. Census data and PIERS data are often dissimilar, and the discrepancy for 1996 is only 730,000 tons. Using PIERS data, Akzo Nobel Salt Inc., Cargill Inc., Morton International, and North American Salt Co. imported 68% of the total imports. Three companies that manufacture chlorine, which was the single largest domestic salt market, consumed 9% of total imports, which was primarily solar salt. The companies were Atochem North America, Occidental Chemical Corp., and Weyerhaeuser Co. Several salt distributors, including Continental Salt Co., Eastern Minerals, Granite State Minerals, Rochez Brothers, and Southern Salt Co., imported 18% of the total salt. The salt producers, salt distributors, and chloralkali producers imported 95% of total PIERS imports; the remainder was by many small direct buyers. Tables 9 through 12 list the import and export statistics reported by the Bureau of Census for 1995-96. *(See tables 9, 10, 11, and 12.)*

World Review

Table 13 lists world salt production statistics for 111 countries based on reported and estimated information. The reunification of Germany and the dissolution of the former Soviet Union, Czechoslovakia, and Yugoslavia in 1992 have modified the list of nations surveyed. Total world production remained the same in 1996 compared with that of 1995. *(See table 13.)*

The United States remained the world's leading salt-producing nation, representing about one-fifth of total world production. The structure of the U.S. industry has changed throughout the years. Based on an annual survey of the domestic salt industry by the former U.S. Bureau of Mines and the USGS, in 1970 there were 50 companies operating 95 plants in the United States. Market competition, energy and labor costs, less expensive imports, and an excess of production capacity resulting in the downsizing of the industry through mergers and acquisitions reduced the size of the industry to 28 companies and 64 plants by 1996.

Most countries possess some form of salt production capability with production levels set to meet their own domestic demand requirements with additional quantities available for export. Many developing nations tend to develop their agricultural resources first to feed their population. Development of easily extractable mineral resources follows with salt being one of the first 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.

Canada.—Harris Chemical North America Inc. announced on April 23 that it planned to increase production capacity from 4.5 million tons to 6.5 milliion tons at its Goderich rock salt mine in Ontario. The $12-million project was scheduled for completion by March 1997. Notice of the expansion came after Akzo announced it would not seek to build a replacement mine at Hamptons Corner, NY (North American Minerals News, 1996).

France.—Morton International purchased the solar salt facility owned by Compaigne des Salins du Mide et des Salines de l'Est for $290 million. This was Morton's first salt acquisition outside of North America. The solar salt plant produces nearly all of France's solar salt and about one-half of vacuum pan salt output. It also is the only producer of rock salt in the country (Wall Street Journal, 1997).

Outlook

Despite the loss of the Retsof Mine that occurred in late 1995, the United States will continue to have adequate sources of salt to satisfy its demand requirements. The supply of salt will come from increases in production capacity at other locations and imports from various salt resources in the Western Hemisphere. With the departure of Akzo Nobel Salt Inc. as a major salt producer in the United States and the Caribbean, the size of the domestic salt industry has shrunk in terms of the number of companies; however, the remaining companies will continue to provide salt to the domestic markets.

Salt consumption for chlorine production should remain stable for the near future despite efforts to reduce chlorine usage in the United States because of environmental concerns regarding chlorinated paper bleaching chemicals containing chlorine. As some countries close some of the small and inefficient synthetic soda ash plants, such as those that closed in the past few years in Belgium, Colombia, and Germany, consumption of salt feedstock will decline. Japan was scheduled to close two of its synthetic soda ash plants in 1996 and 1997 that use imported solar salt from Australia and Mexico. Salt producers in these countries will evaluate alternative markets to offset sales to the soda ash industry.

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[1]Prior to January 1996, published by the U.S. Bureau of Mines.

TABLE 1
SALIENT STATISTICS 1/

(Thousand metric tons and thousand dollars)

	1992	1993	1994	1995	1996
United States:					
Production total: 2/	36,000	39,200	40,100	42,100	42,200
Brine	17,600	18,100	18,000	20,600	21,500
Rock	11,400	14,300	15,100	14,000	13,500
Solar	3,220	2,960	3,020	3,540	3,270
Vacuum pan and open pan	3,810	3,860	3,960	3,950	3,920
Sold or used by producers	34,800	38,200	39,700	40,800	42,900
Value	$803,000	$904,000	$990,000	$1,000,000	$1,060,000
Exports	992	688	742	670	869
Value	$32,200	$34,800	$30,200	$34,400	$39,300
Imports for consumption	5,390	5,870	9,630	7,090	10,600
Value	$87,700	$100,000	$151,000	$114,000	$167,000
Consumption, apparent 3/	39,200	43,400	48,600	47,200	52,600
Consumption, reported	39,700	44,400	47,200	46,500	52,800
World Production	183,000 r/	187,000	191,000 r/	192,000 r/	192,000 e/

e/ Estimated. r/ Revised.
1/ Data are rounded to three significant digits.
2/ Excludes Puerto Rico.
3/ Sold or used plus imports minus exports.

TABLE 2
SALT PRODUCED IN THE UNITED STATES, BY TYPE AND PRODUCT FORM 1/

(Thousand metric tons)

Product form	Vacuum pans and open pans	Solar	Rock	Brine	Total
1995					
Bulk	678	2,590	13,500	20,600	37,300
Compressed pellets	1,020	175	XX	XX	1,200
Packaged	1,990	694	494	XX	3,180
Pressed blocks	257	86	66	XX	409
Total	3,950	3,540	14,000	20,600	42,100
1996					
Bulk	738	1,920	12,900	21,500	37,100
Compressed pellets	1,020	284	XX	XX	1,300
Packaged	1,920	928	555	XX	3,410
Pressed blocks	246	134	67	XX	447
Total	3,920	3,270	13,500	21,500	42,200

XX Not applicable.
1/ Data are rounded to three significant digits; may not add to totals shown.

TABLE 3
SALT SOLD OR USED IN THE UNITED STATES, BY TYPE AND PRODUCT FORM 1/2/

(Thousand metric tons and thousand dollars)

Product form	Vacuum pans and open pans		Solar		Rock		Brine		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1995:										
Bulk	670	35,000	2,370	35,200	12,500	253,000	20,500	142,000	36,100	465,000
Compressed pellets	1,010	135,000	168	18,900	XX	XX	XX	XX	1,180	154,000
Packaged:										
Less-than-5-pound units	108	NA	1	NA	--	NA	XX	XX	109	XX
More-than-5-pound units	1,870	NA	686	NA	464	NA	XX	XX	3,020	XX
Total	1,980	265,000	686	45,400	464	30,600	XX	XX	3,130	341,000
Pressed blocks:										
For livestock	151	NA	68	NA	51	NA	XX	XX	270	XX
For water treatment	105	NA	15	NA	15	NA	XX	XX	135	XX
Total	256	26,200	82	7,690	66	6,470	XX	XX	405	40,300
Grand total	3,920	461,000	3,310	107,000	13,000	290,000	20,500	142,000	40,800	1,000,000
1996:										
Bulk	723	38,500	1,690	31,400	13,800	278,000	21,500	145,000	37,700	492,000
Compressed pellets	1,020	138,000	285	29,200	XX	XX	XX	XX	1,300	167,000
Packaged:										
Less-than-5-pound units	112	NA	(3/)	NA	--	NA	XX	XX	112	XX
More-than-5-pound units	1,800	NA	860	NA	587	NA	XX	XX	3,250	XX
Total	1,910	264,000	860	52,800	587	41,400	XX	XX	3,360	358,000
Pressed blocks:										
For livestock	102	NA	100	NA	66	NA	XX	XX	269	XX
For water treatment	147	NA	34	NA	--	NA	XX	XX	180	XX
Total	249	25,400	134	11,500	66	6,440	XX	XX	449	43,300
Grand total	3,900	466,000	2,970	125,000	14,500	325,000	21,500	145,000	42,900	1,060,000

NA Not available. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ As 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.

3/ Less than 1/2 unit.

TABLE 4
SALT SOLD OR USED BY PRODUCERS IN THE UNITED STATES, BY STATE 1/2/

(Thousand metric tons and thousand dollars)

State	1995		1996	
	Quantity	Value	Quantity	Value
Kansas	2,770	113,000	2,950	118,000
Louisiana	14,700	177,000	15,500	175,000
New York	4,480	185,000	4,420	203,000
Texas	9,110	85,000	9,700	88,900
Utah	2,160	54,800	1,720	70,400
Other Eastern States 3/	6,270	316,000	7,040	332,000
Other Western States 4/	1,370	68,500	1,490	73,400
Total	40,800	1,000,000	42,900	1,060,000
Puerto Rico e/	45	1,500	45	1,500

e/ Estimated.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ 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.

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

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

TABLE 5
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 pans and open pans		Solar		Rock		Salt in brine		Grand total 3/	
		1995	1996	1995	1996	1995	1996	1995	1996	1995	1996
Chemical:											
Chloralkali producers	2812	32	34	492	684	823	906	18,700	19,700	20,100	21,300
Other chemical	28 (excludes 2812, 2899)	378	378	279	178	291	458	136	91	1,090	1,110
Total		410	412	772	862	1,110	1,360	18,800	19,800	21,100	22,400
Food processing industry:											
Meat packers	201	228	238	62	44	119	125	(4/)	--	410	407
Dairy	202	112	116	5	5	4	4	--	--	122	126
Canning	2091, 203	194	202	86	86	51	49	2	--	332	336
Baking	205	143	157	1	1	12	11	--	--	155	169
Grain mill products	204 (excludes 2047)	109	105	8	3	57	50	--	--	174	158
Other food processing	206-208, 2047, 2099	230	210	30	30	33	48	1	1	293	288
Total		1,020	1,030	192	169	274	287	3	1	1,480	1,490
General industrial:											
Textiles and dyeing	22	219	210	48	53	18	18	5	7	290	288

See footnotes at end of table.

TABLE 5-Continued
DISTRIBUTION OF DOMESTIC AND IMPORTED DATA BY PRODUCERS IN THE UNITED STATES
BY END USE AND TYPE 1/2/

(Thousand metric tons)

End use	Standard industrial classification	Vacuum pans and open pans		Solar		Rock		Salt in brine		Grand total 3/	
		1995	1996	1995	1996	1995	1996	1995	1996	1995	1996
General industrial--Continued:											
Metal processing	33, 34, 35, 37	12	11	30	27	193	161	--	--	236	199
Rubber	2822, 30 (excludes 3079)	3	4	(4/)	1	3	4	60	63	67	71
Oil	13, 29	35	35	219	214	69	66	2,090	2,120	2,420	2,430
Pulp and paper	26	9	10	61	65	65	30	17	17	152	122
Tanning and/or leather	311	10	9	32	31	32	42	--	--	74	83
Other industrial	--	58	30	234	170	259	74	2	(4/)	552	275
Total		347	309	625	567	639	395	2,180	2,200	3,790	3,480
Agricultural:											
Feed retailers and/or dealers mixers	5159	223	273	373	387	446	491	--	--	1,040 r/	1,150
Feed manufactuers	2048	68	62	88	102	250	239	(4/)	--	407 r/	403
Direct-buying end user	02	9	6	12	12	44	47	--	--	66 r/	65
Total		300	340	474	502	740	777	(4/)	--	1,510 r/	1,620
Water treatment:											
Government (Federal, State, local)	2899	18	18	73	75	107	131	4	4	201	229
Commercial or other	2899	13	31	61	108	129	162	9	4	212	304
Total		30	49	134	183	235	293	13	8	413	534
Ice control and/or stabilization:											
Government (Federal, State, local)	9621	2	9	512	1,300	11,300 r/	14,000	6	10	11,800 r/	15,300
Commercial or other	--	2	11	68	173	962	2,220	--	--	1,030 r/	2,400
Total		4	20	580	1,470	12,300	16,200	6	10	12,900 r/	17,700
Distributors:											
Agricultural distribution	5191	318	216	182	192	227	252	--	--	726	661
Grocery wholesalers and/or retailers	514, 54	539	535	232	221	76	99	--	--	847	855
Institutional wholesalers and end users	58, 70	84	118	28	36	26	30	(4/)	(4/)	139	184
Water-conditioning distribution	7399	135	163	356	485	72	72	--	--	563	719
U.S. Government resale	9199	1	(4/)	3	1	7	1	--	--	11	2
Other wholesalers and/or retailers	5251	680	724	597	694	635	807	(4/)	(4/)	1,910	2,230
Total		1,760	1,760	1,400	1,630	1,040	1,260	(4/)	1	4,200	4,650
Other n.e.s. 5/		169	139	155	169	661	463	95	118	1,080	889
Grand total		4,030	4,060	4,330	5,550	17,000	21,100	21,100	22,100	46,500	52,800

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

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

3/ Because data include salt imported, produced, and/or sold from inventory from regional distribution centers, 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 show in table 6 because of changes in inventory and/or incomplete data reporting.

4/ Less than 1/2 unit.

5/ Includes exports.

TABLE 6
DISTRIBUTION OF DOMESTIC AND IMPORTED EVAPORATED AND ROCK SALT
IN THE UNITED STATES, BY DESTINATION 1/2/

(Thousand metric tons)

	1995				1996			
	Evaporated				Evaporated			
Destination	Vacuum pans and open pans	Solar	Rock	Total	Vacuum pans and open pans	Solar	Rock	Total
Alabama	59	1	86	146	58	1	74	133
Alaska	(3/)	5	(3/)	5	(3/)	4	(3/)	4
Arizona	47	93	3	143	49	101	2	151
Arkansas	46	2	64	112	46	2	91	140
California	146	758	2	906	148	761	2	911
Colorado	12	80	53	145	15	85	119	218
Connecticut	11	20	125	156	10	89	120	220
Delaware	3	6	13	22	3	6	30	39
District of Columbia	(3/)	1	3	4	(3/)	2	10	13
Florida	70	147	42	259	68	167	22	257
Georgia	63	65	52	180	69	80	65	215
Hawaii	1	2	--	3	1	3	(3/)	4
Idaho	9	94	3	106	10	99	3	112
Illinois	302	160	1,460	1,920	307	176	1,370	1,860
Indiana	212	79	674	965	219	68	728	1,020
Iowa	182	76	478	736	195	73	499	767
Kansas	73	38	329	440	78	40	377	494
Kentucky	57	7	417	481	61	9	727	797
Louisiana	45	2	330	377	46	2	580	628
Maine	9	3	178	190	9	11	654	674
Maryland	72	94	234	400	69	293	199	561
Massachusetts	33	10	352	395	34	39	226	299
Michigan	240	26	1,550	1,810	230	35	1,790	2,060
Minnesota	155	192	941	1,290	149	199	757	1,100
Mississippi	23	1	241	265	22	1	219	242
Missouri	114	44	522	680	103	45	630	778
Montana	1	44	3	48	1	48	3	52
Nebraska	72	38	158	268	72	38	169	280
Nevada	2	247	14	263	2	269	12	283
New Hampshire	5	62	99	166	6	95	98	200
New Jersey	124	197	225	546	129	400	300	829
New Mexico	8	47	1	56	11	53	(3/)	65
New York	202	58	2,300	2,560	213	111	2,930	3,250
North Carolina	211	65	70	346	190	137	109	436
North Dakota	5	39	9	53	6	20	5	30
Ohio	379	39	1,950	2,370	380	42	2,390	2,810
Oklahoma	31	20	68	119	34	19	96	150
Oregon	13	131	1	145	14	129	1	143
Pennsylvania	196	99	1,350	1,640	194	138	1,990	2,320
Rhode Island	10	36	9	55	8	169	23	200
South Carolina	48	11	8	67	58	12	9	79
South Dakota	29	45	34	108	27	59	37	122
Tennessee	71	4	552	627	64	4	690	758
Texas	184	138	225	547	207	155	211	572
Utah	8	247	43	298	8	433	27	468
Vermont	6	1	193	200	4	1	67	72
Virginia	88	81	158	327	81	91	404	576
Washington	30	501	(3/)	531	29	451	1	481
West Virginia	12	2	186	200	13	2	289	305
Wisconsin	233	100	918	1,250	196	143	1,290	1,630
Wyoming	(3/)	24	2	26	(3/)	23	2	25
Other 4/	78	46	288	412	109	92	363	564
Total 5/	4,030	4,330	17,000	25,400	4,060	5,550	21,100	30,700

1/ Data are rounded to three significant digits; may not add to totals shown.

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

3/ Less than 1/2 unit.

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

5/ Because data include salt imported, purchased, and/or sold from inventory from regional distribution centers, 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 7
SALT YEAREND PRICES

	1995	1996
Salt, evaporated, common: 80-pound bags, carlots or truckloads:		
North, works, 80 pounds	$4.02	$4.02
Bulk, same basis, per ton	60.00-61.20	60.00-61.20
Salt, chemical grade, same basis: North, works, 80 pounds	4.30	4.30
Salt, rock, medium, coarse:		
Same basis, 80 pounds	2.70	2.70
Bulk, same basis, per ton	18.00-25.00	18.00-25.00
Sodium chloride, U.S.P.: Granular bags, per pound	.29	.29

Sources: Chemical Marketing Reporter. Current Prices of Chemicals and Related Materials. v. 249, no. 1, Jan. 1, 1996, p. 32; and v. 251, no. 1, Jan. 6, 1997. p. 28.

TABLE 8
AVERAGE VALUE OF SALT, BY PRODUCT FORM AND TYPE 1/

(Dollars per metric ton)

Product form	Vacuum pans and open pans	Solar	Rock	Brine
1995:				
Bulk	$52.24	$14.84 r/	$20.16	$6.91
Compressed pellets	133.07	112.71	XX	XX
Packaged	133.72	66.06	66.04	XX
Average 2/	118.63	30.82 r/	21.80	6.91
Pressed blocks	102.26	93.35	97.48	XX
1996:				
Bulk	53.26	18.56	20.09	6.72
Compressed pellets	135.14	102.45	XX	XX
Packaged	138.22	61.38	70.47	XX
Average 2/	120.54	39.97	22.14	6.72
Pressed blocks	101.89	85.57	97.03	XX

r/ Revised. XX Not applicable.

1/ Net selling value, f.o.b. plant, excluding container costs.

2/ Salt value data previously reported were an aggregate value per 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 shown in table 3.

TABLE 9
U.S. EXPORTS OF SALT, BY COUNTRY 1/

(Thousand metric tons and thousand dollars)

Country	1995		1996	
	Quantity	Value	Quantity	Value
Bahamas, The	1	209	1	239
Bahrain	(2/)	80	1	331
Belgium	1	85	(2/)	39
Brazil	1	370	2	386
Canada	558	24,000	710	23,300
Chile	1	39	(2/)	88
China	2	115	(2/)	85
Colombia	(2/)	168	1	242
Dominican Republic	(2/)	97	1	385
El Salvador	1	117	1	126
Finland	1	85	1	65
France	2	108	2	163
Honduras	1	127	3	452
Hong Kong	(2/)	42	2	81
India	1	120	2	64
Indonesia	(2/)	36	25	1,220
Japan	2	633	3	546
Korea, Republic of	21	635	(2/)	288
Kuwait	(2/)	111	1	136
Malaysia	(2/)	34	2	77
Mexico	36	2,120	64	2,770
Netherlands	(2/)	22	2	868
Pakistan	--	--	1	34
Panama	1	69	1	112
Peru	2	78	1	87
Philippines	1	47	(2/)	17
Saudi Arabia	5	882	17	1,790
Singapore	21	1,170	7	662
Suriname	1	159	1	127
Sweden	(2/)	75	1	135
Taiwan	(2/)	243	1	253
United Arab Emirates	1	168	1	200
United Kingdom	2	236	1	337
Venezuela	1	833	9	1,780
Other	6 r/	1,090 r/	4	1,780
Total	670	34,400	869	39,300

r/ Revised.
1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 10
U.S. EXPORTS OF SALT, BY CUSTOMS DISTRICT 1/

(Thousand metric tons and thousand dollars)

District	1995		1996	
	Quantity	Value	Quantity	Value
Anchorage, AK	(2/)	15	(2/)	51
Baltimore, MD	(2/)	181	1	197
Buffalo, NY	95	4,830	54	4,770
Charleston, SC	(2/)	95	1	190
Chicago, IL	(2/)	11	(2/)	39
Cleveland, OH	324	8,800	480	8,740
Columbia-Snake, OR	(2/)	18	(2/)	36
Detroit, MI	29	3,520	37	3,440
Duluth, MN	(2/)	29	1	58
El Paso, TX	1	78	5	228
Great Falls, MT	5	359	9	658
Houston, TX	5	1,940	18	3,240
Laredo, TX	32	1,890	53	2,340

See footnotes at end of table.

TABLE 10--Continued
U.S. EXPORTS OF SALT, BY CUSTOMS DISTRICT 1/

(Thousand metric tons and thousand dollars)

District	1995		1996	
	Quantity	Value	Quantity	Value
Los Angeles, CA	32	2,290	35	3,200
Miami, FL	3	477	3	654
Minneapolis, MN	--	--	(2/)	4
Mobile, AL	1	64	1	223
New Orleans, LA	3	533	4	641
New York, NY	8	760	7	1,230
Nogales, AZ	2	70	1	58
Norfolk, VA	1	23	1	170
Ogdensburg, NY	7	863	5	698
Pembina, ND	1	164	3	286
Philadelphia, PA	(2/)	14	(2/)	25
Portland, ME	(2/)	35	(2/)	6
St. Albans, VT	(2/)	7	(2/)	22
St. Louis, MO	(2/)	16	(2/)	51
San Diego, CA	2	56	5	148
San Francisco, CA	23	1,130	34	874
San Juan, PR	(2/)	69	1	141
Savannah, GA	2	655	8	1,480
Seattle, WA	4	361	24	762
Tampa, FL	1	106	1	129
Other 3/	89	4,960	78	4480
Total	670	34,400	869	39,300

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Less than 1/2 unit.
3/ Unknown, but assumed to be rail and/or truck shipments to Canada through various points of entry.

Source: Bureau of the Census.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF SALT, BY COUNTRY 1/

(Thousand metric tons and thousand dollars)

Country	1995		1996	
	Quantity	Value	Quantity	Value
Australia	143	2,120	(2/)	45
Bahamas, The	896	11,900	1,240	16,400
Brazil	76	857	161	1,900
Canada	2,980	55,300	3,810	78,100
Chile	861	11,500	2,650	30,100
China	23	435	--	--
Dominican Republic	--	--	39	256
Egypt	29	360	69	722
France	2	752	15	1,010
Ireland	35	355	47	561
Israel	(2/)	252	1	146
Italy	15	364	(2/)	143
Japan	(2/)	138	2	120
Korea, Republic of	3	644	1	769
Mexico	1,660	22,200	2,170	30,600
Netherlands	59	1,770	48	1,440
Netherlands Antilles	158	2,580	80	1,500
Peru	--	--	96	859
Spain	144	1,380	136	1,130
Switzerland	(2/)	5	38	389
United Kingdom	1	136	33	497
Other	2	774	1	691
Total	7,090	114,000	10,600	167,000

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 12
U.S. IMPORTS OF SALT, BY CUSTOM DISTRICTS 1/

(Thousand metric tons and thousand dollars)

District	1995		1996	
	Quantity	Value	Quantity	Value
Anchorage, AK	15	247	17	218
Baltimore, MD	485	8,390	1,130	17,600
Boston, MA	486	5,920	854	10,900
Buffalo, NY	12	551	227	6,400
Charleston, SC	71	1,960	49	1,430
Chicago, IL	468	11,500	518	11,400
Cleveland, OH	109	2,390	268	5,440
Columbia-Snake, OR	378	5,570	425	5,670
Dallas-Fort Worth, TX	--	--	(2/)	9
Detroit, MI	1,160	21,000	1,080	20,300
Duluth, MN	228	3,700	224	3,990
El Paso, TX	--	--	(2/)	2
Great Falls, MT	1	73	1	86
Honolulu, HI	(2/)	7	--	--
Houston, TX	(2/)	93	1	380
Laredo, TX	1	146	1	129
Los Angeles, CA	118	2,220	115	2,350
Miami, FL	(2/)	29	(2/)	20
Milwaukee, WI	643	10,300	1,000	20,300
Minneapolis, MN	(2/)	49	1	9
New Orleans, LA	209	2,710	283	3,910
New York, NY	971	12,900	1,680	18,900
Norfolk, VA	76	1,140	222	2,960
Ogdensburg, NY	20	641	94	2,950
Pembina, ND	9	250	28	645
Philadelphia, PA	376	4,420	761	9,130
Portland, ME	519	7,540	662	8,270
Providence, RI	71	820	227	2,730
St. Albans, VT	3	296	53	1,450
St. Louis, MO	(2/)	16	(2/)	25
San Diego, CA	1	54	1	168
San Francisco, CA	(2/)	123	(2/)	123
San Juan, PR	8	391	9	442
Savannah, GA	56	860	90	1,180
Seattle, WA	316	3,970	312	4,120
Tampa, FL	237	3,330	193	2,740
Wilmington, NC	52	360	106	1,170
Total	7,090	114,000	10,600	167,000

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 13
SALT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1992	1993	1994	1995	1996 e/
Afghanistan (rock salt) e/	12	13	13	13	13
Albania e/	5	10	10	10	10
Algeria (brine and sea salt)	180	179	178	178 e/	178
Angola e/	20	30	30	30	30
Argentina:					
Rock salt e/	-- r/	1	3 r/	1	1
Other salt	952	1,033	852 r/	986 r/	990
Total e/	952 r/	1,030	855 r/	987 r/	991
Armenia e/	50 r/	30 r/	30 r/	33 r/ 4/	26 4/
Australia (brine salt and marine salt)	7,693	7,737	7,685	8,148 r/	7,905 4/

See footnotes at end of table.

TABLE 13--Continued
SALT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1992	1993	1994	1995	1996 e/
Austria:					
Brine salt	662	695	701 r/	523 r/	600
Rock salt e/	1	1	1	1	1
Total e/	663	696	702 r/	524 r/	601
Azerbaijan e/	50	40	30	20	15
Bahamas, The e/	809 4/	850	900	900	900
Bangladesh (marine salt) e/ 5/	320	340	350	350	350
Belarus	360 e/	300 e/	263	1 r/	1 4/
Benin (marine salt) e/	(6/)	(6/)	(6/)	(6/)	(6/)
Bolivia e/	(6/)	(6/)	(6/)	5 4/	(6/) 4/
Bosnia and Herzegovina e/	70	50	50	50	50
Botswana 7/	54	98	186	208	200
Brazil:					
Marine salt	4,030	4,780	4,670	4,460 r/	4,500
Rock salt	1,231	1,400	1,373	1,340 r/	1,400
Total	5,261	6,180	6,043	5,800 r/	5,900
Bulgaria	1,000	650	1,300 r/	1,500 r/	1,600
Burkina Faso e/	7	7	7	7	7
Burma e/ 8/	260	260	260	260	260
Cambodia e/	40	40	40	40	40
Canada	11,171	10,900	11,700	10,957 r/	12,289 p/
Cape Verde e/	4	4	4	4	1
Chile	1,672	1,443	3,178	3,000 e/	3,000
China e/	28,100	29,500	29,700	29,800 r/	28,900
Colombia:					
Marine salt	317	199	358	282 e/	424 p/
Rock salt	230	201	207	268	153 p/
Total	547	400	565	550 e/	576 p/
Costa Rica (marine salt) e/	30 r/	31 r/	32 r/	32 r/	37
Croatia	29	30	22 r/	22 r/	19 4/
Cuba e/	185	185	175	180	180
Czech Republic e/ 9/	XX	180	180	180	180
Czechoslovakia 10/	200 e/	XX	XX	XX	XX
Denmark (sales)	528	591	634 r/	603 r/	600
Dominican Republic (rock salt) e/	12	12 4/	10	10 r/	10
Egypt	1,096	986	1,008	1,000 e/	1,000
El Salvador (marine salt) e/	20	30	30	30	30
Eritrea: 11/					
Marine salt e/	XX	25	206	253	198
Rock salt e/	XX	1	2	2	2
Total	XX	26	208	255	200 4/
Ethiopia: e/ 5/					
Marine salt	100	45	--	--	--
Rock salt	10	8	5	5	5
Total	110	53	5	5	5
France:					
Brine salt	1,651	1,310	1,658	1,491 r/	1,500
Marine salt	1,156	1,200 e/	1,123	1,473 r/	1,500
Rock salt	103	116 e/	143	165 r/	160
Salt in solution	3,206	4,355	4,612	4,410 r/	4,500
Total	6,116	6,980 e/	7,536	7,539 r/	7,660
Germany:					
Marine salt	571	558	801	800 e/	800
Rock salt and other	12,137	12,130	9,731	10,000 e/	10,000
Total	12,709 r/	12,688	10,532	10,800 e/	10,800
Ghana e/	50	50	50	-- r/	-- 4/
Greece	143 r/	175 r/	192 r/	200 r/ e/	200
Guatemala e/	46 r/	47 r/	48 r/	48 r/	48
Honduras e/	30	30	25	25	25
Iceland e/	4 4/	5	5	4	4
India: e/					
Marine salt	9,500	9,500	9,500	9,500	9,500
Rock salt	3 4/	3 4/	3	3	3
Total	9,500	9,500	9,500	9,500	9,500

See footnotes at end of table.

TABLE 13--Continued
SALT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1992	1993	1994	1995	1996 e/
Indonesia e/	630	650	650	670	670
Iran 12/	1,018	720	1,050	936	450
Iraq e/	250	300	300	250	250
Israel	1,102	1,122	1,120 e/	1,200 e/	1,200
Italy:					
Brine salt and rock salt	3,211	3,150	3,353 r/	2,952 r/	3,000
Marine salt, crude e/ 13/	610	580	600	600	600
Total	3,821	3,730	3,953 r/	3,552 r/	3,600
Jamaica	21	18	18	19 r/	20
Japan	1,405	1,378	1,387	1,400 e/	1,400
Jordan	56	26	26 e/	25 e/	25
Kenya (crude salt)	102 e/	75	71 r/	71 r/	72
Korea, North e/	590	590	600	600	600
Korea, Republic of e/	772 4/	750	760	770	770
Kuwait	1	41	45 e/	45 e/	45
Laos (rock salt) e/	8	8	8	8	8
Lebanon e/	3	3	3	3	4
Leeward and Windward Islands e/	1	1	1	1	1
Libya e/	12	12	12	12	12
Madagascar e/	30	30	30	30	30
Mali e/	5	5	5	5	6
Malta (marine salt) e/	(6/)	(6/)	(6/)	(6/)	(6/)
Martinique e/	200	200	200	200	200
Mauritania e/	6	6	6	6	6
Mauritius e/	6	6	6	6	6
Mexico	7,395	7,490	7,458	7,670	8,508 4/
Mongolia	1 r/	1 r/	(6/) r/	(6/) r/	(6/) 4/
Morocco (rock salt)	165	170	177	173 r/	168 4/
Mozambique (marine salt) e/	40	40	40	40	60
Namibia (marine salt) 14/	115	116	316	300 e/	300
Nepal 15/	7	7	7 e/	7 e/	7
Netherlands e/	3,628 4/	3,500	3,500	3,500	3,500
Netherlands Antilles	350 e/	300 e/	420 r/	424 r/	366 4/
New Zealand e/	80	80	80	50	60
Nicaragua (marine salt) e/	15	15	15	15	15
Niger e/	3	3	3	3	3
Pakistan: 5/					
Marine salt	10	14	13	17	18
Rock salt	853	895	847	935	940
Total	863	909	860	952	958
Panama (marine salt) e/	20	20	20	22	22
Peru e/	238 4/	238	238	238	238
Philippines (marine salt)	496	535	540 e/	540 e/	550
Poland:					
Rock salt	582	718	750	812 r/	800
Other salt	3,305	3,099	3,324	3,402 r/	3,360
Total	3,887	3,817	4,074	4,214 r/	4,163 4/
Portugal:					
Marine salt e/	125	125	125	-- r/	--
Rock salt	592	525	519	545	545
Total e/	717	650	644	545 r/ 4/	545
Romania:					
Rock salt	966	808	892	669 r/	350 4/
Other salt	1,590	1,380	1,310	1,820 r/	2,339 4/
Total	2,556	2,188	2,202	2,489 r/	2,689 4/
Russia e/	3,600	2,200	2,000	2,000	1,600
Senegal e/	110	117	117	120	120
Serbia and Montenegro	47	39	32	14 r/	22 4/
Sierra Leone e/	200	200	200	-- r/	100
Slovakia 9/	XX	70 e/	100 r/	100 r/	107 4/
Slovenia	9 r/	7 r/	8	8 e/	8
Somalia e/	1	1	1	1	2
South Africa 14/	702	613	414	313	253 4/

See footnotes at end of table.

TABLE 13--Continued
SALT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1992	1993	1994	1995	1996 e/
Spain:					
Marine salt and other evaporated salt	900 e/	900 e/	1,422 r/	1,282 r/	1,500
Rock salt	2,705	2,505	3,510 r/	3,494 r/	2,500
Total	3,610 e/	3,410 e/	4,932 r/	4,776 r/	4,000
Sri Lanka	122	43	56	60 e/	60
Sudan e/	75	75	75	75	50
Switzerland	276	221 r/	259 r/	399 r/	300
Syria	84	113	127	111 r/	115
Taiwan (marine salt)	26	176	186	221	233 4/
Tanzania	78 e/	18	17	7	7
Thailand:					
Rock salt	213	262	288	381	350
Other e/	100	100	100	100 4/	100
Total e/	313	362	388	481 4/	450
Tunisia (marine salt)	460	435	415	400 e/	478 4/
Turkey	1,418	1,426	1,353	1,444 r/	1,400
Turkmenistan e/	300 r/	300 r/	300 r/	277 r/ 4/	295 4/
Uganda e/	5	5	5	5	5
Ukraine e/	4,400	4,000	3,500	3,000	2,800
United Kingdom:					
Brine salt e/ 16/	1,200	1,200	1,300	1,300	1,300
Rock salt e/	1,500	1,500	1,700 4/	1,800	1,800
Other salt 16/	3,401	4,086	4,004	3,548 r/	3,600
Total e/	6,100	6,790	7,000	6,650 r/	6,700
United States including Puerto Rico:					
United States:					
Brine	17,600	18,100	18,000	20,600	21,500 4/
Rock salt	11,400	14,300	15,100	14,000	13,500 4/
Solar salt	3,220	2,960	3,020	3,540	3,270 4/
Vacuum pan salt	3,810	3,860	3,700	3,950	3,920 4/
Puerto Rico e/	45 4/	45	45	45	45
Total e/	36,100 4/	39,300	39,800	42,200 r/	42,300
Venezuela e/	318 4/	370	400	350 r/	350
Vietnam e/	350	350	375	375	375
Yemen	107	110	110	110 e/	110
Grand total	183,000 r/	187,000	191,000 r/	192,000 r/	192,000

e/ Estimated. p/ Preliminary. r/ Revised. XX Not applicable.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through July 11, 1997.

3/ Salt 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.

4/ Reported figure.

5/ Year ending June 30 of that stated.

6/ Less than 1/2 unit.

7/ From natural soda ash production.

8/ Brine salt production as reported by the Burmese Government in metric tons, was as follows: 1992--46,509; 1993--58,915; 1994--58,612; 1995--81,156; and 1996--75,000 (estimated).

9/ Formerly part of Czechoslovakia; data were not reported separately until 1993.

10/ Dissolved Dec. 31, 1992.

11/ Eritrea production was included in Ethiopia until independence in May 1993.

12/ Year begining Mar. 21 of that stated.

13/ Does not include production from Sardinia and Sicily, estimated at 200,000 metric tons annually.

14/ South Africa's decline and Namibia's increase in 1994 are due to production from Walvis Bay now included under Namibia.

15/ Year ending July 15 of that stated.

16/ Data captioned "Brine salt" for the United Kingdom are the quantities of salt obtained from the evaporation of brines; that captioned "Other salt" is the salt content of brines used for purposes other than production of salt.