

SALT

By Dennis S. Kostick

Sodium chloride, commonly known as salt, is a universal commodity that is known and used by virtually every person in the world. It is an important compound that has a multitude of applications with approximately 14,000 different reported uses, the largest of which is as a mineral feedstock used by the chemical industry. Most individuals usually associate salt with highway deicing and food processing; however, its largest use is as feedstock for chlorine and caustic soda manufacture. These two important inorganic chemicals have a multitude of consumer-related end-use products, such as polyvinyl chloride (PVC) plastic made from chlorine and pulping chemicals manufactured from caustic soda.

Production

Domestic production data for salt are developed by the U.S. Bureau of Mines (USBM) from an annual voluntary survey of U.S. salt-producing sites and of company operations. Of the 27 companies to which a survey request was sent, all but one responded, representing 98% of the total production shown in this report. Data for the one company was estimated on the basis of its prior responses to previous annual surveys, the 1994 production estimate survey, or brine production capabilities for chloralkali manufacture based upon chlorine production capacities.

Total U.S. salt production increased only about 2% in 1994 compared with the previous year; however, rock salt production rose 6% because of strong demand for deicing salt that was forecast based on the previous winter's adverse weather. According to the USBM survey for 1994, 27 companies operated 67 salt-producing plants in 14 States. Nine of the companies and 12 of the plants produced more than 1 million metric tons each and accounted for 91% and 59%, respectively, of the U.S. total. Several companies and plants produced more than one type of salt. In 1994, 11 companies (15 operations) produced solar-evaporated salt; 5 companies (17 operations), vacuum pan salt; 10 companies (14 operations), rock salt; and 14 companies (29 operations), salt brine. (See tables 1, 2, and 3.)

The five leading States in terms of total salt sold or used were Louisiana, 34%; Texas, 20%; New York, 15%; and Kansas, 7%. 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 increased compared with the previous year. Total world production of all types of salt decreased slightly. 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.

In February 1994, Akzo N.V. of the Netherlands merged with Nobel Industrier A.B. of Sweden to form Akzo Nobel N.V. The joint venture resulted in changing the name of its U.S. salt subsidiary to Akzo Nobel Salt Inc.¹

At 5:43 a.m. on Saturday, March 12, 1994, the nation's largest and one of its oldest underground rock salt mines experienced a major roof collapse that gave a seismic signature as if it were a 3.6 magnitude earthquake.² The accident happened at Akzo Salt's Retsof mine near Rochester, NY, which had an annual rock salt production capacity of 3.63 million tons (4.0 million short tons) and has been in continuous mining since 1885 when it began as the Retsof Mining Co. The mine celebrated its 100 millionth ton of salt produced in 1984 which coincided with the mine's centennial of when it sunk its first shaft. The mine reportedly was the largest salt mine in the world and the largest room-and-pillar mine in the Western Hemisphere.

A 183 meter-by-183 meter (600 foot-by-600 foot) section of the roof in the southeast section of the mine unexpectedly fell and created a 43 meter (140 foot) long fracture in the overlying limestone causing water from an overhead aquifer to enter and flood the mine at the rate of 20,800 liters (5,500 gallons) per minute (equal to 30.3 million liters or 8 million gallons daily).³ By May, the rate had increased to nearly 68,100 liters (18,000 gallons) per minute (equal to 98.4 million liters or 26 million gallons daily). The decision was made to continue to mine in the safe areas of the mine until about September 1995 when the mine would have to be permanently abandoned and closed.

Efforts were made to drill down to the fracture and use chemical grout to seal the fissures and stop the flooding; however, the efforts were unsuccessful. After obtaining a permit from the New York State Department of Environmental Conservation, Akzo began pumping the salt brine to the Genesee River to reduce the volume of water and to allow the grout to work but the inflow of fresh water only dissolved more of the pillars causing major surface subsidence.

On November 2, 1994, Akzo announced plans to construct a new rock salt mine at Hampton Corners in the town of Groveland to replace the Retsof mine, which contributed about \$50 million annually to the local economy.⁴ The proposed mine would cost \$120 million when completed. The company was optimistic about retaining its workforce and guaranteed its customers that the mine disaster would not affect the availability of salt in the near future. Akzo increased production output at its other mines in Louisiana and Ohio and imported additional supplies of salt from the Caribbean and Chile to offset any shortages. Other U.S. salt companies also increased production and imports to anticipate any shortages resulting from Akzo's accident.

Consumption

A record 47.2 million metric tons of domestic and imported salt was consumed in the United States in 1994, based on the annual survey of the U.S. salt producers. The reported percent distribution of salt by major end use was chemicals, 39%; ice control, 35%; distributors, 10%; food and agricultural, 6%; industrial, 6%; primary water treatment, 1%; and other combined with exports, 3%. 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 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. According to a survey of domestic salt-based chlorine facilities, about 48% of the salt used to manufacture chlorine was captive, and 31% was purchased brine. Purchased solar or rock salt comprised 12%, and imported rock, solar, and vacuum pan salt was 9%. (See tables 5 and 6.)

HoltraChem Manufacturing, a joint venture between Allied Signal and HoltraChem Group, completed its acquisition of the Hanlin Group's LCP chloralkali plants at Acme, NC, and Orrington, ME, and a terminal at Syracuse, NY. The two chlorine plants have an annual capacity of about 118,000 tons of chlorine and caustic soda.⁵ On April 21, Elf Atochem North America Inc., closed its chloralkali plant in Tacoma, WA, because local pulp mills have begun converting to oxygen-base bleaching agents and discontinuing use of chlorine-base chemicals, such as those made at the Tacoma facility. The plant had a chlorine capacity of about 70,000 tons.⁶

Using Bureau of the Census data, the chlorine and caustic soda industry consumed about 19.2 million tons (21.2 million short tons) of salt for feedstock, 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. Reported consumption of total domestic and imported salt for chlorine manufacture was 17.3 million tons (19.1 million short tons), as noted in table 5. The difference between the calculated and reported quantities was the amount of salt unreported to the USBM from imports or captive brine production of chloralkali producers. Production of chlorine gas and liquid sodium hydroxide, as reported by the Bureau of the Census, was 11.0 million tons 11.7 million tons, respectively.⁷

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 feedstock 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 also is compressed into pellets and used for water conditioning.

There are reportedly about 14,000 different

direct and indirect uses of salt. The USBM 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. Aside from a few economic deposits of natural soda ash, several countries in the world continue to use salt for synthetic soda ash production.

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 short tons of salt to make 1.0 short ton of chlorine and 1.1 short 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 also is used as a feedstock 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 also is used as a cofeedstock with sulfuric acid to produce sodium sulfate and hydrochloric acid. This subsector is relatively small, representing only 10% of domestic salt sales for

the entire chemical sector and only 5% of total domestic salt consumption.

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, baking, dairy, and grain mill products.

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 comprised of 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. 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, condensed and evaporated milk, ice cream, frozen desserts, and specialty dairy products. The final food processing category is grain mill products, which consists of milling flour and rice, and manufacturing cereal breakfast food and blended or prepared flour.

General Industrial.—The industrial uses of salt are diverse. They include, in descending order of salt usage, oil and gas exploration; metal processing; other industrial; pulp and paper; textiles and dyeing; 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 also is 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 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-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 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 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 neoprene rubber, white rubber, and buna 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 are 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. Gabriel Daniel Fahrenheit, 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.

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 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 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.

Other.—The other uses of salt include categories not discussed above.

Stocks

Total yearend stocks reported by 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 and the inevitable loss of the Retsof rock salt mine. 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.

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 curtailed 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.

Ocean borne 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 many 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 USBM. 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 USBM, are listed 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 only have one category known 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 trade tables in this report list the previous and current identification codes for salt.

Based on Bureau of the Census statistics, the United States in 1994 exported 742,000 tons, an 8% increase compared with that of the previous year. Salt was shipped to 65 countries through 32 U.S. customs districts, of which the Cleveland, OH, district exported the most. In 1994, the majority of exports were to Canada, which was 77% of the total. 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 six domestic salt producing companies exported 89% of the 383,000 metric tons exported in 1993. The companies were Akzo Salt Inc., Cargill Salt Co. and its affiliate Leslie Salt Co., North American Salt Co., Morton Salt Co., and Western Salt Co. Therefore, the remaining 12% of exports were conducted by companies that do not produce salt.

The United States imported salt from 30 countries a record 9.63 million tons in 1994, which was 64% more than was imported during the previous year. The high level of imports were to counter the shortage of rock salt resulting from the ultimate closure of the Retsof rock salt mine. The quantity of imports was about 13 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 and currency exchange rates are more favorable.

The PIERS service reported that 8.85 million tons were imported; however, PIERS data includes only ocean freight and does not include salt shipped by rail or truck over the U.S. land borders with Canada and Mexico. Therefore, Census data and PIERS Data often are dissimilar. Using PIERS data, Akzo Salt Co., Cargill Inc., Morton International, and North American Salt Co., imported 67% of the total imports. Three companies that manufacture chlorine, which was the single largest domestic salt market, consumed 9% of

total imports, which were primarily solar salt. These companies were Atochem North America, Occidental Chemical Corp., and Weyerhaeuser Co. Six salt distributors, Continental Salt Co., Eastern Minerals, Granite State Minerals, Rochez Brothers, Inc., Southern Salt Co., and Quality Salt Sales imported 18% of the total salt. The salt producers, salt distributors, and chloralkali producers imported 94% of total PIERS imports; the remainder were by many small direct buyers. Tables 9 through 12 list the import and export statistics reported by the Bureau of Census for 1993 and 1994. (See tables 9, 10, 11, and 12.)

World Review

Table 13 lists world salt production statistics for 110 countries based on reported and estimated information. The unification of the two Germanys and the dissolution of the former U.S.S.R. and Yugoslavia in 1992 have modified the list of nations surveyed. World production decreased less than 1% in 1994 compared with that of the previous year. (See table 13.)

Industry Structure

The United States remains 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. 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 27 companies and 67 plants by 1994.

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.

Outlook

Despite the loss of the Retsof mine that will occur sometime in the fall of 1995, the United States will continue to have adequate sources of salt to satisfy any demand requirements. The mine accident and the anticipated severe 1993-

94 winter caused a surge in imports and an increase in domestic rock salt production in 1994 that contributed to the large buildups of inventories. This will undoubtedly cause domestic production and imports to be less in 1995.

¹Chemical Marketing Reporter. Akzo Nobel Combination Looks Like a Perfect Fit. V. 245, No. 16, Apr. 18, 1994, p. 8.

²Democrat and Chronicle. Livingston Town Jolted in Tremor. Rochester, NY, Sunday, Mar. 13, 1994, p. 1A.

³Industrial Minerals. Flood Closes Akzo Salt Mine. May 1994, No. 320, p. 20-21.

⁴Press Release. Akzo Nobel Salt to Remain in Livingston County. Nov. 2, 1994, 2 pp.

⁵Chemical Week. HoltraChem, Allied Signal Tie Up Hanlin Deal. V. 154, No. 14, Apr. 13, 1994, p. 5.

⁶Chemical Marketing Reporter. Elf Atochem Closes Down Tacoma Chloralkali Facility. V. 245, No. 17, Apr. 25, 1994, p. 4.

⁷U.S. Department of Commerce, Bureau of the Census, Current Industrial Reports, MQ28A, Inorganic Chemicals, First Quarter 1995.

OTHER SOURCES OF INFORMATION

U.S. Bureau of Mines Publications

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Salt. Ch. in 1985 Mineral Facts and Problems.

The Material Flow of Salt, IC 9343, 1993, 32 pp.

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Handbook of World Salt Resources. Stanley J. Lefond, 1969, 384 pp.

Industrial Minerals and Rocks. Salt, D. S. Kostick. Society of Mining Engineers, ed. by D. Carr, 6th ed., 1994.

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Solution Mining Research Institute.

TABLE 1
SALIENT STATISTICS 1/

(Thousand metric tons and thousand dollars)

	1990	1991	1992	1993	1994
United States:					
Production - total: 2/	36,800	36,300	36,000	39,200 r/	39,800
Brine	17,400	18,700	17,600	18,100 r/	18,000
Rock	12,800	11,200	11,400	14,300	15,100
Solar	2,990	2,810	3,220	2,960 r/	3,020
Vacuum pan and open pan	3,660	3,650	3,810	3,860	3,700
Sold or used by producers	36,900	35,900	34,800	38,200 r/	39,500
Value	\$827,000	\$802,000	\$803,000	\$904,000 r/	\$956,000
Exports	2,270	1,780	992	688	742
Value	\$32,900	\$29,900	\$32,200	\$34,800	\$30,200
Imports for consumption	5,970	6,190	5,390	5,870	9,630
Value	\$88,400	\$87,400	\$87,700	\$100,000	\$151,000
Consumption, apparent 3/	40,600	40,300	39,200	43,400 r/	48,400
World Production	183,000 r/	185,000 r/	178,000 r/	181,000 r/	180,000 e/

e/ Estimated. r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

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
1993					
Bulk	726	1,860 r/	13,700	18,100 r/	34,500 r/
Compressed pellets	1,020	194 r/	XX	XX	1,210 r/
Packaged	1,830	794 r/	424	XX	3,050 r/
Pressed blocks	292	114 r/	93	XX	500 r/
Total	3,860	2,960 r/	14,300	18,100 r/	39,200 r/
1994					
Bulk	751	1,820	14,300	18,000	34,800
Compressed pellets	864	197	XX	XX	1,060
Packaged	1,830	877	777	XX	3,490
Pressed blocks	252	125	W	XX	420
Total	3,700	3,020	15,100	18,000	39,800

r/ Revised. XX Not applicable. W Withheld to avoid disclosing company proprietary data.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

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

(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
1993										
Bulk	662	32,800	1,660 r/	27,300 r/	12,800	235,000	18,100 r/	95,000 r/	33,200 r/	390,000 r/
Compressed pellets	967	125,000	194 r/	17,500 r/	NA	XX	XX	XX	1,160 r/	142,000 r/
Packaged:										
Less-than-5-pound units	82	NA	1	NA	--	NA	XX	XX	83	XX
More-than-5-pound units	1,850	NA	848 r/	NA	547	NA	XX	XX	3,250 r/	XX
Total	1,930	241,000	849 r/	48,300 r/	547	35,000	XX	XX	3,330 r/	325,000 r/
Pressed blocks:										
For livestock	108	NA	87 r/	NA	64 r/	NA	XX	XX	259 r/	XX
For water treatment	180	NA	28 r/	NA	21 r/	NA	XX	XX	228	XX
Total	288	28,900	115 r/	10,000 r/	85	8,300	XX	XX	488 r/	47,200 r/
Grand total	3,850	428,000	2,820 r/	103,000 r/	13,400	278,000	18,100 r/	95,000 r/	38,200 r/	904,000 r/
1994										
Bulk	742	37,200	1,690	28,300	14,100	276,000	18,000	97,000	34,600	439,000
Compressed pellets	862	109,000	196	18,900	NA	XX	XX	XX	1,060	128,000
Packaged:										
Less-than-5-pound units	146	NA	110	NA	--	NA	XX	XX	256	XX
More-than-5-pound units	1,680	NA	766	NA	762	NA	XX	XX	3,210	XX
Total	1,820	245,000	876	48,900	762	56,600	XX	XX	3,460	350,000
Pressed blocks:										
For livestock	138	NA	67	NA	42	NA	XX	XX	247	XX
For water treatment	107	NA	57	NA	(3/)	NA	XX	XX	165	XX
Total	245	23,600	124	10,800	42	4,220	XX	XX	412	38,600
Grand total	3,670	415,000	2,890	107,000	14,900	337,000	18,000	97,000	39,500	956,000

r/ Revised. NA Not available. XX Not applicable.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines 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 1/ 2/ BY PRODUCERS IN THE UNITED STATES, BY STATE

(Thousand metric tons and thousand dollars)

State	1993		1994	
	Quantity	Value	Quantity	Value
Kansas 3/	2,280 r/	103,000	2,660	108,000
Louisiana	12,400	115,000	13,500	140,000
New York	5,620	191,000	6,060	233,000
Texas	8,360 r/	76,900 r/	8,040	70,500
Utah	1,680 r/	57,200 r/	1,680	56,700
Other Eastern states 4/	6,050	295,000	6,130	280,000
Other Western states 5/	1,840 r/	65,700	1,470	67,800
Total	38,200 r/	904,000 r/	39,500	956,000
Puerto Rico	45	1,500	45	1,500

r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines 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/ In 1993 the quantity and value of brine for Kansas was included with "Other Western States ." In 1994 brine was included in the quantity and value of all salt produced in Kansas.

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

5/ Includes Arizona, California, Kansas (brine only 1993) Nevada, New Mexico, and Oklahoma.

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

(Thousand metric tons)

End use	Standard industrial classification	Vacuum pans and open pans		Solar		Rock		Salt in brine		Grand total 3/	
		1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
Chemical:											
Chloralkali producers	2812	35	36	135 r/	228	421	770	16,900	16,200	17,500	17,300
Other chemical	28 (excludes 2812, 2899)	475	401	395 r/	299	916 r/	384	79	17	1,870 r/	1,100
Total		509	437	531 r/	528	1,340 r/	1,160	16,900	16,200	19,300	18,400
Food-processing industry:											
Meat packers	201	226	226	63 r/	65	129	119	--	(4/)	418 r/	410
Dairy	202	107	110	6	6	3	3	1	--	117	117
Canning	2091, 203	171	196	81	81	69	62	1	2	322	342
Baking	205	139	142	2	2	11	13	--	--	152	157
Grain mill products	204 (excludes 2047)	101	102	11 r/	17	55	54	--	--	167 r/	175
Other food processing	206-208, 2047, 2099	221	237	25 r/	29	31	31	(4/)	(4/)	278 r/	297
Total		964	1,010	188 r/	201	298	282	3	2	1,450 r/	1,500
General industrial:											
Textiles and dyeing	22	235	226	46	53	27	20	5	5	313	304
Metal processing	33, 34, 35, 37	10	11	27 r/	30	180 r/	198	--	--	216 r/	239
Rubber	2822, 30 (excludes 3079)	2	3	1	1	6	4	28	25	37	33
Oil	13, 29	24	37	239 r/	209	115 r/	80	847	960	1,220 r/	1,290
Pulp and paper	26	18	15	44	52	41 r/	76	8	7	110 r/	150
Tanning and/or leather	311	10	10	27 r/	35	30	37	--	--	67 r/	82
Other industrial	9621	53	59	238 r/	236	196 r/	223	3	3	490 r/	521
Total		352	360	620 r/	615	593 r/	638	891	1,000	2,460 r/	2,610
Agricultural:											
Feed retailers and/or dealers- mixers	434	221	227	393 r/	357	504 r/	490	(4/)	--	1,120 r/	1,070
Feed manufacturers	2048	67	66	101 r/	87	307	324	(4/)	(4/)	476 r/	478
Direct-buying end user	02	8	9	11 r/	12	30 r/	37	--	(4/)	49 r/	58
Total		297	301	505 r/	456	843 r/	851	(4/)	(4/)	1,650 r/	1,610
Water treatment:											
Government (Federal, State, local)	2899	17	18	119	70	107	122	3	3	246	213
Commercial or other	2899	14	18	63	71	97	132	1	7	175	227
Total		31	36	181	141	203	253	4	10	419	440
Ice control and/or stabilization:											
Government (Federal, State, local)	9621	1	4	407	1,070	12,200 r/	13,900	10	10	12,700 r/	15,000
Commercial or other	5159	2	2	53 r/	111	840 r/	1,310	1	--	896 r/	1,430
Total		4	5	460 r/	1,180	13,100 r/	15,200	12	10	13,600 r/	16,400

See footnotes at end of table.

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

(Thousand metric tons)

End use	Standard industrial classification	Vacuum pans and open pans		Solar		Rock		Salt in brine		Grand total 3/	
		1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
Distributors:											
Agricultural distribution	5191	326 r/	320	191 r/	208	290 r/	314	(4/)	--	808 r/	842
Grocery wholesalers and/or retailers	514, 54	506	525	230 r/	297	86 r/	112	--	--	823 r/	934
Institutional wholesalers and end users	58, 70	80	82	29	29	30	33	(4/)	(4/)	139	144
Water-conditioning distribution	7399	125 r/	131	336 r/	309	66 r/	65	--	--	527 r/	505
U.S. Government resale	9199	1	1	3 r/	5	2 r/	8	--	--	5 r/	13
Other wholesalers and/or retailers	5251	649 r/	711	639 r/	665	732 r/	968	(4/)	(4/)	2,020 r/	2,340
Total		1,690 r/	1,770	1,430 r/	1,510	1,210 r/	1,500	(4/)	1	4,320 r/	4,780
Other n.e.s. 5/		277	199	225 r/	253	592 r/	869	148	150	1,250 r/	1,470
Grand Total		4,130	4,120	4,140 r/	4,890	18,200 r/	20,700	18,000	17,400	44,400 r/	47,200

r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines 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 reported 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 1/ 2/
IN THE UNITED STATES, BY DESTINATION

(Thousand metric tons)

Destination	1993				1994			
	Evaporated			Total	Evaporated			Total
	Vacuum pans and open pans	Solar	Rock		Vacuum pans and open pans	Solar	Rock	
Alabama	58	1	84	143	56	(3/)	92	149
Alaska	(3/)	5	--	5	(3/)	4	(3/)	4
Arizona	9	101 r/	60	173	11	90	2	102
Arkansas	43	3	72	118	42	3	87	132
California	141	806 r/	2	950 r/	145	758	2	905
Colorado	12	189 r/	48	247 r/	12	76	52	140
Connecticut	12	8	219	239	14	13	230	257
Delaware	3	38	16	57	3	31	29	62
District of Columbia	1	1	19	21	1	15	11	27
Florida	76 r/	134	27	237 r/	75	150	34	258
Georgia	85	35	68	188	69	49	57	175
Hawaii	2	3	1	6	1	3	--	4
Idaho	6	85	(3/)	91	8	84	1	93
Illinois	330 r/	102 r/	1,720 r/	2,150 r/	333	167	1,920	2,420
Indiana	195	72 r/	677 r/	945 r/	217	79	859	1,160
Iowa	178 r/	81 r/	496 r/	755 r/	180	69	469	718
Kansas	98 r/	64	434	595 r/	75	36	536	422
Kentucky	60	5	356 r/	420 r/	56	5	529	590
Louisiana	39	1	356 r/	397 r/	45	2	367	413
Maine	8	19	258	285	8	29	250	288
Maryland	77	173	139	389	76	447	227	750
Massachusetts	26	8	673	707	33	25	568	626
Michigan	240	26	1,520 r/	1,780 r/	248	28	1,720	2,000
Minnesota	132	191 r/	582 r/	902 r/	139	182	513	834
Mississippi	20	(3/)	207 r/	227 r/	23	(3/)	237	261
Missouri	166	37 r/	540 r/	742 r/	129	44	576	749
Montana	1	45 r/	3	48 r/	1	44	3	48
Nebraska	73	30	245	348	75	38	159	272
Nevada	2	203 r/	W	228 r/	2	237	11	251
New Hampshire	4	4	214	222	5	4	102	111
New Jersey	125	145	338	608	131	234	523	889
New Mexico	7	48	--	55	6	49	1	55
New York	144	52	2,560 r/	2,760 r/	206	164	3,170	3,540
North Carolina	264	42	85 r/	390 r/	218	68	105	390
North Dakota	11	27 r/	18	57 r/	5	28	9	43
Ohio	349	33	1,640 r/	2,010 r/	368	45	2,090	2,500
Oklahoma	31	16	78 r/	126 r/	31	19	61	111
Oregon	12	43 r/	1	56 r/	13	130	131	274
Pennsylvania	180	132	1,360 r/	1,670 r/	217	187	1,900	2,310
Rhode Island	10	7	50	67	8	10	101	119
South Carolina	43	8	12	63	49	7	12	67
South Dakota	32	46 r/	47	126 r/	31	53	26	110
Tennessee	75	2	529 r/	605 r/	71	3	579	653
Texas	181 r/	139	320	635	183	137	258	578
Utah	6	428 r/	W	434 r/	7	347	W	354
Vermont	5	1	179	185	5	1	254	261
Virginia	100	49	160	309	95	161	193	449
Washington	23	279 r/	(3/)	303 r/	26	240	(3/)	266
West Virginia	13	3	128	144	12	3	183	199
Wisconsin	227	88 r/	1,070 r/	1,380 r/	230	104	1,180	1,510
Wyoming	(3/)	20 r/	2	22 r/	(3/)	25	2	27
Other 4/	208	64 r/	319 r./	592 r/	128	161	302	592
Total 5/	4,130	4,140 r/	18,200 r/	26,200 r/	4,120	4,890	20,700	29,500

r/ Revised. W Withheld to avoid disclosing company proprietary data; included with "Other."

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines 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, some shipments to unspecified destinations, and shipments to States indicated by symbol W.

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

	1993	1994
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. 245, No. 1, Jan. 3, 1994, p 30; and v. 247, No. 1, Jan. 2, 1995, p. 32.

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

(Dollars per metric ton)

Product form	Vacuum pans and open pans	Solar	Rock	Brine
1993				
Bulk	49.63 r/	16.48 r/	18.40	5.24 r/
Compressed pellets	129.16	90.48 r/	XX	XX
Packaged	124.72 r/	56.90 r/	64.07	XX
Average 2/	111.97 r/	34.51 r/	20.28 r/	5.24 r/
Pressed blocks	100.38	86.76 r/	97.55 r/	XX
1994				
Bulk	50.14	16.74	19.54	5.40
Compressed pellets	126.85	96.06	XX	XX
Packaged	134.34	55.85	74.26	XX
Average 2/	114.24	34.77	22.33	5.40
Pressed blocks	96.11	87.38	99.27	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, which 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	1993		1994	
	Quantity	Value	Quantity	Value
Argentina	(2/)	30	2	63
Australia	2	87	(2/)	16
Bahamas, The	2	138	1	185
Bahrain	1	299	3	352
Belize	(2/)	9	(2/)	4
Brazil	(2/)	15	1	57
Canada	499	20,400	573	20,300
Chile	1	29	(2/)	21
Costa Rica	1	28	(2/)	33
Dominican Republic	(2/)	87	(2/)	100
El Salvador	5	440	1	132
France	(2/)	56	1	29
Germany	2	69	2	68
Guatemala	1	96	(2/)	11
Honduras	3	181	1	74
Hong Kong	(2/)	65	(2/)	72
Ireland	(2/)	26	(2/)	20
Jamaica	2	154	2	152
Japan	11	644	4	225
Korea, Republic of	32	2,080	1	362
Mexico	66	3,860	80	3,040
Netherlands	(2/)	7	(2/)	21
Netherlands Antilles	(2/)	65	(2/)	76
Panama	2	187	3	342
Saudi Arabia	29	3,380	21	1,870
Taiwan	8	705	4	177
Trinidad and Tobago	(2/)	5	(2/)	7
United Arab Emirates	1	282	1	210
United Kingdom	1	131	2	231
Venezuela	1	24	2	58
Other	16	1,220	37	1,910
Total	688	34,800	742	30,200

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines 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)

Country	1993		1994	
	Quantity	Value	Quantity	Value
Anchorage, AK	27	410	(2/)	4
Baltimore, MD	10	1,420	6	829
Boston, MA	--	--	(2/)	14
Buffalo, NY	12	1,580	62	2,790
Charleston, SC	(2/)	7	(2/)	26
Chicago, IL	(2/)	13	(2/)	43
Cleveland, OH	276	6,580	290	5,600
Columbia-Snake, OR	(2/)	77	(2/)	10
Detroit, MI	63	3,660	50	3,530
Duluth, MN	(2/)	24	(2/)	22
El Paso, TX	1	126	3	132
Great Falls, MT	2	223	4	275
Houston, TX	11	903	28	1,520
Laredo, TX	61	2,520	72	2,620
Los Angeles, CA	36	2,180	10	827
Miami, FL	5	360	5	528
Mobile, AL	1	135	(2/)	62
New Orleans, LA	15	1,940	7	694
New York, NY	4	285	12	735
Nogales, AZ	1	65	3	149
Norfolk, VA	7	1,430	3	492
Ogdensburg, NY	4	454	24	861
Pembina, ND	1	207	1	166
Philadelphia, PA	(2/)	37	(2/)	44
St. Albans, VT	--	--	(2/)	3
St. Louis, MO	(2/)	56	(2/)	26
San Diego, CA	1	259	2	139
San Francisco, CA	28	1,210	38	1,120
San Juan, PR	(2/)	26	(2/)	5
Savannah, GA	7	1,130	2	326
Seattle, WA	13	1,010	18	623
Tampa, FL	(2/)	33	1	50
Other 3/	100	6,450	99	5,930
Total	688	34,800	742	30,200

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines 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	1993		1994	
	Quantity	Value	Quantity	Value
Bahamas, The	807	11,300	1,180	16,700
Brazil	106	1,200	220	2,480
Canada	3,100	53,000	3,660	67,700
Chile	192	4,180	1,920	23,000
France	3	599	1	635
Germany	3	536	2	428
Italy	1	70	37	778
Korea, Republic of	3	564	3	633
Mexico	1,340	20,900	2,120	30,700
Netherlands	176	4,140	70	1,510
Netherlands Antilles	93	1,710	212	3,810
Spain	16	531	188	1,740
United Kingdom	2	113	14	216
Other	23 r/	1,030 r/	7	1,010
Total	5,870	100,000	9,630	151,000

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

TABLE 12
U.S. IMPORTS OF SALT, BY CUSTOMS DISTRICT 1/

(Thousand metric tons and thousand dollars)

Country	1993		1994	
	Quantity	Value	Quantity	Value
Anchorage, AK	--	--	3	119
Baltimore, MD	344	6,610	1,170	18,600
Boston, MA	295	5,830	474	10,900
Buffalo, NY	4	363	46	1,820
Charleston, SC	94	1,970	87	1,830
Chicago, IL	575	9,470	535	10,700
Cleveland, OH	127	2,410	89	2,190
Columbia-Snake, OR	363	4,210	357	4,280
Dallas-Fort Worth, TX	--	--	(2/)	2
Detroit, MI	873	15,800	1,190	23,200
Duluth, MN	175	2,470	159	2,550
El Paso, TX	(2/)	3	(2/)	2
Great Falls, MT	(2/)	17	1	71
Honolulu, HA	(2/)	30	(2/)	2
Houston, TX	(2/)	23	(2/)	72
Los Angeles, CA	119	2,080	114	2,150
Miami, FL	(2/)	43	(2/)	27
Milwaukee, WI	748	13,700	682	12,700
Minneapolis, MN	20	334	--	--
New Orleans, LA	176	2,440	223	3,020
New York, NY	235	5,380	1,650	21,100
Norfolk, VA	19	288	175	2,490
Ogdensburg, NY	49	915	95	3,770
Pembina, ND	12	379	20	443
Philadelphia, PA	329	4,720	752	8,530
Portland, ME	356	5,160	595	7,870
Providence, RI	70	782	202	2,090
St. Albans, VT	(2/)	12	8	453
St. Louis, MO	(2/)	26	(2/)	13
San Diego, CA	(2/)	46	(2/)	40
San Francisco, CA	(2/)	42	(2/)	80
San Juan, PR	16	595	22	787
Savannah, GA	83	1,390	41	572
Seattle, WA	454	6,940	374	5,140
Tampa, FL	209	3,090	197	2,860
Washington, DC	(2/)	3	--	--
Wilmington, NC	120	2,420	95	830
Total	5,870	100,000	9,630	151,000

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines 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/	1990	1991	1992	1993	1994 e/
Afghanistan (rock salt) e/	10	12	12	13	13
Albania e/	85 4/	55	5	10	10
Algeria	222	211	210 e/	210 e/	210
Angola e/	30 r/	40 r/	20 r/	30 r/	30
Argentina:					
Rock salt e/	1	(5) r/	(5) r/	1 r/	1
Other salt	833 r/	943 r/	952 r/	1,030 r/	1,000
Total e/	834	943	952	1,030	1,000
Armenia e/	XX	XX	100	50	40
Australia (brine salt and marine salt)	7,230	7,790	7,690 r/	7,740 r/	7,800
Austria:					
Brine salt	674	698	662	695 r/	700
Rock salt	1	1	1 e/	1 e/	1
Total	675	699	663 e/	696 e/	701
Azerbaijan e/	XX	XX	50	40	30
Bahamas, The	828	1,100	809	850 e/	900
Bangladesh (marine salt) e/ 6/	350 4/	300	320	340	350
Belarus e/	XX	XX	360	300	250
Benin (marine salt) e/	(5)	(5)	(5)	(5)	(5)
Bolivia	(5)	(5)	(5) e/	(5) e/	(5)
Bosnia and Herzegovina e/	XX	XX	70	50	50
Botswana 7/	--	3	54	98 r/	100
Brazil:					
Marine salt	4,170	3,700	4,030 r/	4,000 r/	4,000
Rock salt	1,200 r/	1,200 r/	1,230 r/	1,250 r/	1,250
Total	5,370	4,900	5,260	5,250	5,250
Bulgaria e/	93 4/	90	90	80	80
Burkina Faso e/	7	7	7	7	7
Burma e/ 8/	260	260	260	260	260
Cambodia e/	40	40	40	40	40
Canada	11,300	12,000	11,200	10,900 r/	11,500 4/
Cape Verde e/	4	4	4	4	4
Chile	1,840	1,680	1,670	1,440 r/	1,500
China e/	20,000	24,100	28,100	29,500	29,700
Colombia:					
Marine salt	478	482	317	169 r/	170
Rock salt	209	219	230	231 r/	230
Total	687	701	547	400	400
Costa Rica (marine salt) e/	40	50	50	45	45
Croatia	XX	XX	40 r/	23 r/	25
Cuba e/	200	200	185	185	175
Czech Republic e/	XX	XX	XX	180	180
Czechoslovakia 9/	227	207	200 e/	XX	XX
Denmark (sales)	522	550	528	591 r/	600
Dominican Republic (rock salt)	11	11	12 e/	12	10
Egypt (marine salt)	989	891	890 e/	972 r/	972
El Salvador (marine salt)	8	15	20 e/	20 e/	20
Eritrea: e/ 10/					
Marine salt	XX	XX	XX	25	50
Rock salt	XX	XX	XX	1	2
Total	XX	XX	XX	26	52
Ethiopia: e/ 6/					
Marine salt	100	85	70 r/	45 r/	20
Rock salt	10	8	6 r/	3 r/	2
Total	110	93	76	48	22
France:					
Brine salt	1,160	1,000 e/	1,650	1,310 r/	1,400
Marine salt	1,300	1,200 e/	1,160	1,200 e/	1,200
Rock salt e/	790	800	103 4/	116 r/	120
Salt in solution	3,360	3,500 e/	3,210	2,630 r/	2,720
Total e/	6,610	6,500	6,120 4/	5,260	5,440

See footnotes at end of table.

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

(Thousand metric tons)

Country 3/	1990	1991	1992	1993	1994 e/
Germany:					
Marine salt:					
Eastern states	45	XX	XX	XX	XX
Western states	785	XX	XX	XX	XX
Total marine	830	563 r/	571 r/	558 r/	575
Rock salt and other:					
Eastern states	4,080	XX	XX	XX	XX
Western states	10,800	XX	XX	XX	XX
Total rock and other	14,900	14,300 r/	12,100 r/	12,100 r/	12,100
Total	15,700	14,900	12,700	12,700	12,700
Ghana e/	50	50	50	50	50
Greece e/	150 4/	150	125	100	100
Guatemala e/	181 4/	100	100	100	100
Honduras e/	30	30	30	30	25
Iceland e/	3	3	4 4/	5	5
India: e/					
Marine salt	9,500	9,500	9,500	9,500	9,500
Rock salt	3	3	3 4/	3 r/ 4/	3
Total	9,500	9,500	9,500	9,500	9,500
Indonesia e/	600	610	630	650	650
Iran 11/	848	901	1,110	720 r/	900
Iraq e/	250	120	250	300	300
Israel	426	1,120	1,100	1,120 r/	1,120
Italy:					
Brine salt and rock salt	3,750	3,500	3,210	2,490 r/	2,500
Marine salt, crude e/ 12/	680	450	610 r/	580 r/	600
Total e/	4,430	3,950	3,820	3,070	3,100
Jamaica	12	14 r/	14	14	14
Japan	1,380	1,380	1,410	1,380 r/	1,390
Jordan	55	57	56	26 r/	26
Kenya (crude salt)	102	102 e/	102 e/	75 r/	75
Korea, North e/	580	580	590	590	600
Korea, Republic of	617	696	772	750 e/	760
Kuwait	30 e/	--	15 e/	30	30
Laos (rock salt) e/	8	8	8	8	8
Lebanon e/	3	3	3	3	3
Leeward and Windward Islands e/	5	5	1	1	1
Libya e/	12	12	12	12	12
Madagascar e/	30	30	30	30	30
Mali e/	5	5	5	5	5
Malta (marine salt) e/	(5) 4/	(5)	(5)	(5)	(5)
Martinique e/	200	200	200	200	200
Mauritania e/	6	6	6	6	6
Mauritius e/	6	6	6	6	6
Mexico	7,140	7,530	7,400	7,490 r/	7,460 4/
Mongolia e/	17	17	17	18	18
Morocco (rock salt)	125	109	165	170 r/	170
Mozambique (marine salt) e/	40	40	40	40	40
Namibia (marine salt) 13/	157	141	115	116 r/	400
Nepal 14/	7	7	7	7	7
Netherlands	3,650	3,420	3,630	3,500 e/	3,500
Netherlands Antilles e/	350	350	350	300	350
New Zealand e/	80	80	80	80	80
Nicaragua (marine salt) e/	15	15	15	15	15
Niger e/	3 4/	3	3	3	3
Pakistan: 6/					
Marine salt	14	12	10	14 r/	13
Rock salt	763	769	853	895 r/	900
Total	777	781	863	909	913
Panama (marine salt) e/	22	18	20	20	20
Peru e/	200	200	238 4/	238	238
Philippines (marine salt)	490	493	496	535 r/	540

See footnotes at end of table.

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

(Thousand metric tons)

Country 3/	1990	1991	1992	1993	1994 e/
Poland:					
Rock salt	556	556	582	718 r/	700
Other salt	3,500	3,280	3,310	3,100 r/	3,100
Total	4,060	3,840	3,890	3,820	3,800
Portugal:					
Marine salt e/	125	125	125	125	125
Rock salt	523	525	592 r/	580 r/	560
Total e/	648	650	717	705	685
Romania:					
Rock salt e/	2,000	1,000	900 4/	900	900
Other salt	2,260	3,000 e/	1,590	1,500 e/	1,500
Total e/	4,260	4,000	2,490 4/	2,400	2,400
Russia e/	XX	XX	4,000	3,500	3,000
Senegal e/	92	102	110	117 r/	117
Serbia and Montenegro	XX	XX	47	39 r/	32 4/
Sierra Leone e/	200	200	200	200	200
Slovakia e/	XX	XX	XX	70	70
Slovenia e/	XX	XX	8	8	8
Somalia e/	2	1	1	1	1
South Africa, Republic of 13/	728	665	702	613 r/	282 4/
Spain:					
Marine salt and other evaporated salt e/	858 4/	900	900	900	900
Rock salt	2,520	2,500 e/	2,870 e/	2,510 r/	2,500
Total e/	3,380	3,400	3,770	3,410	3,400
Sri Lanka	53	53	122	43 r/	50
Sudan e/	68 4/	75	75	75	75
Switzerland	254	250 e/	276	300 e/	300
Syria e/	127 4/	127	127	127	127
Taiwan (marine salt)	83	195	26	176 r/	195
Tanzania	39	64	64 e/	64 e/	64
Thailand:					
Rock salt	119	125	213	262 r/	230
Other e/	100	100	100	100	100
Total e/	219	225	313	362	330
Tunisia (marine salt)	402	441	460	435 r/	435
Turkey	1,890	1,440	1,420	1,430	1,400
Uganda e/	5	5	5	5	5
U.S.S.R. 15/	14,700	14,000 e/	XX	XX	XX
Ukraine e/	XX	XX	4,400	4,000	3,500
United Kingdom:					
Brine salt 16/	1,340	1,320	1,200 e/	1,200 e/	1,300
Rock salt	1,100	1,640	1,500 e/	1,500 e/	1,200
Other salt 16/	3,990	3,870	3,400	3,500 e/	3,200
Total	6,430	6,830	6,100 e/	6,200 e/	5,700
United States including Puerto Rico:					
United States:					
Brine	17,700	18,600	17,600	18,100 r/	18,000 4/
Rock salt	13,100	11,100	10,900	14,300 r/	15,100 4/
Solar salt	2,480	2,580	2,540	3,540 r/	3,020 4/
Vacuum pan salt	3,660	3,620	3,760	3,860 r/	3,700 4/
Puerto Rico e/	41	41	45 4/	45	45
Total e/	37,000	35,900	34,800 4/	39,800	39,800
Venezuela	439	430	318	370 r/ e/	400
Vietnam e/	340	350	350	350	375
Yemen e/	220 4/	250	280	280	280
Yugoslavia: 17/					
Brine salt	204	220 e/	XX	XX	XX
Marine salt	71	70 e/	XX	XX	XX
Rock salt	100	100 e/	XX	XX	XX
Total	375	390 e/	XX	XX	XX
Grand total	183,000 r/	185,000 r/	178,000 r/	181,000 r/	180,000

See footnotes at end of table.

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

(Thousand metric tons)

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

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ Table includes data available through June 5, 1995.

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/ Less than 1/2 unit.

6/ Year ending June 30 of that stated.

7/ From natural soda ash production.

8/ Brine salt production as reported by the Burmese Government in metric tons, was as follows: 1990--49,700; 1991--46,800; 1992--46,500 ; 1993--58,900 (revised); and 1994--58,000 (estimated).

9/ Dissolved Dec. 31, 1992.

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

11/ Year beginning Mar. 21 of that stated.

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

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

14/ Year ending July 15 of that stated.

15/ Dissolved in Dec. 1991.

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.

17/ Dissolved in Apr. 1992.