

Salt

Michel Dumont

*The author is with the Minerals and Metals Sector,
Natural Resources Canada.
Telephone: (613) 995-2917
E-mail: mdumont@nrcan.gc.ca*

BRIEF HISTORICAL FACTS

The word “salt” comes from the Greek *halos*, and is commonly referred to as sodium chloride (NaCl).

Human history was shaped by the need for salt. Wars were fought over the possession of salt deposits. Salt bought slaves and at times was traded at twice the value of gold. Armies and civilians required salt to maintain health, preserve meat and tan leather. Salt became one of the world’s first commodities. Each human being contains about four ounces of salt and, unless we get enough of it, our muscles won’t contract, our blood won’t circulate, our food won’t digest and our hearts won’t beat. The same is true for livestock; therefore, salt is important in diets.

Salt is such a common part of our everyday lives that we rarely think of it as a natural resource that must be discovered, boiled/evaporated or mined, processed, marketed and consumed. Accordingly, salt data and information are needed by the public and private sectors to better understand the use and ultimate disposition of minerals and materials in the economy and the environment, and to develop policies and practices that better use our mineral and material resources. The basic methods of salt production have not changed for centuries – only the woes surrounding it in meeting people’s needs have changed.

In 2000, the top six salt-producing nations that collectively accounted for 55% of total world output (Table 3), in descending order of quantity produced, were the United States, China, Germany, India, Canada and Australia. In North America, some 57.5 Mt of salt were produced in 2000: 79.3% by the United States and 20.7% by Canada.

Canada exported close to 3.5 Mt of salt in 2000; 99.8% of this quantity was shipped to the United States. Canada also imports salt; it imported 1.14 Mt in 2000, 51.9% from the United States (Table 1). Canada’s imports of salt from the United States represent close to 77% of the majority of U.S. exports of salt.¹

Estimated world production of salt in 2000 was 214 Mt. The United States was the largest salt-producing nation, representing about 21.3% of total world output with 45.6 Mt. Canada’s share was 5.6% of world production, or 11.9 Mt. The largest underground mine in North America is located in Goderich, Ontario.

On a per-capita basis, Canada is the largest consumer of salt in the world, and this is due mainly to its winter conditions. Most of the salt used as a de-icing agent is consumed in Ontario, Quebec and Atlantic Canada. The apparent domestic consumption is reflected as follows: chemical and de-icing uses account for between 90% and 95% while the remainder is used for water conditioning, food processing, fisheries, and other industrial uses.

Of the millions of tonnes of dry salt produced annually in North America, a very small percentage finds its way to family dining tables, either in commercially processed foods, in home preparations, or in the salt shaker. By far the biggest part of salt produced as brine and dry salt – approximately 70% – is used in the chemical industry. Directly or indirectly, salt plays a part in the manufacture of a seemingly endless list of chemicals and chemical products. For example, salt goes into the production of chlorine and into the manufacture of soda ash; in turn, these two products are used in the processing or manufacture of a wide variety of end products ranging from rayon, polyester and other synthetics to plastics for explosives, fertilizers, glass and cosmetics.

The salt markets in developed regions such as North America and Western Europe are mature and expanding at a rate a little below the average growth of the world economy. The main consuming regions

¹ Source: U.S. Geological Survey (USGS).

are North America, Asia and the Middle East, and Western Europe. World salt consumption is on the rise, mainly in response to increasing demand in the countries of Southeast Asia and other developing nations.

SUMMARY

Preliminary data indicate that Canadian salt shipments for 2001 were valued at \$449.5 million, a \$98 000 increase from 2000. This 2001 value reflects the cyclical production level from year to year in response to winter conditions. Imports were valued at almost \$61.4 million for 2001, a \$13.4 million increase from 2000. Preliminary exports for 2001 represented \$116.2 million, an increase of \$28.3 million from the previous 2000 value. Canadian exports are mainly sent to the United States while imports come primarily from the United States, Mexico and Chile. The provinces of Ontario, Quebec and British Columbia are the main destinations for these imports (Table 1).

Mined rock salt represents 83.6% of 2001 total shipments while brine represents 10.0% and fine vacuum salt represents 6.4%. Every year since 1980, exports have surpassed imports; the only exceptions to this trend were in 1989 and 1990 (Table 2).

PRICE

Due to the unavailability of prices from Canada's salt industry, the following price examples from other sources are provided. The May 2002 edition of *IM Magazine* reported that salt prices (ground rocksalt, 15-20 short ton lots, average price delivered U.K.) were in the range of £20-£30 (converted: \$46.70-\$70.00). As a basis of comparison for the North American market,¹ the salt produced has unique production, processing and packaging factors that determine the selling prices. Generally, salt sold in bulk is less expensive than salt that has been packaged, pelletized or pressed into blocks. Salt in brine is the least expensive salt sold because mining and processing costs are lower. Vacuum pan salt is the most expensive because of the higher energy cost involved in processing it and the purity of the product. Year 2000 average prices (net selling value, free on board plant, excluding container costs, U.S. dollars per metric ton) are as follows: bulk (vacuum pan and open pans, \$50.58; rock, \$21.16; brine, \$5.70); compressed pellets (vacuum pan and open pans, \$130.97; rock, n.a.; brine, n.a.); packaged (vacuum pan and open pans, \$128.05; rock, \$62.34; brine, n.a.); and pressed blocks (vacuum pan and open pans, \$101.18; rock, \$91.14; brine, n.a.).

Canadian producers and others are well aware of the globalization factor affecting prices. A slight difference in price and usual orders made in previous years can be lost to a foreign competitor.

TRADE

Salt is a widespread, low-value, bulk commodity. It is relatively easy to extract and transportation represents a significant proportion of the total delivered price (one reason for imports into and exports from the United States and Canada for specific regions is the economic factor). As a consequence, international trade in salt is small relative to world production.

Canadian salt exports for 2001 went mostly to the United States (99.9%), an increase of 33% from 2000. Imports in Canada in 2001 came mainly from the United States, Mexico, Chile, the Bahamas, France, Japan, China and other countries. The United States provided 68.8% of the imports (Table 1).

CONSUMPTION

Chemical raw materials represent 60% of world salt consumption, followed by table salt (20%) and road de-icing salt (10%); the remaining 10% is used in animal feed and water treatment. Consumption patterns differ in North America.

Canada's high level of consumption, which at one time was estimated at over 360 kg of salt per person per year (consumption statistics were available until 1987), is due to severe winter conditions in many parts of the country and the use of salt to improve winter driving conditions.

The United States provides consumption details and these could be used to estimate the North American consumption of Canadian salt. In 2000, the U.S. distribution of salt by major end use was chemicals (42%), ice control (36%), distributors (grocery and other wholesalers and retailers) (7%), general industrial (6%), agricultural (4%), food processing (3%), primary water treatment (1%), and other uses (1%). For a more descriptive idea of the end-use industrial sector applications in these above categories, a paper was written in 1993 by Mr. Denis S. Kostick (USGS) titled *The Material Flow of Salt*, information circular #9343. One example in this report of the general industrial use of salt in the oil and gas exploration is described as follows: "Salt is an important component of drilling fluids in well drilling, since 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. It is also used to increase the set rate of concrete in cemented casings.”

The Canadian Salt Institute provides a web site with an explanation of the many uses of salt at the following address: www.saltinstitute.org/16.html.

The industrial chemicals industry (source: NRCan) consumes salt for the manufacture of chloralkali such as caustic soda (sodium hydroxide), chlorine, and sodium chlorate. Salt for caustic soda and chlorine plants in Canada is obtained from on-site brining and natural brines; other plants used mined rock salt or imported solar or evaporated salt. Other industrial chemicals that require significant quantities of salt include sodium bicarbonate, sodium chlorite, sodium hypochlorite, sodium carbonate (soda ash), and calcium chloride.

Most pulp and paper mills in Canada have carried out extensive process modifications and improvements in effluent treatment. Several have opted to reduce chlorine usage by installing other bleaching processes such as extended lignification, oxygen delignification, sodium chlorate bleaching, integrated chlorine dioxide with hydrochloric acid recycling, and ozone and hydrogen peroxide bleaching processes. Although seen as a step in the right direction by environmentalists, they would prefer that the industry adopt dioxin-free bleaches such as oxygen and hydrogen peroxide.

Sodium chloride, or salt, remains the primary de-icing agent. Different de-icers are used in accordance with site requirements. Calcium chloride is the second most used de-icer, being effective at temperatures ranging between -10 and -20° C; this chemical is usually mixed with salt at a 2-4% rate. Growing concerns over the environment and the corrosion of infrastructure, such as bridge decks and parking lots, have led to numerous experiments with de-icing salt substitutes.

The effects of salt-spreading on the environment depend on a variety of factors such as weather conditions, road characteristics, traffic loads, winter maintenance methods, and local topography. Environmental effects may include adverse impacts on plant growth and crop productivity in the immediate vicinity of highways, as well as higher salinity levels in streams and groundwater systems. Because of its low price, de-icing salt is the favoured de-icing agent. The optimization of spreading rates, in combination with the search for adequate abrasive mixtures, will continue to be evaluated. For many years, provincial/territorial and regional agencies in charge of road maintenance have pursued the objective of optimizing the use and selection of ice and snow control methods. Cost, operational reliability, public safety and environmental issues must be considered and these agencies will continue to evaluate improve-

ments to existing methods and better road safety and rideability.

Although the benefits of de-icing agents were recognized by the Environment Minister's Expert Advisory Panel on the Second Priority Substance List, the Panel recommended that they be assessed for potential impact on the environment but that “any measures developed as a result of the assessment must never compromise human safety.” The overall conclusion of Environment Canada's *Canadian Environmental Protection Act, 1999* (CEPA 1999) report entitled *Priority Substances List Assessment* on road salts, is as follows: “Based on the available data . . . it is concluded that road salts that contain inorganic chloride salts with or without ferrocyanide salts are ‘toxic’ as defined in Section 64 . . .”

A working group that includes representatives of governments, industry, and environmental groups, met three times in 2002 to discuss best practices for the application, storage and disposal of road salt and to develop a guideline under CEPA 1999. The proposed control measures are expected to be published in the *Canada Gazette* in December 2003.

PRODUCTION

Canada has an abundant resource of salt. The vast Canadian territory has three known major salt formations, all of great area and thickness, in economically strategic locations. The largest deposits are in western Canada, followed by Ontario and the Atlantic provinces. In western Canada, the salt beds extend from the Northwest Territories down through Alberta, Saskatchewan and into Manitoba. This immense deposit, averaging 122 m (400 feet) in thickness and covering an area of approximately 390 000 km² (150 000 square miles), contains more than one million billion tonnes of salt.

In Ontario, salt is found along the shores of Lake Huron and Lake Erie. This deposit is part of the known Michigan Basin and is a saucer-shaped formation underlying part of Michigan, part of Ohio, and lakes Huron and Erie.

In the Atlantic provinces, large, thick deposits have been found underlying New Brunswick, Nova Scotia, part of Newfoundland and Labrador, and even the Gulf of Saint Lawrence. These deposits occurred in various geologic eras and all of them are the remains of ancient inland seas. The shorelines of these ancient seas, which outline the edges of the salt beds, mark the occurrences of the oil, gas and coal deposits that have been found in such abundance in Canada.

Major salt deposits and dry salt production in North America can be viewed at the following web site: www.saltinstitute.org/images/map.pdf.

The Canadian salt industry produces 13.5 Mt of salt from major rock salt mines in Ontario, Quebec and New Brunswick and from vacuum pan refineries in Alberta, Saskatchewan, Ontario, New Brunswick and Nova Scotia. Nearly three-quarters of this production was rock salt, used primarily for highway de-icing. In quantities produced, Canada ranks fifth in the world (Table 3). Two major methods are used to obtain salt from Canada's age-old deposits: underground room-and-pillar mining and brining. Recovery as a co-product of potash mining is also practised (Table 4). The most important Canadian producers are described below.

In Nova Scotia, The Canadian Salt Company Limited operates an underground rock salt mine at Pugwash in Cumberland County. Most of the salt from this mine is used for snow and ice control. It also operates an evaporated salt plant where saturated brine is fed to a quadruple-effect vacuum pan, where brine solution is evaporated to produce high-quality salt crystals for use in the chemical and food industries.

Sifto Canada Inc.'s (a subsidiary of Compass Minerals Group Inc.) production process in eastern Canada is a brining operation at the Amherst, Nova Scotia plant. Its vapour re-compression process produces an unequaled salt purity in North America and its evaporated salt products are sold for table salt, fisheries, and water conditioning.

In New Brunswick, Potash Corporation of Saskatchewan Inc. (New Brunswick Division) produces potash and salt at its underground mine near Sussex. It extracts salt and sells it mainly to the United States and eastern Canada. It also pumps brine back to the surface for re-use. This brine is produced from the clay slimes and excess brine slurries from the processing plant piped underground as backfill where rock salt has been extracted.

In Quebec, Seleine Mines Division (a subsidiary of The Canadian Salt Company Limited) is the only operating salt producer. It is located on the Magdalen Islands.

In Ontario, Sifto Canada Inc. operates an underground rock salt mine in Goderich Harbor on the shores of Lake Huron. It also operates an evaporating plant for brine production on the escarpment of the Maitland River. The products serve the home water softeners, packaged icemelts, agricultural salts, food processing, table salts, and industrial salts markets.

More commonly recognized under the leading consumer brand of Windsor, The Canadian Salt Company Limited is headquartered in Pointe-Claire, Quebec. It produces both rock salt from the Ojibway underground mine and vacuum salt from brine wells

near Windsor. Salt products include de-icing road salt, and water softening, agricultural and chemical fine salt.

In Saskatchewan, Sifto Canada Inc. operates a brining operation near Unity for the production of fine vacuum pan salt, which is used for water softening, for agriculture and in food processing, as well as some de-icing salt for local use.

The Canadian Salt Company Limited at Belle-Plaine produces evaporated salt from by-product brines sourced from an adjacent potash solution mine operated by IMC Potash Belle Plaine, a subsidiary of IMC Kalium Canada Ltd. Most of the production goes towards water softening; other uses are for agriculture, food processing, and ice control.

In Alberta, The Canadian Salt Company Limited, at Lindberg, produces fine vacuum pan salt, which is also used for water softening, agriculture and food processing, as well as some de-icing salt for local use.

Other companies known to produce salt (mainly brine) are as follows:

- In Quebec, Junex, an oil and gas exploration company, has discovered a natural brine zone while drilling for gas in Bécancour. In 2001, Junex created Junex Solnat, which operates the natural brine operation. Its natural brine is sold as a dust control agent and ice removal products.
- In Saskatchewan, IMC Esterhazy Canada Limited Partnership (formerly known as International Minerals & Chemical Corporation [Canada] Global Limited) supplied by-product rock salt from its potash operation at Esterhazy to Kayway Salt, who is distributing it locally for road de-icing. Saskatoon Chemicals ("SaskChem," a subsidiary of Sterling Chemicals Holdings, Inc.) produces brines from wells near Saskatoon for the manufacture of caustic soda, chlorine and sodium chlorate to be used internally for its pulp chemicals operations. NSC Minerals Inc. in Rocanville, and also in Vanscoy, produces coarse and fine salt products from potash tailings.
- In Alberta, Dow Chemical Canada Inc. at Fort Saskatchewan near Edmonton extracts salt brines for the manufacture of chloralkali. Nexen Incorporated (formerly known as Canadian Occidental Petroleum Ltd. [Canadian OXY Ltd.]), and Albchem Industries Ltd. (where the plant site is located on the large and very pure Upper Lotsberg salt deposit), near Bruderheim, operate solution mines to produce sodium chlorate used mostly for pulp bleaching in the Prairie provinces and western Canada.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 64. (2) Information in this review was current as of September 30, 2002. (3) This and other reviews, including previous editions, are available on the Internet at www.nrcan.gc.ca/mms/cmy/index_e.html.

NOTE TO READERS

The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The authors and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.

TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2501.00	Salt (including table salt and denatured salt) and pure sodium chloride, whether or not in aqueous solution or containing added anti-caking or free-flowing agents; sea water				
2501.00.10	Table salt made by an admixture of other ingredients when containing 90% or more of pure sodium chloride	2.5%	Free	Free	Free
2501.00.90	Other	Free	Free	Free	Free

Sources: *Customs Tariff*, effective January 2002, Canada Customs and Revenue Agency; *Harmonized Tariff Schedule of the United States*, 2002.

TABLE 1. CANADA, SALT SHIPMENTS AND TRADE, 1999-2001

Item No.	1999		2000		2001 (p)	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
SHIPMENTS						
By type						
Mined rock salt	10 004 167	274 744	9 458 260	253 876	11 331 585	338 639
Fine vacuum salt	823 983	86 927	827 630	86 266	862 132	100 554
Salt content of brines used or shipped	1 857 745	11 948	1 878 179	11 266	1 354 677	10 315
Total	12 685 895	373 619	12 164 069	351 408	13 548 394	449 508
By province						
Nova Scotia	x	x	x	x	x	x
New Brunswick	x	x	x	x	x	x
Quebec	x	x	x	x	x	x
Ontario	7 745 160	230 153	7 236 664	212 215	8 472 765	288 967
Saskatchewan	754 992	33 485	756 958	33 650	798 120	38 400
Alberta	1 286 729	21 544	1 310 891	19 554	1 231 725	19 782
Total	12 685 895	373 619	12 164 069	351 408	13 548 394	449 508
IMPORTS						
2501.00						
Salt (1)						
United States	771 678	33 767	592 846	33 251	1 131 501	47 925
Mexico	308 529	4 871	357 776	6 464	292 669	5 296
Chile	257 672	6 987	146 827	4 415	129 431	4 613
Bahamas	23 259	734	11 641	313	62 425	1 331
France	3 511	406	2 892	321	7 786	806
Japan	2 179	197	1 127	177	388	197
China	381	154	664	133	3 648	154
Other countries	8 423	894	27 896	2 935	16 273	1 094
Total	1 375 633	48 012	1 141 669	48 009	1 644 121	61 416
By province of clearance						
Newfoundland and Labrador	23 066	721	11 712	327	24 211	717
Nova Scotia	684	99	5	...	6 365	122
New Brunswick	528	44	2 276	188	2 656	266
Quebec	363 385	11 331	198 954	8 810	324 483	11 409
Ontario	616 096	26 619	410 452	22 680	883 817	37 392
Manitoba	7 108	761	12 715	886	12 149	773
Saskatchewan	3 374	464	14 053	1 502	2 642	409
Alberta	8 566	763	21 780	2 472	11 926	1 100
British Columbia	352 826	7 210	469 721	11 144	375 870	9 228
Total	1 375 633	48 012	1 141 669	48 009	1 644 119	61 416
EXPORTS						
2501.00						
Salt (1)						
United States	3 807 405	99 343	3 469 601	87 084	4 614 059	115 850
Dominican Republic	616	163	3 516	377	1 397	103
Hong Kong	-	-	9	5	25	49
Other countries	72	33	2 629	389	25	49
Total	3 808 093	99 539	3 475 755	87 855	4 616 725	116 153

Sources: Natural Resources Canada; Statistics Canada.

- Nil; ... Amount too small to be expressed; (p) Preliminary; x Confidential.

(1) Includes table salt, pure sodium chloride and seawater salt.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, SALT SHIPMENTS AND TRADE, 1980-2001

	Producers' Shipments			Total	Imports	Exports
	Mined Rock	Fine Vacuum	In Brine and Recovered in Chemical Operations			
	(tonnes)					
1980	4 507 416	781 428	2 134 010	7 422 854	1 151 203	1 637 601
1981	4 371 314	764 037	2 107 243	7 242 594	1 254 992	1 507 710
1982	5 223 073	773 086	1 944 172	7 940 331	1 526 879	1 721 893
1983	5 846 994	714 464	2 040 925	8 602 383	814 250	1 914 629
1984	7 030 664	754 675	2 450 060	10 235 399	1 053 217	2 530 038
1985	6 608 739	805 209	2 670 749	10 084 697	1 255 518	2 263 076
1986	6 867 287	815 044	2 649 515	10 331 846	1 328 298	2 502 518
1987	6 670 863	866 475	2 591 715	10 129 053	1 112 102	1 924 686
1988	7 126 762	783 368	2 777 050	10 687 180	1 202 219	3 030 124
1989	7 548 732	821 284	2 788 395	11 158 411	2 360 432	2 137 321
1990	7 704 499	778 428	2 708 458	11 191 385	2 095 321	1 897 816
1991	8 615 755	799 563	2 455 541	11 870 859	1 202 880	2 783 021
1992	7 912 989	770 370	2 404 667	11 088 026	1 041 424	2 650 921
1993	8 073 435	817 859	2 101 711	10 993 005	1 051 096	3 079 298
1994	9 446 002	822 181	1 975 704	12 243 887	940 131	3 638 674
1995	8 077 661	850 676	2 029 047	10 957 384	1 294 996	2 986 802
1996	9 499 189	853 858	1 895 430	12 248 477	1 137 604	3 816 788
1997	10 923 966	863 112	1 709 778	13 496 856	1 262 822	3 634 009
1998	10 517 641	834 944	1 681 710	13 034 295	977 944	4 177 880
1999	10 004 167	823 983	1 857 745	12 685 895	1 375 633	3 808 093
2000	9 458 260	827 630	1 878 179	12 164 069	1 141 669	3 475 755
2001 (p)	11 331 585	862 132	1 354 677	13 548 394	1 644 119	4 616 725

Sources: Natural Resources Canada; Statistics Canada.
(p) Preliminary.

TABLE 3. WORLD SALT PRODUCTION, 1996-2001

	1996	1997	1998	1999	2000	2001 (e)
	(000 tonnes)					
United States (1)	42 300	(r) 41 500	(r) 41 300	45 000	45 600	45 100
China	(r) 29 035	(r) 30 830	(r) 22 420	28 124	31 300	32 000
Germany	15 907	(r) 15 787	(r) 15 700	15 700	15 700	15 800
India	(r) 14 466	(r) 14 251	(r) 11 964	14 453	14 500	14 500
Canada (2)	12 248	(r) 13 264	13 296	(r) 12 686	11 900	12 500
Mexico	8 508	7 933	(r) 8 412	(r) 8 236	8 900	8 600
Australia	7 905	(r) 8 801	(r) 8 879	10 003	8 800	8 000
France	7 860	(r) 7 085	(r) 7 000	7 000	7 000	7 100
Brazil	5 384	(r) 6 516	(r) 6 837	(r) 5 958	6 000	7 000
United Kingdom	6 610	6 600	6 600	5 800	5 800	5 700
Poland	4 163	(r) 3 859	(r) 4 005	(r) 4 212	4 200	4 500
Italy	(r) 3 541	(r) 3 510	3 600	3 600	3 600	3 600
Spain	4 000	4 000	(r) 3 500	3 200	3 200	3 300
Russia	2 100	2 100	(r) 2 200	(r) 3 200	3 200	3 000
Ukraine	2 800	2 500	2 500	(r) 2 185	2 390	2 400
Other countries	(r) 37 173	(r) 38 464	(r) 41 787	41 643	41 900	41 000
Total	(r) 204 000	(r) 207 000	(r) 200 000	(r) 211 000	214 000	214 000

Sources: Natural Resources Canada; U.S. Geological Survey.

(e) Estimated; (r) Revised.

(1) Excludes Puerto Rico. (2) The U.S. Geological Survey is the source for all data, excluding data for Canada, for which the source is Natural Resources Canada.

Note: Numbers may not add to totals due to rounding.

TABLE 4. CANADIAN SALT PRODUCERS, 2000-01

Company	Location/ Initial Production	Mill/Plant Capacity	Remarks
		(t/d)	
Albchem Industries Ltd.	Virde n, Man./2002	40 t/y	Brining to produce sodium chlorate.
	Bruderheim, Alta./1991	129	Brining to produce sodium chlorate. (Salt brine)
Nexen Chemicals Canada Limited Partnership	Bruderheim, Alta./1991	100	Brining to produce sodium chlorate. (Salt brine)
Canadian Salt Company Limited, The	Pugwash, N.S./1959	4 000	(Rock salt)
	Pugwash, N.S./1963	310	Brine made from mined rock salt used to produce fine evaporated salt. (Rock salt)
	Iles-de-la-Madeleine, Que./1982	4 800	(Rock salt)
	Ojibway, Ont./1955	10 300	Salt graded and prepared for markets. (Rock salt)
	Windsor, Ont./1892	681	Evaporated salt.
	Belle-Plaine, Sask./1969	650	Plant uses sodium chloride brines produced at the nearby potash solution mine of IMC Kalium Canada Ltd. (Evaporated salt)
	Lindbergh, Alta./1968	400	Produces coarse and fine salt. (Evaporated salt)
Dow Chemical Canada Inc.	Fort Saskatchewan, Alta./1967	3 500	Brining to produce caustic soda and chlorine. (Salt brine)
General Chemical Canada Ltd.	Amherstburg, Ont./1919	–	Brining to produce sodium carbonate and chloride. Discontinued operation in April 2001.
IMC Potash Belle Plaine, a subsidiary of IMC Kalium Canada Ltd.	Colonsay, Sask./1969	–	Various grades of salt are also produced. Discontinued operation in June 2001.
IMC Global Inc.	K1 mine, Esterhazy, Sask./1962	180 t/y	By-product rock salt from potash mine (standard, coarse and granular grades).
NSC Minerals Inc.	Rocanville, Sask./1990	200 t/y	Produces coarse and fine products. (Rock salt)
	Vanscoy, Sask./1988	300 t/y	Produces coarse and fine products. (Rock salt)
Potash Corporation of Saskatchewan Inc., New Brunswick Division	Sussex, N.B./1983	700 t/y	Three grades of muriate of potash (KCl) are produced from a flotation circuit and a crystallizer circuit. (Salt)
Sterling Pulp Chemicals (Sask) Ltd.	Saskatoon, Sask./1979	130	Primarily a manufacturer of pulp and water treatment chemicals. Brining to produce caustic soda, chlorine and sodium chlorate.
Sifto Canada Inc.	Amherst, Nappan, N.S./1947	312	Brining for vacuum pan evaporation. (Evaporated salt)
	Goderich, Ont./1959	26 000	Rock salt mining.
	Goderich, Ont./1872	326	Brining for vacuum pan evaporation. (Evaporated salt)
	Unity, Sask./1949	408	Brining for vacuum pan evaporation. (Evaporated salt)

Source: Natural Resources Canada, company surveys.