

Salt

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This review on salt has been abbreviated to include mainly statistical tables and a brief description of the Canadian salt industry.

In 1998, Canadian salt production was estimated at 13.3 Mt, a very marginal decrease over 1997. Estimated Canadian shipments of all types of salt in 1998 were 13.2 Mt, a 2.2% decrease over 1997 shipments of 13.5 Mt. In 1998, shipments from Ontario accounted for 63% of all shipments, a slight decrease in both the share and volume over 1997 shipments. Rock salt shipments accounted for 81% of total shipments, followed by salt in brines (13%) and evaporated salt (6%). The average unit value of salt shipments was estimated at \$30.29/t, a 1% increase over that of 1997. In 1998, rock salt mines operated at 85% of capacity; captive brining plants and evaporated salt facilities operated at 74% and 80%, respectively. Salt operations overall ran at an average rate of 84% of capacity.

The year 1998 was relatively slow for the Canadian pulp and paper industry, which is one of the largest end users for chloralkali. Pulp mills operated at 86% of capacity in 1998, compared to 89% in 1997, and they are expected to increase their operating rate in 1999. Overall, Canadian shipments and exports of pulp, paper and paperboard were down by about 3% from 1997 levels.

ATLANTIC REGION

Salt production in the Atlantic provinces was from an underground rock salt mine at Pugwash, Nova Scotia; an underground potash and salt mine at Sussex, New Brunswick; and a brining operation near Nappan, Nova Scotia.

In Nova Scotia, The Canadian Salt Company Limited operates an underground rock salt mine at Pugwash

in Cumberland County with a rated capacity of approximately 1.2 Mt/y. Most of the salt from this mine is used for snow and ice control. At the evaporated salt plant, saturated brine is fed to a quadruple-effect vacuum pan, rated at 13 t/h, where brine solution is evaporated to produce high-quality salt crystals for use in the chemical and food industries.

In New Brunswick, Potash Corporation of Saskatchewan Inc. (New Brunswick Division) produced potash and salt at its underground mine near Sussex. Salt is extracted at a rate of about 700 000 t/y and is sold mainly to the eastern United States and eastern Canada under a sales contract with Akzo Salt Limited. Reserves are estimated to be large enough to operate for as long as potash is extracted, which is at least 25 years. The mine is now using the integrated method of utilizing salt tailings underground as fill to support the salt and potash mining operation. Approximately 1.75 Mt of salt waste from the potash operation and rock salt screen rejects are sent directly to active cut-and-fill potash stopes to be used as backfill. Clay slimes and excess brine slurries from the processing plant are also piped underground to be discharged into large cavities created by the extraction of rock salt. After the solids have settled, the clear brine solution is re-pumped to the surface for re-use. The entire operation results in a closed circuit or "zero effluent" system.

Sifto Canada Inc., a division of North American Salt Co., has a brining operation at Nappan in Cumberland County, Nova Scotia. Evaporated salt products are sold for table salt, fisheries, and water conditioning.

QUEBEC

There is only one operating salt producer in Quebec, Seleine Mines Inc., located on the Magdalen Islands. Seleine Mines Inc. is owned by The Canadian Salt Company Limited. In 1995, this operation was closed down as a result of water infiltration. It resumed production in 1997 and, by 1998, the mine had reached its pre-closure production level.

ONTARIO

In 1998, salt was produced from two underground rock salt mines (Goderich and Ojibway) and from brining operations at Goderich, Windsor and Amherstburg. Salt is extracted from the Salina formation.

At Goderich, Sifto Canada Inc. operates an underground rock salt mine. Mining is currently conducted approximately 537 m below the surface, 2.5 km off the shore of Lake Huron. Reserves are estimated to be about 240 Mt and the mine has an annual capacity of 5.5 Mt of salt products. The mine has now completed its conversion to the bench mining technique. In 1998, IMC Global Inc., the Chicago-based parent company of IMC Kalium, purchased the assets of Harris Chemical Group, which included Sifto Canada Inc., and became one of the largest salt operators in Canada. Sifto's salt is marketed mainly for ice control and is sold primarily in eastern Canada, the north-central United States (Great Lakes Basin), and regions accessible through the Mississippi River system. Salt produced at Goderich is also used by the chemical and water treatment industries. Evaporated salt is produced at the Sifto brining operation located near Goderich and is used mainly for the water-softening market.

The Canadian Salt Company Limited produced both rock salt from the Ojibway underground mine and vacuum salt products from brine wells near Windsor. The mine capacity is 2.7 Mt/y and current estimated reserves are 100 Mt. Rock salt is extracted using room-and-pillar mining methods from a 7.5-m unit of the Salina formation about 297 m below the surface. Brine is pumped from the 427-m and 457-m levels. Salt products include de-icing road salt (accounting for two thirds of production) and water softening, agricultural and chemical fine salt. The main markets are Canada and the midwestern United States for all salt products except chemical fine salt, which is marketed in Quebec for the manufacture of caustic soda and chlorine. In 1994, The Canadian Salt Company Limited acquired the mineral rights to Fighting Island in the Detroit River and, consequently, it now has sufficient reserves for at least 40 years.

In the vicinity of Amherstburg, General Chemical Canada Ltd. operates a brining operation for the manufacture of sodium carbonate and by-product calcium chloride. Because of the important quantities of sodium chloride resulting from the calcium chloride stream, the company is currently assessing the possibility of profiting from this by-product sodium chloride.

PRAIRIE PROVINCES

In Saskatchewan, four companies produced salt from the Middle Devonian Prairies formation in 1998.

International Minerals & Chemical Corporation (Canada) Global Limited, a subsidiary of IMC Kalium, supplied by-product rock salt from its potash operation at Esterhazy to Kayway Salt, who is distributing it locally for road de-icing. Kayway Salt is presently considering the U.S. market, especially North Dakota, Wisconsin and Montana. Sifto Canada Inc. operated a brining operation near Unity for the production of fine vacuum pan salt. Uses of the salt produced at Unity are for water softening, for agriculture, in food processing, and some de-icing salt for local use. The Canadian Salt Company Limited at Belle-Plaine produced evaporated salt from by-product brines sourced from an adjacent potash solution mine operated by IMC Kalium Canada Limited, a subsidiary of IMC Kalium. Most of the production goes towards water softening; other uses include for agriculture and in food processing and ice control. Saskatoon Chemicals, a division of Weyerhaeuser Canada Ltd., produced brines from wells near Saskatoon for the manufacture of caustic soda, chlorine and sodium chlorate to be used internally in its pulp and paper operations.

Nu Salt Corp. processed salt-rich potash tailings from Potash Corporation of Saskatchewan's Rocanville operation. The potash tailings are dried and bulk delivered to local distributors for road de-icing. Other applications are for cattle feed and water softening. Nusalt is currently seeking new markets, such as the United States.

IMC Central Canada Potash Limited, a subsidiary of IMC Kalium, began salt production in September 1992. Salt is recovered from its potash tailings. The main product is de-icing salt, which accounts for 80% of production; the remaining 20% is for general use. Products are mostly sold locally in British Columbia, Alberta and Saskatchewan. The company is now moving to the commercial market where its products can be found under the Canadian registered trademark "Sabre." Salt is bagged at three locations. The company is seeking new markets in both Canada and the United States.

In Alberta, four producers operated brining operations. At Fort Saskatchewan near Edmonton, Dow Chemical Canada Inc. extracted salt brines for the manufacture of chloralkali and, at Lindberg, The Canadian Salt Company Limited produced fine vacuum pan salt. Near Bruderheim, two companies, CXY Chemicals Canada Ltd. Partnership (formerly known as Canadian Oxy Ltd.) and Albchem Industries, operated solution mines to produce sodium chlorate used mostly for pulp bleaching in the prairie provinces and western Canada.

BRITISH COLUMBIA

There was no production of salt in this province where three companies operated four chloralkali

plants. These operations used solar salt imported from Mexico, the United States and Chile.

CONSUMPTION

In Canada, since the early 1990s, the apparent consumption of salt varied between 9 and 11 Mt/y compared to 7 Mt/y in the early 1980s. In 1998, the apparent consumption of salt in Canada was estimated at 10 Mt, a 10% decrease over 1997. In 1998, imports, mainly in British Columbia, Ontario and Quebec, accounted for about 9.8% of total domestic consumption. Chemical and de-icing uses accounted for between 90% and 95% of Canadian consumption, with the remainder being used for water conditioning, food processing, fisheries, and other industrial uses. Most of the salt used as a de-icing agent is consumed in Ontario, Quebec and Atlantic Canada. The average yearly consumption of salt in Canada for ice and snow control ranges between 3.2 and 4.5 Mt.

Some 60% of world salt consumption is as a chemical raw material, followed by table salt (20%) and road de-icing salt (10%); the remaining 10% is used in animal feed and water treatment. The consumption pattern differs in North America where the chemical industry consumes about 56% of total production, followed by highway usage (24%) and the food industry (7%).

Salt Uses

Chloralkali and Related Uses

The industrial chemicals industry consumes salt for the manufacture of chloralkali such as caustic soda (sodium hydroxide), chlorine, and sodium chlorate. Salt for four caustic soda and chlorine plants in Canada is obtained from on-site brining and natural brines; other plants use 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 environmentalists consider sodium chlorate to be a step in the right direction in the move away from chlorine, they still would like the pulp and paper industry to adopt dioxin-free bleaches such as oxygen and hydrogen peroxide.

De-icing

Sodium chloride, or salt, remains the primary de-icing agent. Different de-icers are used in accordance with site requirements. On streets and highways, rock salt, calcium chloride-salt mixtures, salt brines, and mechanical measures (plowing and blowing) are mostly used. On bridges, salt, sand-salt mixtures, and salt alternative methods are used; pavement heating and non-corrosive chemicals with corrosion inhibitors are under investigation. On runways, non-corrosive compounds are used and comprise urea, formamide, and glycols. In residential and commercial areas, rock salt, potassium chloride (potash), calcium chloride, and various combinations of these materials with abrasives (sand and gravel) are regularly used. 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. The use of abrasives is mostly limited to highways and residential areas; a mixture of coarse sand and small crushed stone is spread to improve the skid resistance of slippery roads.

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. Research on alternatives has focused on abrasive mixes, magnesium chloride, ammonium compounds, tetrapotassium pyrophosphates, calcium magnesium acetate (CMA), sodium formate, isopropyl alcohol, ethylene glycol, and technical urea. Studies have also been conducted on non-chemical treatments, including a series of measures that are used mainly in Europe such as ice-retardant pavement surfacing and roadway heating. 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. For many years, provincial 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 considerations have all resulted in improvements to existing methods and better road safety and rideability.

As a result of these concerns, Environment Canada has decided to put "Road Salts" on the second Priority Substances List (PSL2) that was announced on December 16, 1995. The inclusion of road salts is the result of the recommendations outlined in the *Report of the Ministers' Expert Advisory Panel on the Second Priority Substances List under CEPA* that was issued in October 1995. In the rationale for including road salts in PSL2, while recognizing the benefits of their

usage, the Panel cites "evidence of adverse local environmental effects to groundwater and to plant and animal life." Because of these consequences and the widespread use of road salts, and "their release in large volume into the Canadian environment, the panel believes that an assessment is needed to determine their ecological effects."

Other Uses

Other sectors that consume salt include water softening, food processing, and the fisheries industry, which together account for close to 5% of total salt consumption in Canada. The North American salt industry is currently investigating the potential of using salt in several cosmetic and body products, a market that has grown significantly in Japan where some body shampoos can contain up to 50% salt.

TRADE

Imports of salt in 1998 were 0.98 Mt valued at \$38.3 million, which in volume represented a 22.5% drop compared to 1997, but represented only a 2% decrease in value. In 1998, the import unit price increased 26.1% to \$39.20/t from \$31.09/t in 1997. The origin of imports in 1998 was from 47 countries, but mainly from the United States (59%), Mexico (28%), Chile (5%) and the Bahamas (2%), for deliveries in Ontario (51%), British Columbia (41%), Quebec (4%) and the rest of Canada (4%).

Exports of salt in 1998 were 4.2 Mt valued at \$116.7 million which, when compared to 1997 figures of 3.6 Mt valued at \$102 million, represents an increase of 15% in volume and 14% in value. The unit value decreased by 0.5% from \$28.08/t in 1997 to \$27.94/t in 1998. Exports of salt products in 1998 were to eight countries, but principally to the United States, which accounted for 99.9%. Deliveries were shipped mainly from Ontario (83%) and Quebec (13%).

WORLD PRODUCTION

The total world production of salt in 1998 was estimated at 200 Mt, down slightly from 1997. Salt is produced in numerous countries, but the bulk of the production is from about 13 countries, of which the United States is the principal producer. The United States accounted for 21%, while China accounted for 15%, Germany for 8%, Canada for 7%, and India for 5%.

United States

Domestic salt production in the United States was estimated to be 42.1 Mt in 1998, up from 41.4 Mt in 1997; the total value was estimated to be in excess of

US\$965 million. Twenty-eight companies operated sixty-eight plants in fourteen states. Apparent consumption in 1997 was 49.0 Mt, down 7% from the 52.8 Mt in 1996; the 1998 figure is estimated to be marginally higher at 49.2 Mt. The distribution of salt sold or used by type, in 1995, was brine sales, 51%; rock salt, 31%; evaporated salt, 9%; and solar salt, 9%. The chemical industry consumed about 45% of the total salt sold, while road and ice control usage accounted for 30%, food and agricultural sectors for 7%, general industrial for 7%, and others for 11%. The 1998 estimated average unit value of salt from brine decreased 10% to US\$6.00/t and the average unit value for rock salt shipments decreased 13% to US\$17.90/t.

U.S. salt imports in 1998 were estimated at 9.3 Mt, a 1.5% increase over 1997. The major exporting countries were Canada (39%), followed by Chile (20%), Mexico (20%) and the Bahamas (12%). The net import reliance of the United States for 1998 was estimated at 17% of apparent consumption. Salt exports increased by 7% to 0.8 Mt.

INTERNATIONAL 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. As a consequence, international trade in salt is small relative to world production, i.e., about 20% of total world production. Trade in the Pacific area currently accounts for one half of seaborne movements, followed by North America (24%) and northwestern Europe (20%). Australia is expected to remain the major supplier to Japan, while Mexico will continue to export mainly to Japan and North America. Imports into the European Union are expected to remain minimal as this region is essentially self-sufficient. However, only facts relevant to the United States are of interest to the Canadian salt industry.

OUTLOOK

In 1999, domestic production and consumption of salt is forecast to remain stable. Imports of salt are likely to remain at 1998 levels. Rock salt prices are expected to increase by about 3%, and the price of value-added products should perform differently according to the product.

Despite environmental pressures and the recent inclusion on PSL2, de-icing salt will continue to be the major de-icing agent because of its low price. The optimization of spreading rates, in combination with the search for adequate abrasive mixtures, will continue to be evaluated. The winter of 1998/99, although considered a harsh winter in the northeastern United States, can only be considered a normal

winter for Canada and therefore should not result in above-average demand for de-icing salt in Canada, but may lead to increased exports to the United States.

The pulp and paper industry, which is the major consumer of chloralkali, is expected to improve in 1999 with a resulting increase in operating rates. Demand in the chloralkali sector is forecast to grow at a marginal rate of 1-2%. A decline in the consumption of chloralkali in the pulp and paper sector will likely be offset by an anticipated continued growth in the polyvinyl chloride (PVC) sector (in which sales of chlorine will register an annual increase of 5-6%). PVC output should continue to grow in 1999, mainly because of strength in the export market and the strengthening of the construction sector.

Sales of salt in the fisheries and food industries are believed to have now reached a plateau, but for dif-

ferent reasons. The Canadian fisheries seem to have completed their round of cuts in fish quotas. In the food industry, the concerns over salt in diets seem to be less important to the consumers (many products presented are already low in sodium content) and no further reduction is expected. Salt substitutes are still making some gains in this market.

A new but restricted market is currently being investigated by the industry. This market results from a Japanese fashion to use salt in many cosmetic and body-care products. The ageing but wealthy population of baby-boomers could be a good target for this new industry.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of March 31, 1999.

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 anticaking 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 1999, Revenue Canada; Harmonized Tariff Schedule of the United States, 1999.

TABLE 1. CANADA, SALT SHIPMENTS AND TRADE, 1996-98

Item No.	1996		1997		1998 ^p	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
SHIPMENTS						
By type						
Mined rock salt	9 499 189	268 040	10 923 966	310 547	10 675 654	304 395
Fine vacuum salt	853 858	84 343	863 112	84 834	844 281	85 077
Salt content of brines used or shipped	1 895 430	7 435	1 709 778	10 128	1 671 875	10 049
Total	12 248 477	359 818	13 496 856	405 509	13 191 810	399 520
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	8 402 232	2 561 156	8 968 029	275 229	8 315 286	257 856
Saskatchewan	791 929	32 364	837 625	32 434	701 906	30 729
Alberta	1 317 920	16 612	1 093 323	x	1 052 529	16 399
Total	12 248 477	359 818	13 496 856	405 509	13 191 810	399 520
IMPORTS						
2501.00						
Salt ¹						
United States	793 801	30 216	796 743	31 838	581 299	28 848
Mexico	272 597	4 810	393 019	5 489	272 071	5 335
Chile	42 550	515	46 407	560	88 813	2 169
Bahamas	10 463	233	11 970	227	22 574	551
France	2 145	272	3 920	152	2 104	236
Germany	1 750	230	3 258	276	4 608	106
Other countries	14 298	650	7 505	718	6 676	1 101
Total	1 137 604	36 926	1 262 822	39 260	978 145	38 346
By province of clearance						
Newfoundland	7 951	249	4 225	177	16 444	541
Nova Scotia	6 689	119	8 305	159	6 645	115
New Brunswick	52	9	91	10	2 938	863
Quebec	393 550	9 898	292 022	7 671	42 020	2 428
Ontario	320 808	17 560	372 960	20 441	502 235	24 264
Manitoba	4 725	487	4 101	457	3 862	529
Saskatchewan	1 246	225	1 135	276	1 368	396
Alberta	7 170	825	8 401	800	6 421	565
British Columbia	395 413	7 554	571 581	9 274	396 211	8 646
Total	1 137 603	36 926	1 262 821	39 264	978 145	38 348
EXPORTS						
2501.00						
Salt ¹						
United States	3 812 315	108 236	3 631 586	101 676	4 177 499	116 609
Panama	1 860	254	101	25	202	47
Costa Rica	296	72	1 210	58	23	14
Other countries	2 317	487	1 112	270	157	67
Total	3 816 788	109 049	3 634 009	102 029	4 177 881	116 737

Sources: Natural Resources Canada; Statistics Canada.

^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, 1980-98

	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
1998P	10 675 654	844 281	1 671 875	13 191 810	978 145	4 177 881

Sources: Natural Resources Canada; Statistics Canada.
P Preliminary.

TABLE 3. WORLD SALT PRODUCTION, 1993-98

Countries	1993	1994	1995	1996	1997	1998 ^e
	(000 tonnes)					
United States	39 300	39 800	42 200	42 300	41 400	42 100
China ^e	29 500	29 700	29 800	29 000	29 300	30 000
Germany	12 688	10 273	15 224	15 907	15 700	15 000
Canada	10 993	12 244	10 957	12 248	13 497	13 192
India	9 500	9 500	9 500	9 500	9 500	9 400
Australia	7 737	7 685	8 148	7 905	8 722	8 800
Mexico	7 490	7 458	7 670	8 508	7 933	7 900
France	6 980	7 536	7 539	7 860	7 160	7 200
United Kingdom	6 790	7 000	6 650	6 610	6 600	6 600
Brazil	6 180	6 043	5 800	5 384	5 520	5 700
Spain	3 410	4 932	4 776	4 000	4 000	4 100
Poland	3 817	4 074	4 214	4 163	3 968	4 000
Italy	3 730	3 953	3 552	3 600	3 600	3 600
Other	38 885	40 802	42 970	44 015	44 100	42 408
Total	187 000	191 000	199 000	201 000	201 000	200 000

Sources: Natural Resources Canada; U.S. Geological Survey.
^e Estimated.

TABLE 4. 1998 CANADIAN SALT PRODUCERS

Company	Location/ Initial Production	Annual Production Capacity	Remarks
		(000 t/y)	
Alchem Industries Ltd.	Bruderheim, Alta./1991	35	Brining to produce sodium chlorate.
CXY Chemicals Canada Ltd. Partnership	Bruderheim, Alta./1991	37	Brining to produce sodium chlorate.
Canadian Salt Company Limited, The	Pugwash, N.S./1959	1 200	Rock salt mining to a depth of 305 m.
	Pugwash, N.S./1962	110	Dissolving rock salt fines for vacuum pan evaporation.
	Îles-de-la-Madeleine, Que./1982	1 700	Rock salt mining to a depth of up to 273 m.
	Ojibway, Ont./1955	2 700	Rock salt mining at a depth of 300 m.
	Windsor, Ont./1892	200	Brining, vacuum pan evaporation.
	Belle-Plaine, Sask./1969	200	Producing fine salt from by-product brine from nearby potash operation owned by IMC Kalium Canada.
	Lindbergh, Alta./1968	150	Brining, vacuum pan evaporation.
Dow Chemical Canada Inc.	Fort Sask., Alta./1968	1 400	Brining to produce caustic soda and chlorine.
General Chemical Canada Ltd.	Amherstburg, Ont./1919	690	Brining to produce sodium carbonate.
IMC Kalium	Colonsay, Sask./1992	130	By-product rock salt from potash operation.
	Esterhazy, Sask./1962	180	By-product rock salt from potash mine for use in snow and ice control.
Nu Salt Corp.	Rocanville, Sask./1990	200	By-product rock salt from potash tailings.
	Vanscoy, Sask./1988	200	By-product rock salt from potash tailings.
Potash Corporation of Saskatchewan – New Brunswick Division	Sussex, N.B./1980	700	Rock salt produced in association with potash for use in snow and ice control.
Sterling Pulp Chemicals (Sask) Ltd.	Saskatoon, Sask./1968	90	Brining to produce caustic soda, chlorine and sodium chlorate.
Sifto Canada Inc.	Nappan, N.S./1947	100	Brining for vacuum pan evaporation.
	Goderich, Ont./1959	5 500	Rock salt mining at a depth of 536 m.
	Goderich, Ont./1880	120	Brining for vacuum pan evaporation.
	Unity, Sask./1949	180	Brining vacuum pan evaporation. Fusion plant closed in 1991.
Total		15 822	

Sources: Natural Resources Canada, 1998; company surveys.