

Sulphur

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Preliminary figures for 1999 show Canadian sulphur production was up by 4.4% when compared to the previous year's level. Total sulphur production was estimated at 10.1 Mt. Of this amount, elemental sulphur accounted for 8.9 Mt. Nearly all of this came from the production of natural gas, with the remainder derived from the refining of high-sulphur crude oil and heavy oil. An additional 1.2 Mt of sulphur, in the form of sulphuric acid and liquefied sulphur dioxide, was recovered from the smelting of metallic sulphides and the roasting of zinc sulphide concentrates. Most sulphur production occurs in Alberta, followed by British Columbia and Saskatchewan. Other provinces produce small amounts of sulphur, mostly from oil refining.

At an estimated 5.3 Mt, Canadian sulphur offshore exports¹ in 1999 were about similar to the 1998 level. Losses in some destinations like Tunisia, and in many others where tonnages were reduced, were entirely compensated for by a 144% increase in deliveries to China. Canadian sulphur was sold to about 20 countries.

In addition, Canada exported about 2.1 Mt of sulphuric acid, nearly all of it to the United States, as well as a small amount of sulphur dioxide, all of which went to the United States. Canadian sulphur imports continued to be minimal and were mostly from the United States.

Most elemental sulphur is consumed in the form of sulphuric acid, for which the single largest use is in the manufacture of phosphate-based fertilizers. An estimated 2.5 Mt of sulphuric acid were consumed in Canada in 1998 (an amount similar to that in 1997), the latest year for which statistics are available.

¹ The trade numbers used are from industry, which differ from Statistics Canada's numbers.

About half of the acid consumption was for agricultural chemicals and fertilizers. The next largest use was for industrial inorganic chemicals followed closely by the pulp and paper industry. This is the first time that industrial inorganic chemical uses have surpassed pulp and paper uses since 1992.

NEWS AND DEVELOPMENTS

As a result of last year's "sunset review" by the U.S. International Trade Commission, anti-dumping duties against the Canadian sulphur industry were lifted on January 1, 2000.

Shell Canada Limited, Chevron Canada Resources Limited and Western Oil Sands Inc. announced the development of their oil sands property known as the Athabasca Oil Sands Project near Fort McMurray, Alberta. The \$1.8 billion Muskeg River mine will be constructed 70 km north of Fort McMurray. A \$1.7 billion upgrader will be built at Scotford, north of Fort Saskatchewan, and the capacity of the existing Shell refinery will be increased to accommodate this new production. When the project is completed by 2004, it will add about 450 000 t of sulphur to Canadian production on an annual basis. The project has a 30-year life.

Syncrude Canada Ltd. and the Alberta Sulphur Research Laboratory teamed up to test the underground storage of sulphur as an alternative to the traditional above-ground blocking. Under the agreement, the test period will be five years. This technique appears to be attractive since it could avoid some of the problems associated with above-ground storage. Another innovative approach to avoiding the production of sulphur, which has also been the subject of several successful tests, is the re-injection of acid gas into suitable reservoirs. Today, about 20 wells in both Alberta and British Columbia are using this technique. However, because of the risks and the energy requirements associated with re-injection, this technique will have limited application.

Marsulex Inc. and Inco Limited extended a contract by which Marsulex takes the sulphuric acid and liquid sulphur dioxide from the Copper Cliff smelter in Ontario.

PRICES

Entering 1999, sulphur price quotations on a free on board (f.o.b.) Vancouver basis were between US\$24 and \$28/t. Quotations increased consistently through the beginning of the year to reach a plateau of US\$35-\$39/t in June. Quotations then remained at that level for the rest of the year. The strength in prices was largely due to strong demand.

USES

The principal use of all sulphur consumed in the world is as a process agent in the manufacture of fertilizers such as superphosphates, ammonium phosphate, and ammonium sulphate (60% of world demand). The second-largest consuming sector is the chemical industry where sulphur is used as sulphuric acid in products ranging from pharmaceuticals to synthetic fibres. Other consumers of sulphur include manufacturers of pulp and paper, iron and steel, non-ferrous metals, and titanium dioxide pigments. These consuming industries use sulphur in the form of sulphuric acid, which accounts for almost 90% of total sulphur consumption. (Some 60% of sulphuric acid consumption is in fertilizers.) Manufactured products that require sulphur in non-acid form in their production include insecticides and fungicides, pulp and paper, photography, leather products, rayon and rubber.

OUTLOOK

In 2000, the world sulphur market is expected to perform at a level equal to or slightly better than that of 1999. Based on an average economic growth estimated by the World Bank at 5.7% for the next decade, and on the need to feed a growing population,

the consumption of fertilizers is forecast to grow in most Asian regions. Exports of Canadian sulphur to China are expected to continue to grow, but at a slower rate than in 1999, which saw a 144% increase over 1998. This is due to the commitment by Chinese authorities to meet the pressing needs of the agricultural sector, as well as its commitment to move away from the pyrite process. China has already generated a series of investments in phosphate-based fertilizers. Its output from its chemical fertilizer industry is expected to reach 32 Mt in 2000, up 7 Mt from its 1995 performance. In the coming years, Canadian producers can expect much competition in their export markets from the former Soviet Union and Iran.

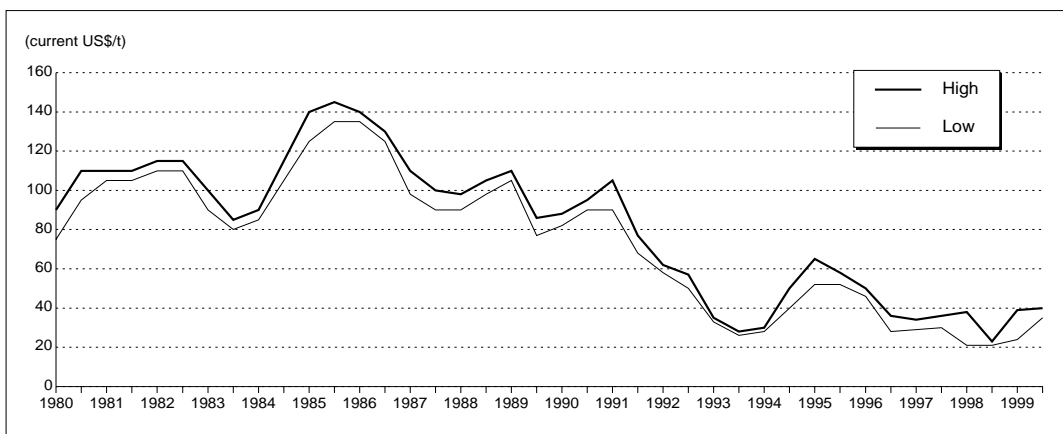
In 2000, Canadian sulphur production is expected to remain at its 1999 level or to be up marginally. Prices are expected to fluctuate around the US\$40/t level.

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, 2000. (3) This and other reviews, including previous editions, are available on the Internet at http://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 author 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.

Figure 1
Canada, Offshore Sulphur Price Quotations, 1980-99
f.o.b. Vancouver Contract



Source: Compiled by Natural Resources Canada from trade magazines and specialized subscriptions.

TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2503.00.00	Sulphur of all kinds, other than sublimed sulphur, precipitated sulphur and colloidal sulphur				
2503.00.00.10	Crude or unrefined sulphur	Free	Free	Free	Free
2503.00.00.90	Other	Free	Free	Free	Free
2802.00.00	Sulphur, sublimed or precipitated; colloidal sulphur	Free	Free	Free	Free
2807.00.00	Sulphuric acid; oleum	Free	Free	Free	Free
2811.23.00	Sulphur dioxide	Free	Free	Free	Free

Sources: Customs Tariff, effective January 2000, Canada Customs and Revenue Agency; Harmonized Tariff Schedule of the United States, 2000.

TABLE 1. CANADA, SULPHUR SHIPMENTS AND TRADE, 1998 AND 1999

Item No.	1998		1999 ^p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
SHIPMENTS¹					
	Sulphur in smelter gases ²	1 048 169	69 528 725	1 093 214	81 578 358
	Elemental sulphur ³	7 406 276	57 433 282	8 163 703	77 989 799
	Total sulphur content	8 454 445	126 962 007	9 256 917	159 568 157
PRODUCTION					
	Sulphur in smelter gases ²	1 152 726	..	1 156 276	..
	Elemental sulphur ³	8 541 291	..	8 960 065	..
	Total sulphur content ²	9 694 017	..	10 116 341	..
IMPORTS					
2503.00.00.10	Sulphur, crude or unrefined				
	United States	25 128	3 703	18 469	2 666
	China	2	..	-	-
	Total	25 130	3 703	18 469	2 666
2503.00.00.90	Sulphur, n.e.s.				
	United States	27 471	4 746	29 134	4 675
	Finland	154	22	566	97
	France	322	48	294	47
	China	-	-	57	16
	Germany	38	7	24	4
	Uruguay	1	..	3	1
	United Kingdom	-	-	1	..
	Other countries	7	1	7	..
	Total	27 993	4 824	30 086	4 840
2802.00	Sulphur sublimed or precipitated; colloidal sulphur				
	France	901	280	431	230
	United States	288	126	170	117
	Germany	3	2	5	2
	Netherlands	3	2	4	2
	Other countries	2	1	1	-
	Total	1 197	411	611	351
2807.00	Sulphuric acid; oleum				
	United States	128 885	9 601	138 081	10 037
	China	-	-	377	38
	Canada	51	6	126	15
	India	181	31	127	9
	Netherlands	-	-	50	2
	Germany	13	1	13	1
	Japan	-	-	6	1
	United Kingdom	6	1	14	1
	Mexico	-	-	7	1
	Other countries	65	3	6	..
	Total	129 201	9 643	138 807	10 105

TABLE 1 (cont'd)

Item No.	1998		1999 ^p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
IMPORTS (cont'd)					
2811.23	Sulphur dioxide				
	United States	2 090	239	2 659	436
	Canada	–	–	171	23
	Germany	73	9	6	1
	Total	2 163	248	2 836	460
EXPORTS					
2503.00.00.10	Sulphur, crude or unrefined				
	China	405 894	15 502	1 252 540	60 609
	Morocco	753 279	45 115	608 668	35 883
	Brazil	753 834	43 535	563 716	31 252
	South Africa	594 307	26 562	520 722	26 347
	Mexico	425 902	17 723	429 015	21 345
	United States	652 243	27 566	370 694	16 686
	Cuba	163 406	14 700	154 692	14 902
	Israel	418 910	16 292	354 656	13 370
	Australia	181 165	7 204	175 925	8 594
	New Zealand	83 384	3 446	138 004	6 962
	Indonesia	132 399	7 147	89 019	5 668
	Senegal	115 268	4 209	37 672	3 180
	Philippines	20 004	998	70 686	3 016
	Chile	12 549	980	32 000	2 967
	Tunisia	256 016	12 364	26 251	1 082
	Japan	–	–	15 000	574
	Guatemala	–	–	2 608	138
	Other countries	231 469	12 273	2 200	117
	Total	5 200 029	255 616	4 844 068	252 692
2503.00.00.90	Sulphur, n.e.s.				
	United States	53 335	4 871	48 444	4 817
	South Africa	–	–	4 665	168
	Total	53 335	4 871	53 109	4 985
2802.00	Sulphur, sublimed or precipitated; colloidal sulphur				
	Mexico	–	–	20	37
	United States	2 017	254	20	10
	China	1 980	86	–	–
	Total	3 997	340	40	47
2807.00	Sulphuric acid; oleum				
	United States	1 552 588	80 133	865 177	35 137
	Mexico	28 954	1 243	29 372	740
	China	–	–	14	151
	Croatia	–	–	122	18
	Other countries	62	30	80	25
	Total	1 581 604	81 406	894 765	36 071
2811.23	Sulphur dioxide				
	United States	57 660	16 403	50 101	13 020
	Chile	–	–	1	1
	Total	57 660	16 403	50 102	13 021

Sources: Natural Resources Canada; Statistics Canada.

– Nil; . . Not available; . . . Amount too small to be expressed; n.e.s. Not elsewhere specified; ^p Preliminary.

1 Data compiled regardless of origin (i.e., domestic and foreign source materials). 2 Sulphur in liquefied SO₂ and H₂SO₄ recovered from the smelting of metallic sulphides and from the roasting of zinc sulphide concentrates. 3 Producers' shipments of elemental sulphur produced from natural gas; also included are small quantities of sulphur produced in the refining of domestic crude oil and synthetic crude oil.

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

TABLE 2. CANADA, SULPHUR SHIPMENTS AND TRADE, 1983-99

	Shipments ¹			Imports ²	Exports ²
	In Smelter Gases	Elemental Sulphur	Total	Elemental Sulphur	Elemental Sulphur
	(tonnes)				
1983	678 286	6 631 123	7 309 409	2 365	5 670 275
1984	844 276	8 352 978	9 197 254	3 019	7 326 847
1985	822 359	8 102 163	8 924 522	3 167	7 848 380
1986	758 141	6 953 298	7 711 439	10 763	6 257 054
1987	783 115	7 322 791	8 105 906	24 711	6 571 800
1988	867 800	8 106 641	8 974 441	21 825	7 384 160
1989	831 503	6 868 930	7 700 433	18 311	5 514 059
1990	879 149	6 873 495	7 752 644	13 203	6 057 523
1991	883 565	6 937 884	7 821 449	9 026	5 845 372
1992	914 978	6 393 932	7 308 910	8 645	5 653 506
1993	856 236	5 220 304	6 076 540	7 532	4 193 877
1994	1 025 561	5 791 482	6 817 043	1 979	4 983 257
1995	1 074 206	7 089 297	8 163 503	25 593	6 077 414
1996	1 033 348	7 433 112	8 466 460	24 345	6 026 287
1997	1 060 743	7 900 926	8 961 669	46 370	6 497 753
1998	1 048 169	7 406 276	8 454 445	53 123	5 253 364
1999 ^P	1 093 214	8 163 703	9 256 917	48 555	4 897 177

Sources: Natural Resources Canada; Statistics Canada.

^P Preliminary.

¹ Shipment data compiled regardless of origin (i.e., domestic and foreign source materials). ² Includes only elemental sulphur in a crude or refined form.

TABLE 3. CANADA, SULPHURIC ACID PRODUCTION, TRADE AND APPARENT CONSUMPTION, 1986-99

	Production	Imports	Exports	Apparent Consumption
	(tonnes, 100% acid)			
1986	3 536 062	29 127	755 606	2 809 583
1987	3 436 977	44 623	803 178	2 678 422
1988	3 804 856	40 078	851 622	2 993 312
1989	3 718 578	28 433	978 190	2 768 821
1990	3 829 570	71 319	1 280 502	2 620 387
1991	3 675 839	79 207	1 265 740	2 489 306
1992	3 776 086	86 284	1 340 213	2 522 157
1993	3 958 416	95 806	1 629 054	2 425 168
1994	4 055 165	68 261	1 645 406	2 478 020
1995	4 276 383	70 816	1 732 522	2 614 677
1996	4 355 592	76 016	1 596 343	2 835 265
1997	4 314 773	95 551	1 602 468	2 807 856
1998	4 590 056	129 201	1 581 604	3 137 653
1999 ^P	..	138 807	894 765	..

Sources: Natural Resources Canada; Statistics Canada.

.. Not available; ^P Preliminary.

TABLE 4. CANADA, SULPHURIC ACID, REPORTED CONSUMPTION BY END USE, 1996-98

	1996a	1997a	1998p,a
	(tonnes)		
Agricultural chemicals and fertilizers	1 227 577	1 164 570	1 186 560
Industrial inorganic chemicals	388 850	459 483	498 981
Pulp and paper	470 325	490 822	480 082
Nonferrous smelting and refining	122 631	116 502	123 416
Uranium mines	108 294	102 159	90 031
Crude and refined petroleum products	58 865	54 445	32 041
Other mines, metal and nonmetal	39 478	30 160	17 442
Soap and cleaning compounds	x	x	x
Metal rolling and extruding	x	9 120	8 770
Electrical products	x	3 577	4 131
Food, brewery and distillery	7 252	x	2 286
Plastics and synthetic resins	x	x	x
Leather and textile	x	-	x
Other end uses	39 242	35 794	38 664
Total¹	2 487 556	2 485 013	2 497 166

Source: Reports from producing companies, compiled by Natural Resources Canada, 2000.

- Nil; p Preliminary; x Confidential.

a Confidential numbers are included in the totals.

¹ Reported consumption does not include imported acid.

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

TABLE 5. CANADA, CRUDE OIL AND OIL SANDS REFINERIES, SULPHUR CAPACITY, 1997-99

Operating Company	Location	Daily Sulphur Capacity		
		1997	1998	1999
(tonnes/day)				
CRUDE OIL REFINERIES				
Canadian Ultramar Limited	St. Romuald, Quebec	50	50	50
Chevron Canada Limited	Burnaby, British Columbia	32	33	33
Imperial Oil Limited	Dartmouth, Nova Scotia	56	56	56
	Edmonton, Alberta	40	40	40
	Nanticoke, Ontario	70	86	86
	Sarnia, Ontario	140	140	140
Irving Oil Limited	Saint John, New Brunswick	183	183	183
North Atlantic Refinery Limited	Come-By-Chance, Newfoundland	150	150	150
Petro-Canada Inc.	Edmonton, Alberta	60	60	60
	Lake Ontario-Mississauga, Ontario	44	44	44
	Lake Ontario-Oakville, Ontario	40	40	40
Shell Canada Limited	Sarnia, Ontario	35	35	35
	Scotford, Alberta	14	14	14
Sulconam Inc.	Montréal, Quebec	150	150	150
Suncor Inc.	Sarnia, Ontario	50	50	50
Total effective capacity		1 114	1 131	1 131
HEAVY OIL UPGRADERS				
Consumers' Co-operative Refineries Limited	Regina, Saskatchewan	220	250	250
Husky Oil Operations Limited	Lloydminster, Saskatchewan	330	330	330
Total effective capacity		550	580	580
OIL SANDS PLANTS				
Suncor Inc.	Fort McMurray, Alberta	850	850	850
Syncrude Canada Ltd.	Mildred Lake, Alberta	1 255	1 255	1 255
Total effective capacity		2 105	2 105	2 105

Sources: Natural Resources Canada; company interviews, 1999.

TABLE 6. CANADA, NATURAL SOUR GAS PROCESSING PLANTS, SULPHUR CAPACITY, 1997-99

Operating Company	Source Field or Plant Location	H ₂ S in Raw Sour Gas (%)	Daily Sulphur Capacity ¹ (tonnes/day)		
			1997	1998	1999
SOUR GAS, ALBERTA					
Alberta Energy Company Ltd.	Sinclair-Hythe	3	256.7	256.7	256.7
Alberta Energy Company Ltd.	Valhalla-Sexsmith	10	475.4	475.4	475.4
Amoco Canada Petroleum Company	Caroline North-Garrington	0.3	10.4	10.4	10.4
Amoco Canada Petroleum Company	Caroline South-Harmattan	0.4	8.6	8.6	8.6
Amoco Canada Petroleum Company	Kaybob I/II-Fir	8	1 090	1 090	1 090
Amoco Canada Petroleum Company	Windfall-Whitecourt	12	1 333	1 333	1 333
Anderson Exploration Limited	Carstairs	0.5	64.8	64.8	64.8
Anderson Exploration Limited	Wimborne	10.5	182	182	182
Burlington Resources Canada Energy Ltd.	Bonanza	. .	–	–	3.1
Burlington Resources Canada Energy Ltd.	Sturgeon Lake South	9.5	98	98	98
Canadian 88 Energy Corporation	Olds-Garrington	14	391	590.4	590.4
Chevron Canada Resources	Kaybob South III-Obed	8	3 557	3 561	3 561
Dynegy Canada Inc., Dynegy Midstream Services Division	Mazeppa	25	577	577	577
Gibson Petroleum Company Limited	Rainbow Lake	1.0	–	301.2	301.2
Gulf Midstream Services	Brazeau River-Nordegg	1.7	46.5	46.5	46.5
Gulf Midstream Services	Brazeau River-Peco	1.3	110	110	110
Gulf Midstream Services	Homeglen-Rimbey	0.5	127.5	127.5	127.5
Gulf Midstream Services	Strachan	9	953	953	853
Husky Oil Operation Limited	Rainbow Lake	2	142	142	142
Husky Oil Operation Limited	Ram River (Ricinus)	16.5	4 572	4 572	4 572
Imperial Oil Resources Limited	Bonnie Glen	0.4	34.5	34.5	34.5
Imperial Oil Resources Limited	Quirk Creek	9	301.2	301.2	301.2
Imperial Oil Resources Limited	Redwater	3	11	11	11
Keywest Energy Corporation	Swapwell	. .	–	–	3.2
Mobil Oil Canada, Ltd.	Lone Pine Creek	13.5	162	162	162
Northstar Energy Corporation	Savannah Creek (Coleman)	12	696.4	789.4	789.4
Penn West Petroleum Ltd.	Minnehik-Buck Lake	0.1	37.5	37.5	37.5
Petro-Canada Oil and Gas	Brazeau River-Peco	21	447.3	447.3	447.3
Petro-Canada Oil and Gas	Gold Creek	2.4	97	97	97
Petro-Canada Oil and Gas	Hanlan Robb	8	1 092	1 095	1 095
Petro-Canada Oil and Gas	Wildcat Hills	7	280.3	280.3	280.3
PrimeWest Energy Trust Inc.	East Crossfield-Lone Pine Creek	34	283	283	283
Shell Canada Limited	Burnt Timber Creek (Cremona)	13	560	560	560
Shell Canada Limited	Caroline	25	4 504	5 445	5 445
Shell Canada Limited	Cochrane (Jumping Pound)	7.5	597	597	597
Shell Canada Limited	Pincher Creek (Waterton)	15	3 107	3 107	3 107
Suncor Energy Inc.	Progress	. .	–	–	2.5
Suncor Energy Inc.	Rosevear North	8	111.3	109.5	109.5
Suncor Energy Inc.	Rosevear South	6.5	171	171	171
Suncor Energy Inc.	Simonette River	5.5	115.8	115.8	115.8
Talisman Energy Inc.	Edson-Pine Creek	1.4	292	342.6	342.6
Talisman Energy Inc. Division	Teepee Creek	0.4	23	23	23
TransCanada Midstream Division	Harmattan-Elkton-Leduc	52	81	81.5	81.5
TransCanada Midstream	Zama	4	74	74	74
Union Pacific Resources Inc.	Hays	. .	–	–	8.1
Union Pacific Resources Inc.	Progress	0.7	49.5	224.4	224.4
Western Facilities Management Limited	Nevis	4	300	300	300
Wascana Energy Inc.	East Calgary-Crossfield	16	1 696	1 696	1 696
Wolcott Gas Processing Ltd.	West Pembina-Brazeau	11	520	520	520
SOUR GAS, BRITISH COLUMBIA					
Amoco Canada Petroleum Company	Cypress	1.4	12.8	12.8	12.8
Petro-Canada Inc.	Boundary Lake II (sour)	. .	–	8	8
Westcoast Energy Inc.	Fort Nelson	2	674	674	674
Westcoast Energy Inc.	Taylor Flats-McMahon	1.6	558	558	558
Westcoast Energy Inc.	Pine River	12	2 000	2 000	2 000

Sources: Alberta Energy and Utilities Board publication, January 2000; Natural Resources Canada company survey 1998-99; Fertecon 2000.

– Nil; . . Unknown.

¹ Maximum design capacity.

TABLE 7. CANADA, PRINCIPAL SULPHUR DIOXIDE AND SULPHURIC ACID PRODUCTION CAPACITIES, 1999

Operating Company	Plant Location	Feedstock	Annual Capacity		
			Liquefied SO ₂	Sulphuric Acid ¹	Sulphur Equivalent ²
(000 tonnes/year)					
EASTERN CANADA					
CE ZINC Falconbridge Limited	Valleyfield, Que. Kidd Creek, Ont.	SO ₂ zinc conc. SO ₂ zinc conc.		430 220	140 72
	Kidd Creek, Ont. Sudbury, Ont.	SO ₂ copper conc. SO ₂ nickel conc.	30	470 355	168 116
Gaspé Copper Mines, Limited Inco Limited	Murdochville, Que. Copper Cliff, Ont.	SO ₂ copper conc. SO ₂ nickel conc.	100	1 000	54 377
Noranda Copper Smelting and Refining Noranda Inc.	Rouyn-Noranda, Que. Belledune, N.B.	SO ₂ copper conc. SO ₂ lead and zinc conc.		450 176	147 57
Sulco Chemicals Ltd. Subtotal	Elmira, Ont.	Elem. sulphur		33	11
			130	3 299	1 142
WESTERN CANADA³					
Agrium Inc. ⁴	Redwater, Alta.	Elem. sulphur		910	297
Border Chemical Company Limited	Transcona, Man.	Elem. sulphur		150	49
Cameco Corporation-Rabbit Lake Operation	Rabbit Lake, Sask.	Elem. sulphur		72	24
Cameco Corporation-Key Lake Operation	Key Lake, Sask.	Elem. sulphur		72	24
Cominco Ltd. ⁵	Trail, B.C.	SO ₂ lead and zinc conc.	80	430	210
Hudson Bay Mining and Smelting Co. ⁶	Flin Flon, Man.	SO ₂ zinc conc.		n.a.	35
Sherritt International Corporation	Fort Saskatchewan, Alta.	Elem. sulphur		233	76
Westcoast Energy Inc. Subtotal	Prince George, B.C.	Elem. sulphur	30	75	39
			110	1 942	754
Total Canada			240	5 241	1 896

Sources: Natural Resources Canada; Canadian company interviews, 1999.

n.a. Not applicable.

¹ 100% H₂SO₄. ² Elemental sulphur equivalent of sulphuric acid is 32.7% and sulphur equivalent of liquefied SO₂ is 50%. ³ Marsulex Inc. idled its 160 000-t/y acid plant in Fort Saskatchewan in 1993. ⁴ Agrium Inc. acquired the acid operations from Viridian Inc. (formerly Sherritt Inc.) in 1996. ⁵ Cominco operation at Trail also has a 30 000-t/y production capacity for elemental sulphur that has been added to the total sulphur equivalent production capacity of Cominco. ⁶ Hudson Bay recovers elemental sulphur from its zinc pressure leach smelter at Flin Flon; elemental sulphur is currently disposed of in tailings.

TABLE 8. WORLD PRODUCTION OF SULPHUR, 1996-98

	1996 ^r		1997		1998 ^p	
	All Forms ¹	Elemental	All Forms ¹	Elemental	All Forms ¹	Elemental
(000 tonnes)						
WESTERN EUROPE						
Finland	775	40	728	40	768	50
France	1 229	968	1 200	945	1 099	849
Germany	2 368	1 591	2 443	1 623	2 620	1 761
Italy	477	308	527	354	557	393
Netherlands	487	377	481	370	574	453
Spain	1 083	167	1 106	175	1 063	190
Others	1 200	708	1 236	733	1 251	759
Total, Western Europe	7 619	4 159	7 721	4 240	7 932	4 455
CENTRAL EUROPE						
Poland	2 033	1 790	1 969	1 710	1 558	1 290
Others	628	205	616	210	666	230
Total, Central Europe	2 661	1 995	2 585	1 920	2 224	1 520
FORMER SOVIET UNION						
	5 341	3 769	5 765	4 465	6 848	5 678
AFRICA						
South Africa	552	260	522	250	522	260
Others	166	3	149	5	119	5
Total, Africa	718	263	671	255	641	265
NORTH AMERICA						
Canada	9 490	8 446	9 480	8 408	9 694	8 451
United States	12 931	10 360	13 176	10 460	12 812	10 070
Total, North America	22 421	18 806	22 656	18 868	22 506	18 611
LATIN AMERICA						
Mexico	1 312	921	1 401	932	1 394	913
Others	1 551	556	1 697	567	1 994	683
Total, Latin America	2 863	1 477	3 098	1 499	3 388	1 596
MIDDLE EAST						
Iran	894	894	845	845	880	880
Iraq	375	375	425	425	475	475
Kuwait	576	576	591	591	560	650
Saudi Arabia	1 730	1 730	1 690	1 690	1 800	1 800
United Arab Emirates	780	780	900	900	980	980
Others	397	234	431	268	495	342
Total, Middle East	4 752	4 589	4 882	4 719	5 280	5 127
ASIA						
China	7 951	239	7 750	230	6 981	228
Japan	3 217	1 791	3 450	2 013	3 510	2 083
South Korea	767	467	943	617	1 134	669
Others	1 223	597	1 303	668	1 508	821
Total, Asia	13 158	3 094	13 446	3 528	13 133	3 801
OCEANIA						
	362	58	444	60	451	52
Total, World	59 895	38 210	61 268	39 554	62 403	41 105

Source: British Sulphur Consultants, 2000.

^p Preliminary; ^r Revised.¹ All forms includes elemental sulphur, sulphur contained in pyrites, and contained sulphur recovered from metallurgical waste gases, mostly in the form of sulphuric acid.