

# Sulphur

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**A**s with last year's review, this review on sulphur has been abbreviated to include mainly statistical tables.

Preliminary figures for 1998 show Canadian sulphur production was up by 2.2% when compared to the previous year's level. Total sulphur production was estimated at 9.7 Mt. Of this amount, elemental sulphur accounted for 8.5 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.

At an estimated 5.2 Mt, Canadian sulphur offshore exports<sup>1</sup> in 1998 were about 7% lower than in 1997. This decrease was mostly due to much reduced exports to Brazil and Morocco, the largest offshore destinations for Canadian sulphur. Some of this reduction was offset by a significant increase in exports to China. Canadian sulphur was sold to more than 20 countries.

In addition, Canada exported 1.8 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 1997 (an amount similar to that in 1996), the latest year for which statistics are available. About half of the acid consumption was for agricultural chemicals and fertilizers. The next largest use was for the pulp and paper industry followed closely by the industrial inorganic chemicals, which have shown a marked increase compared to 1996.

Of importance to the Canadian sulphur industry is the revocation by the U.S. International Trade Commission (ITC) of the antidumping duty order on elemental sulphur from Canada. In its "sunset" review, the ITC found that lifting existing duties would not hurt the U.S. industry. As a result, duties will be lifted on January 1, 2000. This review was also prompted by the U.S. obligations under the *Uruguay Round Agreements Act* to revoke countervailing or antidumping duties after five years unless injury can be demonstrated.

## PRICES

Entering 1998, sulphur price quotations on a free on board (f.o.b.) Vancouver basis were between US\$38 and \$30/t. Quotations decreased consistently through the beginning of the year to reach a low of US\$21-\$23/t in June. Quotations then remained at that level for the rest of the year. Prices could have fallen lower if several major suppliers had not initiated inventory additions.

## 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 chemicals 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, nonferrous metals, and titanium dioxide pigments. These consuming industries use sulphur in the form of sulphuric acid, which accounts for almost

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

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 1999, the world sulphur market is expected to perform at a level equal to or slightly better than that of 1998. The consumption of phosphate fertilizers is forecast to grow in most Asian regions where the average economic growth has been evaluated by the World Bank at 5.7% for the next decade. The commitment by Chinese authorities to meet the pressing needs of the agricultural sector has already generated a series of investments in phosphate-based fertilizers. Furthermore, the commitment of the Chinese government to move away from the pyrite

process for sulphur production has already had a significant positive impact on Canadian exports, which are expected to do even better in 1999. China's output from its chemical fertilizer industry is expected to reach 32 Mt in 2000, up 7 Mt from its 1995 performance. In India, the government has delivered on its promise to increase access to fertilizers by readjusting its subsidies and pricing mechanisms for phosphate fertilizers. As a result, yearly sulphur imports by India are expected to reach 2.7 Mt in 2005 from its current level of 1.8 Mt.

In 1999, Canadian production is expected to remain at its 1998 level or to be up marginally; however, prices are expected to rebound throughout all of 1999.

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

TABLE 1. CANADA, SULPHUR SHIPMENTS AND TRADE, 1997 AND 1998

Item No.	1997		1998p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
<b>SHIPMENTS<sup>1</sup></b>					
	Sulphur in smelter gases <sup>2</sup>	1 060 743 <sup>r</sup>	78 831 <sup>r</sup>	1 114 717	77 592
	Elemental sulphur <sup>3</sup>	7 900 926 <sup>r</sup>	82 846 <sup>r</sup>	7 307 471	49 357
	Total sulphur content	8 961 669 <sup>r</sup>	161 677 <sup>r</sup>	8 422 188	126 949
<b>PRODUCTION</b>					
	Sulphur in smelter gases <sup>2</sup>	1 073 128 <sup>r</sup>	..	1 152 922	..
	Elemental sulphur <sup>3</sup>	8 407 686 <sup>r</sup>	..	8 544 544	..
	Total sulphur content <sup>2</sup>	9 480 814 <sup>r</sup>	..	9 697 466	..
<b>IMPORTS</b>					
2503.00.00.10	Sulphur, crude or unrefined				
	United States	15 791	2 305	23 374	3 451
	China	–	–	2	...
	Total	15 791	2 305	23 376	3 451
2503.00.00.90	Sulphur, n.e.s.				
	United States	28 732	4 351	27 471	4 746
	France	1 813 <sup>r</sup>	311 <sup>r</sup>	322	48
	Finland	–	–	154	22
	Germany	–	–	38	7
	Malaysia	–	–	5	1
	Japan	2	...	2	...
	Uruguay	–	–	1	...
	Other countries	32	4	–	–
	Total	30 579 <sup>r</sup>	4 666 <sup>r</sup>	27 993	4 824
2802.00	Sulphur sublimed or precipitated; colloidal sulphur				
	France	156 <sup>r</sup>	95 <sup>r</sup>	901	280
	United States	305 <sup>r</sup>	150 <sup>r</sup>	288	126
	Japan	21	12	11	7
	Germany	10 <sup>r</sup>	5 <sup>r</sup>	3	2
	Netherlands	1	1	3	2
	Spain	7	5	–	–
	Total	500 <sup>r</sup>	268 <sup>r</sup>	1 206	417
2807.00	Sulphuric acid; oleum				
	United States	95 109 <sup>r</sup>	7 480 <sup>r</sup>	128 799	9 592
	India	338	44	181	31
	Canada	87	4	51	6
	Norway	–	–	17	2
	United Kingdom	–	–	6	1
	Germany	3	...	13	1
	South Africa	–	–	40	1
	Other countries	14	1	8	–
	Total	95 551 <sup>r</sup>	7 529 <sup>r</sup>	129 115	9 634
2811.23	Sulphur dioxide				
	United States	3 270 <sup>r</sup>	606 <sup>r</sup>	2 090	239
	Germany	–	–	73	9
	Canada	42	9	–	–
	United Kingdom	3	1	–	–
	Total	3 315 <sup>r</sup>	616 <sup>r</sup>	2 163	248

TABLE 1 (cont'd)

Item No.		1997		1998 <sup>P</sup>	
		(tonnes)	(\$000)	(tonnes)	(\$000)
<b>EXPORTS</b>					
2503.00.00.10	Sulphur, crude or unrefined				
	Morocco	1 255 263 <sup>r</sup>	93 982 <sup>r</sup>	753 279	45 115
	Brazil	970 380 <sup>r</sup>	66 171 <sup>r</sup>	711 834	42 069
	United States	943 824	33 813 <sup>r</sup>	652 222	27 562
	South Africa	632 272 <sup>r</sup>	32 248 <sup>r</sup>	570 212	25 670
	Mexico	503 957 <sup>r</sup>	23 858 <sup>r</sup>	384 558	16 423
	Israel	301 281	12 908	418 910	16 292
	China	174 958	8 281	405 894	15 502
	Cuba	130 445	15 601	163 406	14 700
	Tunisia	459 209	25 829	256 016	12 364
	Australia	107 512	4 440	181 165	7 204
	Indonesia	118 232 <sup>r</sup>	7 385	132 399	7 147
	Thailand	33 583	2 354	95 233	6 523
	Senegal	—	—	115 268	4 209
	New Zealand	190 688 <sup>r</sup>	9 219 <sup>r</sup>	79 450	3 300
	India	157 853	7 609	58 564	1 702
	Argentina	94 336 <sup>r</sup>	5 377 <sup>r</sup>	24 332	1641
	Egypt	27 523	1 441	32 340	1 349
	Vietnam	21 000	1 093	21 000	1 058
	Philippines	133 563	7 517	20 004	998
	Chile	35 970	2 984	12 549	980
	South Korea	38 523	2 050	—	—
	Jordan	32 304	1 393	—	—
	Italy	20 788	1 611	—	—
	Nigeria	9 847	504	—	—
	Malaysia	9 343	405	—	—
	Uganda	6 500	343	—	—
	Uruguay	4 950	277	—	—
	Martinique	4 911	388	—	—
	Total	6 419 015 <sup>r</sup>	369 031 <sup>r</sup>	5 088 635	251 808
2503.00.00.90	Sulphur, n.e.s.				
	United States	76 929 <sup>r</sup>	5 018 <sup>r</sup>	53 335	4 871
	New Zealand	647 <sup>r</sup>	117 <sup>r</sup>	—	—
	Mexico	1 162 <sup>r</sup>	145 <sup>r</sup>	—	—
	Total	78 738 <sup>r</sup>	5 280 <sup>r</sup>	53 335	4 871
2802.00	Sulphur, sublimed or precipitated; colloidal sulphur				
	United States	1 423	213	2 017	254
	China	—	—	1 980	86
	France	28	106	—	—
	Total	1 451	319	3 997	340
2807.00	Sulphuric acid; oleum				
	United States	1 588 405	71 276	1 566 699	80 226
	Mexico	—	—	28 954	1 243
	Chile	—	—	9	22
	Italy	—	—	53	8
	Georgia	14 005	164	—	—
	Pakistan	12	51	—	—
	Nicaragua	39	32	—	—
	Saint Lucia	4	12	—	—
	Cuba	3	11	—	—
	Total	1 602 468	71 546	1 595 715	81 499
2811.23	Sulphur dioxide				
	United States	77 445	19 936	57 581	16 373
	Total	77 445	19 936	57 581	16 373

Sources: Natural Resources Canada; Statistics Canada.

— Nil; . . Not available; . . . Amount too small to be expressed; n.e.s. Not elsewhere specified; <sup>P</sup> Preliminary; <sup>r</sup> Revised.

<sup>1</sup> Data compiled regardless of origin (i.e., domestic and foreign source materials). <sup>2</sup> Sulphur in liquefied SO<sub>2</sub> and H<sub>2</sub>SO<sub>4</sub> recovered from the smelting of metallic sulphides and from the roasting of zinc-sulphide concentrates. <sup>3</sup> 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, 1983-98**

	Shipments <sup>1</sup>			Imports <sup>2</sup>	Exports <sup>2</sup>
	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 <sup>P</sup>	1 114 717	7 307 471	8 422 188	32 817	5 141 970

Sources: Natural Resources Canada; Statistics Canada.

<sup>P</sup> Preliminary.

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

**TABLE 3. CANADA, SULPHURIC ACID PRODUCTION, TRADE AND APPARENT CONSUMPTION, 1986-98**

	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	713 19	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 <sup>P</sup>	..	129 115	1 595 715	..

Sources: Natural Resources Canada; Statistics Canada.

.. Not available; <sup>P</sup> Preliminary.

**TABLE 4. CANADA, SULPHURIC ACID, REPORTED CONSUMPTION BY END USE, 1995-97**

	1995 <sup>a</sup>	1996 <sup>a</sup>	1997 <sup>p,a</sup>
	(tonnes)		
Agricultural chemicals and fertilizers	1 285 834	1 227 577	1 164 570
Pulp and paper	476 152	470 325	490 822
Industrial inorganic chemicals	369 770	388 850	459 483
Nonferrous smelting and refining	116 421	122 631	116 502
Uranium mines	118 785	108 294	102 159
Crude and refined petroleum products	64 631	58 865	54 445
Other mines, metal and nonmetal	34 149	39 478	30 160
Soap and cleaning compounds	x	x	x
Food, brewery and distillery	x	7 252	x
Metal rolling and extruding	8 026	x	9 120
Electrical products	x	x	3 577
Leather and textile	x	x	x
Plastics and synthetic resins	x	x	-
Other end uses	68 517	39 242	35 794
<b>Total<sup>1</sup></b>	<b>2 560 406</b>	<b>2 487 556</b>	<b>2 485 013</b>

Source: Reports from producing companies, compiled by Natural Resources Canada, 1998.

- Nil; P Preliminary; x Confidential.

<sup>a</sup> Confidential numbers are included in the totals.

<sup>1</sup> Reported consumption does not include imported acid.

**TABLE 5. CANADA, CRUDE OIL AND OIL SANDS REFINERIES, SULPHUR CAPACITY, 1996-98**

Operating Company	Location	Daily Sulphur Capacity		
		1996	1997	1998
		(tonnes/day)		
<b>CRUDE OIL REFINERIES</b>				
Canadian Ultramar Limited	St. Romuald, Quebec	50	50	50
Chevron Canada Limited	Burnaby, British Columbia	15	32	33
Imperial Oil Limited	Dartmouth, Nova Scotia	76	56	56
	Edmonton, Alberta	40	40	40
	Nanticoke, Ontario	59	70	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	56	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
<b>Total effective capacity</b>		<b>1 102</b>	<b>1 114</b>	<b>1 131</b>
<b>HEAVY OIL UPGRADERS</b>				
Consumers' Co-operative Refineries Limited	Regina, Saskatchewan	220	220	250
Husky Oil Operations Ltd.	Lloydminster, Saskatchewan	330	330	330
<b>Total effective capacity</b>		<b>550</b>	<b>550</b>	<b>580</b>
<b>OIL SANDS PLANTS</b>				
Suncor Inc.	Fort McMurray, Alberta	850	850	850
Syncrude Canada Ltd.	Mildred Lake, Alberta	1 255	1 255	1 255
<b>Total effective capacity</b>		<b>2 105</b>	<b>2 105</b>	<b>2 105</b>

Sources: Natural Resources Canada; company interviews, 1998.

**TABLE 6. CANADA, NATURAL SOUR GAS PROCESSING PLANTS, SULPHUR CAPACITY, 1996-98**

Operating Company	Source Field or Plant Location	H <sub>2</sub> S in Raw Sour Gas	Daily Sulphur Capacity <sup>1</sup>		
			1996	1997	1998
		(%)	(tonnes/day)		
<b>SOUR GAS, ALBERTA</b>					
Alberta Energy Company Ltd.	Sinclair-Hythe	3	256	256.7	256.7
Alberta Energy Company Ltd.	Valhalla-Sexsmith	10	475.4	475.4	475.4
Amoco Canada Petroleum Company Ltd.	Bigstone, Fox Creek <sup>2</sup>	15	385	–	–
Amoco Canada Petroleum Company Ltd.	Caroline North-Garrington	0.3	10.4	10.4	10.4
Amoco Canada Petroleum Company Ltd.	Caroline South-Harmattan	0.4	8.6	8.6	8.6
Amoco Canada Petroleum Company Ltd.	Kaybob I/II-Fir	8	1 090	1 090	1 090
Amoco Canada Petroleum Company Ltd.	Windfall-Whitecourt	12	1 333	1 333	1 333
Anderson Exploration Limited	Carstairs	0.5	64.8	64.8	64.8
Canadian 88 Energy Corporation	Olds-Garrington	14	389	391	590.4
Chevron Canada Resources	Kaybob South III-Obed	8	3 557	3 557	3 561
Chevron Canada Resources	Medicine Lodge	7.5	55.9	55.9	55.9
Crestar Energy Inc.	Paddle River <sup>2</sup>	0.1	19.4	–	–
Dynegy Midstream Services	Mazeppa	25	577	577	577
Gulf Canada Limited	Brazeau River-Nordeg	1.7	46.5	46.5	46.5
Gulf Canada Limited	Brazeau River-Peco	1.3	110	110	110
Gulf Canada Limited	Homeglen-Rimbey	0.5	127.5	127.5	127.5
Gulf Canada Limited	Strachan	9	953	953	953
Husky Oil Ltd.	Rainbow Lake	2	142	142	142
Husky Oil Ltd.	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
Inuvialuit	Rainbow Lake	1.0	–	–	301.2
Mobil Oil Canada, Ltd.	Lone Pine Creek	13.5	162	162	162
Northstar Energy Corporation	Savannah Creek (Coleman)	12	696.4	696.4	789.4
Penn West Petroleum Ltd.	Minnehik-Buck Lake	0.1	45	37.5	37.5
Petro-Canada Inc.	Brazeau River-Peco	21	447.3	447.3	447.3
Petro-Canada Inc.	Hanlan Robb	8	1 092	1 092	1 095
Petro-Canada Inc.	Wildcat Hills	7	280.3	280.3	280.3
Poco Petroleum Ltd.	Sturgeon Lake South	9.5	98	98	98
PrimeWest Energy Trust Inc.	East Crossfield-Lone Pine Creek <sup>3</sup>	34	283	283	–
Rio Alto Exploration Ltd.	Gold Creek	2.4	43	97	97
Shell Canada Limited	Burnt Timber Creek (Cremona)	13	560	560	560
Shell Canada Limited	Caroline	25	4 504	4 504	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 Inc.	Rosevear North	8	111.3	111.3	109.5
Suncor Inc.	Rosevear South	6.5	171	171	171
Suncor Inc.	Simonette River	5.5	115.8	115.8	115.8
Talisman Energy Inc.	Edson-Pine Creek	1.4	292	292	342.6
Talisman Energy Inc.	Teepee Creek	0.4	23	23	23
Talisman Energy Inc.	Turner Valley	1.2	15.5	15.5	–
TransCanada Midstream	Harmattan-Elkton-Leduc	52	66.2	81	81.5
TransCanada Midstream	Zama	4	74	74	74
Ulster Petroleum Ltd.	Wimborne	10.5	182	182	182
Union Pacific Resources Inc.	Progress	0.7	49.5	49.5	224.4
Western Facilities Management Limited	Nevis	4	245.8	300	300
Wascana Energy Inc.	East Calgary-Crossfield	16	1 696	1 696	1 696
Wolcott Gas Processing Ltd.	W. Pembina-Brazeau	11	520	520	520
<b>SOUR GAS, BRITISH COLUMBIA</b>					
Amoco Canada Petroleum Company Ltd.	Cypress	1.4	12.8	12.8	12.8
Petro-Canada Inc.	Boundary Lake II (sour)	**	–	–	8
TransCanada Midstream	Caribou	**	–	–	34
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 1999; Natural Resources Canada company survey 1997-98; Fertecon.

– Nil; \*\* Unknown.

<sup>1</sup> Maximum design capacity. <sup>2</sup> Closed in 1996. <sup>3</sup> Closed in 1998.

**TABLE 7. CANADA, PRINCIPAL SULPHUR DIOXIDE AND SULPHURIC ACID PRODUCTION CAPACITIES, 1998**

Operating Company	Plant Location	Feedstock	Annual Capacity		
			Liquefied SO <sub>2</sub>	Sulphuric Acid <sup>1</sup>	Sulphur Equivalent <sup>2</sup>
(000 tonnes/year)					
<b>EASTERN CANADA</b>					
CE Zinc	Valleyfield, Que.	SO <sub>2</sub> zinc conc.		430	140
Falconbridge Limited	Kidd Creek, Ont.	SO <sub>2</sub> zinc conc.		220	72
	Kidd Creek, Ont.	SO <sub>2</sub> copper conc.	30	470	168
	Sudbury, Ont.	SO <sub>2</sub> nickel conc.		355	116
Gaspé Copper Mines, Limited	Murdochville, Que.	SO <sub>2</sub> copper conc.		165	54
Inco Limited	Copper Cliff, Ont.	SO <sub>2</sub> nickel conc.	100	1 000	377
Noranda Copper Smelting and Refining	Rouyn-Noranda, Que.	SO <sub>2</sub> copper conc.		450	147
Noranda Mining and Exploration Inc.	Belledune, N.B.	SO <sub>2</sub> lead and zinc conc.		176	57
Sulco Chemicals Ltd.	Elmira, Ont.	Elem. sulphur		33	11
Subtotal			130	3 299	1 142
<b>WESTERN CANADA<sup>3</sup></b>					
Agrium Inc. <sup>4</sup>	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. <sup>5</sup>	Trail, B.C.	SO <sub>2</sub> lead and zinc conc.	80	430	210
Hudson Bay Mining and Smelting Co. <sup>6</sup>	Flin Flon, Man.	SO <sub>2</sub> zinc conc.		n.a.	35
Sherritt International Corporation	Fort Saskatchewan, Alta.	Elem. sulphur		233	76
Westcoast Energy Inc.	Prince George, B.C.	Elem. sulphur	30	75	39
Subtotal			110	1 942	754
Total Canada			240	5 241	1 896

Sources: Natural Resources Canada; Canadian company interviews, 1998.

n.a. Not applicable.

<sup>1</sup> 100% H<sub>2</sub>SO<sub>4</sub>. <sup>2</sup> Elemental sulphur equivalent of sulphuric acid is 32.7% and sulphur equivalent of liquefied SO<sub>2</sub> is 50%. <sup>3</sup> Marsulex Inc. idled its 160 000-t/y acid plant in Fort Saskatchewan in 1993. <sup>4</sup> Agrium Inc. acquired the acid operations from Viridian Inc. (formerly Sherritt Inc.) in 1996. <sup>5</sup> 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. <sup>6</sup> 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, 1995-97

	1995 <sup>r</sup>		1996		1997 <sup>p</sup>	
	All Forms <sup>1</sup>	Elemental	All Forms <sup>1</sup>	Elemental	All Forms <sup>1</sup>	Elemental
(000 tonnes)						
<b>WESTERN EUROPE</b>						
Finland	691	38	775	40	728	40
France	1 252	1 042	1 172	958	1 126	910
Germany	2 322	1 562	2 368	1 591	2 443	1 623
Italy	460	310	471	308	518	355
Netherlands	475	353	487	377	481	370
Spain	852	154	1 073	167	1 104	175
Others	1 103	626	1 188	702	1 200	706
Total, Western Europe	7 155	4 085	7 534	4 143	7 600	4 179
<b>CENTRAL EUROPE</b>						
Poland	2 635	2 425	2 002	1 790	1 935	1 710
Others	614	190	711	210	705	215
Total, Central Europe	3 249	2 615	2 713	2 000	2 640	1 925
<b>COMMONWEALTH OF INDEPENDENT STATES</b>						
	5 268	3 754	5 341	3 769	5 783	4 483
<b>AFRICA</b>						
South Africa	508	233	564	260	531	250
Others	179	3	167	3	182	5
Total, Africa	687	236	731	263	713	255
<b>NORTH AMERICA</b>						
Canada	8 953	7 973	9 412	8 429	9 394	8 401
United States	12 793	10 359	12 931	10 360	13 224	10 510
Total, North America	21 746	18 332	22 343	18 789	22 618	18 911
<b>LATIN AMERICA</b>						
Mexico	1 251	882	1 303	921	1 400	941
Others	1 401	521	1 557	556	1 686	567
Total, Latin America	2 652	1 403	2 860	1 477	3 086	1 508
<b>MIDDLE EAST</b>						
Iran	855	855	894	894	845	845
Iraq	375	375	375	375	425	425
Kuwait	559	559	576	576	591	591
Saudi Arabia	1 720	1 720	1 730	1 730	1 690	1 690
Others	754	590	1 177	1 014	1 331	1 168
Total, Middle East	4 263	4 099	4 752	4 589	4 882	4 719
<b>ASIA</b>						
China	7 562	403	7 969	239	8 174	315
Japan	3 133	1 682	3 217	1 791	3 451	2 013
South Korea	580	250	760	460	927	600
Others	1 201	529	1 288	632	1 349	713
Total, Asia	12 476	2 864	13 234	3 122	13 901	3 641
<b>OCEANIA</b>						
	315	89	401	95	482	95
Total, World	57 811	37 477	59 909	38 247	61 705	39 716

Source: The British Sulphur Corporation Limited, 1998.

<sup>p</sup> Preliminary; <sup>r</sup> Revised.

<sup>1</sup> All forms includes elemental sulphur, sulphur contained in pyrites, and contained sulphur recovered from metallurgical waste gases, mostly in the form of sulphuric acid.