

# Gypsum and Anhydrite

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## GYP SUM

Canadian shipments of crude gypsum were 8 109 890 t valued at \$91.1 million in 1994, compared to 7 563 369 t valued at \$83.0 million in 1993. This increase of about 7% was mainly a result of higher exports from Nova Scotia to the United States. However, shipments from Ontario and British Columbia, destined for local use, were also substantially higher, based on preliminary data.

### The Canadian Industry

Most deposits of gypsum being mined in the Atlantic provinces are characterized by high quality, amenability to inexpensive mining methods, and close access to coastal bulk-shipping facilities. Nova Scotia accounts for more than 75% of Canada's output and nearly all of its exports (Table 1). Ontario production is used on site, except in the case of Westroc Industries Limited at Drumbo, which ships to the company's Mississauga wallboard plant. Production from Amaranth, Manitoba, and from Windermere (Elkhorn II deposit) and Canal Flats in British Columbia serve the Prairie region and a portion of the B.C. market not served by imports. Domtar Inc. meets most of the requirements of its wallboard plant in Surrey, British Columbia, with gypsum provided under a long-term contract by a 49% Domtar-owned Mexican affiliate. Canadian operations are mainly subsidiaries of U.S. and U.K. gypsum product manufacturers. In Nova Scotia, National Gypsum (Canada) Ltd. is owned by the National Gypsum Company, and both Fundy Gypsum Company Limited and Little Narrows Gypsum Company Limited are owned by USG Corporation, the leading manufacturer of gypsum products in the United States. Westroc Industries Limited, a subsidiary of BPB Industries Plc., which has worldwide interests and is the largest gypsum products manufacturer in Europe, operates mining and manufacturing facilities across most of Canada. CGC Inc. (formerly Canadian Gypsum Company), with operations at Montréal,

Quebec, and Hagersville, Ontario, is 75% controlled by USG Corporation.

Westroc Industries Limited proceeded with plans to use up to 200 000 t/y of 100% synthetic gypsum at its Clarkson, Ontario, wallboard plant. This desulphogypsum will be purchased by long-term contract from Ontario Hydro's Lambton facility, the site of the first flue-gas desulphurization (FGD) system at a thermal-electric generating station in Ontario. Gypsum mining and related production plants are listed in Table 2.

Domtar's long-established mine at Flat Bay, Newfoundland, ceased production in September 1994; the company plans to buy gypsum from Nova Scotia to supply the company's board plant in Newington, New Hampshire. CGC Inc. continued its six-year project, which began in 1989, to develop ore reserves at its mine at Hagersville, Ontario. Production from the new eastern reserves will be phased in gradually as present reserves are depleted. Also, the company allocated capital expenditures to modify its Montréal wallboard plant to accept synthetic gypsum to be supplied by Kronos Canada Inc. (CGC's other wallboard plant in St-Jérôme, Quebec, was mothballed in 1991 because of weak demand.)

Louisiana-Pacific Corporation, a major Oregon-based wood products manufacturer, continued to produce fibre-gypsum board at its relatively new \$65 million fibre-gypsum board plant at Port Hawkesbury, Nova Scotia. Gypsum is purchased locally, perlite is imported, and large quantities of recycled paper are backhauled, mainly from the United States. This project was the first in Atlantic Canada to manufacture a gypsum board product for both regional and export markets.

Westroc Industries Limited, of Mississauga, Ontario, purchased the Nova Gypsum Inc. wallboard plant in McAdam, New Brunswick, which went into receivership in 1993. Production of wallboard began in the second half of 1994 using natural gypsum from Nova Scotia. However, synthetic gypsum may be used if good-quality material becomes available.

Several companies now use recycled gypsum wallboard in their production process; Domtar's Surrey, British Columbia, wallboard plant was the first in North America to use large quantities. This was

possible through arrangements with a reclaimer, New West Gypsum, of Vancouver, British Columbia, which operates a plant with a capacity of about 40 000 t/y. In the case of Domtar, up to one fifth of some plants' raw material needs is recycled material, a combination of about 75% scrap from new construction sites (post-construction material) and 25% waste from wallboard plants. Westroc currently recycles about 20 000 t and 30 000 t of board, respectively, at its Vancouver and Mississauga, Ontario plants.

## World Developments and Trade

Gypsum-related projects are generally limited to industrialized countries because of dependence on the building construction sector. However, world reserves are widespread and are conservatively estimated to be about 2.4 billion t. World production of gypsum in 1994 was an estimated 110.7 Mt, according to the U.S. Bureau of Mines. The United States ranked number one with 17.3 Mt, followed by China (11.0 Mt) and Canada (8.1 Mt). Shipments of wallboard by U.S. producers were considerably higher than in 1993, based on late 1994 reports.

International trade has become more important in North American markets in recent years as a result of low production costs and competitive shipping rates. In particular, U.S. imports of gypsum from Spain remain relatively high, amounting to several hundred thousand tonnes per year. Relatively low east-to-west backhaul freight rates are the main factors at work. Canada's imports of gypsum from Mexico, as described earlier, as well as those from the United States, are used by both wallboard and cement manufacturers. Imports from Spain, however, are used only by specific cement manufacturers.

Imports of gypsum wallboard from the United States into Canada have increased since 1986, and amounted to about 6% of domestic consumption in 1992. Following a review in 1994 of an earlier ruling on anti-dumping, a bi-national panel concluded that the overall weighted average margin of dumping of approximately 36% would stand. Revenue Canada's enforcement activities are ongoing.

Growth in the demand for gypsum products is expected in the countries of central and eastern Europe. Gebr. Knauf, BPB Industries Plc., and Lafarge Coppée Groupe either have established plants or are becoming involved in markets in these countries.

## Processing and Markets

Gypsum is a hydrous calcium sulphate ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) which, when calcined at temperatures ranging from 120° to 205°C, releases three quarters of its chemically combined water. The resulting hemihydrate of calcium sulphate (commonly referred to as plaster of Paris), when mixed with water, can be moulded, shaped or spread and

subsequently dried, or set, to form a hard plaster. This is particularly suited to products such as wallboard, lath and tile. Anhydrite, an anhydrous calcium sulphate ( $\text{CaSO}_4$ ), is commonly associated geologically with gypsum but is not a suitable substitute for most uses.

In general, the wallboard industry serves the residential, institutional and commercial building sectors. Housing starts have become a less reliable indicator of the demand for gypsum wallboard because its improved fire-retardant qualities, along with increased renovation activity, has encouraged its broader use. In Canada, expenditures in 1992 on major renovations reached \$17.4 billion, accounting for 23% of total capital expenditures on construction, according to Statistics Canada (Catalogue no. 61-223).

The Portland cement industry accounts for about 15% of the gypsum used in North America. Crushed, uncalcined gypsum, acting as a set regulator, in a proportion up to 5% by total weight, is ground with the primary stage clinker to produce the final cement product. Based on this proportion of gypsum, the total amount required by cement producers in Canada is estimated to be about 500 000 t/y.

For agricultural purposes, specifications mainly relate to the degree of fineness. Gypsum combines with potassium aluminum silicates in the soil resulting in the release of potassium for use as a nutrient. Also, gypsum serves to reduce sub-soil acidity, which is particularly beneficial in aluminum-rich lateritic soils. In addition, it provides a source of calcium and sulphur trioxide and helps break up hard soils, allowing better aeration and water penetration and retention.

For filler uses, gypsum is dried and finely ground to a range of particle sizes for use in joint compounds (mainly with gypsum wallboard), plastics, paint and paper. Relatively pure uncalcined gypsum, depending on glass batch chemistry, may also substitute for salt cake (sodium sulphate) in glass manufacturing. Special high-purity gypsum may be used in foods and pharmaceutical products.

ORTECH Corporation will sponsor its fourth conference on flue-gas derived gypsum, the "Fourth International Conference on FGD and Chemical Gypsum," to be held in Toronto in May 1995. Conference goals will be to facilitate communication and the dissemination of new information among power utilities and other synthetic gypsum producers, gypsum consumers, and FGD and pollution control system suppliers.

In the United States an estimated 700 000 t/y of FGD gypsum is consumed as a complete or partial substitute for natural gypsum in the manufacture of wallboard. The United States Gypsum Company, a subsidiary of USG Corporation which operates 22

gypsum board plants and 11 mines and quarries, is the largest consumer. (This estimated consumption accounts for less than 5% of total U.S. consumption of gypsum for all uses.)

Increased interest in flue gas desulphurization (the most widely used sulphur dioxide control technology) and the related role of industrial minerals prompted a cooperative effort by Natural Resources Canada and the U.S. Bureau of Mines (USBM) to produce a bibliography on the subject. A free copy of *Flue Gas Desulfurization and Industrial Minerals: A Bibliography*, which has more than 4000 references covering the period 1982 through June 1993, may be obtained from Natural Resources Canada or the USBM.

*Gypsum and Anhydrite* is one of a series of 19 reports published by the Canada Centre for Mineral and Energy Technology (CANMET Summary Report No. 7). Each of these industrial mineral reports summarizes information on mineral occurrences, deposits of specific interest, product uses and specifications, and process technology.

## Prices

Prices for gypsum in non-captive markets are negotiated, the only published figure being an approximate minimum price for crude material, ex-mine or c.i.f. United Kingdom, published in *Industrial Minerals*. In the United States, average prices for crude material, f.o.b. mine, have been about US\$6.75/t during the five-year period from 1990 to 1994, according to preliminary information from the USBM.

## Outlook

Canadian shipments of gypsum in 1995 are expected to be about 8 Mt. Housing starts in Canada were 168 300 in 1992, 155 400 in 1993, and about 155 000 in 1994. According to the Canada Housing and Mortgage Corporation, 157 000 housing starts are forecast in 1995. The outlook in the office and industrial building sectors is expected to continue to improve.

Housing starts in the United States increased nearly 13%, the highest level since 1988, despite rising interest rates. Total construction activity is expected to remain firm, assuming that real economic growth continues as forecast. (The U.S. economy has grown at an average rate of 3.5%/y since the beginning of 1992.)

Although new construction materials are being introduced, demand for gypsum wallboard is expected to remain popular because of its low price, ease of installation, and well-recognized fire-retarding properties. The present structure of the industry in Canada is not expected to change greatly, although future availability of synthetic gypsum resulting from

more strenuous emission controls will likely influence developments in some areas. The recycling of scrap and waste gypsum from construction sites and wall-board manufacturing lines will continue to become more important in both Canada and the United States.

## ANHYDRITE

Production and trade statistics for anhydrite are included with gypsum. Anhydrite, the anhydrous form of gypsum (about twice as hard and also heavier than gypsum), is produced by Fundy Gypsum Company Limited at Wentworth, Nova Scotia, and by Little Narrows Gypsum Company Limited at Little Narrows, Nova Scotia.

Production of anhydrite in 1993 was 168 200 t based on final figures, and in 1994 was an estimated 174 800 t, according to the Nova Scotia Department of Natural Resources. Shipments were mainly to the United States for use in manufacturing Portland cement and as a peanut crop fertilizer. Also, minor quantities were shipped to Quebec and Ontario for the manufacture of cement.

Testwork has been conducted in Nova Scotia on the utilization of anhydrite in floor screed and suspended floor systems. This was undertaken as part of the Canada-Nova Scotia Mineral Development Agreement (MDA-II, 1990-93). The project, involving the private sector and, in part, the Canada Centre for Mineral and Energy Technology (CANMET) of Natural Resources Canada, relates to optimizing compressive strength and dry shrinkage using suitable plasticizers. More product demonstrations are planned.

On-site testing continued for using anhydrite (in combination with water and special chemicals) as a mine "pack" construction material to improve underground support in coal mines. This work is based on an earlier cooperative program (MDA-I) involving CANMET and the Technical University of Nova Scotia.

*Notes: (1) For information and valuation of mineral production, shipments and trade, please refer to Chapter 60. (2) Information in this review was current as of February 1, 1995.*

TABLE 1. CANADA, GYPSUM PRODUCTION AND TRADE, 1992-94

Item No.	1992		1993		1994P	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
<b>PRODUCTION (shipments)</b>						
Crude gypsum						
Nova Scotia	5 502 562	47 251	5 835 915	56 295	6 391 483	62 421
Ontario	915 008	14 120	826 166	14 533	1 070 658	19 703
British Columbia	482 141	x	456 846	x	507 136	x
Manitoba	x	x	x	x	x	x
Newfoundland	x	x	x	x	x	x
Total <sup>1</sup>	7 294 700	71 820	7 563 369	82 973	8 109 890	91 102
<b>IMPORTS</b>						
2520.10 Gypsum, anhydrite						
Mexico	211 493	4 692	248 386	4 962	255 351	2 480
United States	48 806	1 398	31 945	1 333	36 429	1 716
Hong Kong	62	3	82	5	352	24
People's Republic of China	3	..	70	4	24	1
Germany	140	7	98	6	-	-
Total	260 505	6 101	280 581	6 314	292 156	4 223
2520.20 Gypsum; anhydrite; plasters						
United States	30 638	6 316	34 717	7 689	36 915	8 654
Germany	1 287	436	39	40	23	24
Japan	28	28	48	50	19	20
Australia	-	-	-	-	195	15
Italy	33	11	10	8	13	11
Other countries	7	9	152	185	20	20
Total	31 993	6 800	34 965	7 972	37 185	8 744
	(square metres)		(square metres)		(square metres)	
6809.11 Plasterboards, etc., not ornamental; faced or reinforced with paper or paperboard						
United States	14 656 852	14 510	2 097 892	2 645	1 096 255	1 477
United Kingdom	20 335	172	..	126	5 225	203
New Zealand	-	-	-	-	..	5
Mexico	-	-	-	-	..	3
Denmark	-	-	-	-	..	..
Total	14 677 187	14 683	2 097 892	2 772	1 101 480	1 690
6809.19 Plasterboards, etc., not ornamental; faced or reinforced, n.e.s.						
United States	..	1 912	..	2 353	..	2 370
Taiwan	-	-	-	-	..	21
United Kingdom	..	23	..	2	-	-
Total	..	1 936	..	2 355	..	2 392
6809.90 Articles of plaster or compositions based on plaster, n.e.s.						
United States	..	1 853 <sup>r</sup>	..	2 383	..	4 955
United Kingdom	..	806	..	1 131	..	1 254
People's Republic of China	..	81	..	165	..	325
Mexico	..	79	..	72	..	312
Other countries	..	216 <sup>r</sup>	..	220	..	206
Total	..	3 035	..	3 971	..	7 052
Total imports of gypsum and gypsum products	..	25 755	..	15 412	..	15 357
<b>EXPORTS</b>						
2520.10 Gypsum, anhydrite						
United States	5 010 642 <sup>r</sup>	46 584 <sup>r</sup>	5 276 649	57 634	5 902 549	62 381
Denmark	..	..	38 846	392	39 861	396
United Arab Emirates	-	-	-	-	61	21
Saudi Arabia	-	-	-	-	16	20
Czech Republic	-	-	-	-	52	11
Iceland	-	-	-	-	28	8
Trinidad and Tobago	-	-	-	-	5	..
Other countries	7	..	123	63	-	-
Total	5 010 649 <sup>r</sup>	46 585 <sup>r</sup>	5 315 618	58 091	5 942 572	62 841

TABLE 1 (cont'd)

Item No.	1992		1993		1994 <sup>p</sup>	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
<b>EXPORTS (cont'd)</b>						
2520.20	Gypsum; anhydrite; plasters					
	6 092	685	22 089	1 923	1 165	700
United States	346	247	574	355	222	220
Thailand	26	25	—	—	59	70
South Korea	—	—	21	5	115	44
Bermuda	—	—	17	12	27	25
Indonesia	171	97	295	245	104	77
Other countries						
Total	6 636	1 054	22 996	2 540	1 691	1 136
	(square metres)		(square metres)		(square metres)	
6809.11	Plasterboards, etc., not ornamental; faced or reinforced with paper or paperboard					
	11 776 357 <sup>r</sup>	11 883	20 818 143	23 478	59 494 073	61 098
United States	—	—	—	—	450 958	166
Singapore	—	—	8 662	59	24 608	46
Portugal	299 059	765	316 553	309	205 379	142
Other countries						
Total	12 075 416 <sup>r</sup>	12 648	21 143 358	23 846	60 175 018	61 453
6809.19	Plasterboards, etc., not ornamental; faced or reinforced, n.e.s.					
	..	4 288	..	9 230	..	14 287
United States	..	53	..	237	..	271
Japan	—	—	—	—	..	42
Sri Lanka	—	—	—	—	..	34
Singapore	—	—	..	27	..	30
Taiwan	—	—	—	—	..	6
Czech Republic	..	228	..	168	—	—
Other countries						
Total	..	4 572	..	9 664	..	14 672
6809.90	Articles of plaster or compositions based on plaster					
	..	1 448	..	2 125	..	4 715
United States	—	—	..	102	..	59
Japan	..	18	..	21	..	25
Germany	—	—	..	15	..	11
United Arab Emirates	—	—	—	—	..	8
Hong Kong	..	5	..	32	—	—
Other countries						
Total	..	1 472	..	2 298	..	4 820
	Total exports of gypsum and gypsum products					
	..	65 277 <sup>r</sup>	..	93 899	..	143 786

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>x</sup> Confidential.<sup>1</sup> Totals do not include gypsum produced or shipped for use by Canadian Portland cement producers.

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

**TABLE 2. CANADA, GYPSUM MINING AND GYPSUM PRODUCTS MANUFACTURING OPERATIONS, 1994**

Company	Location	Operation
<b>NEWFOUNDLAND</b>		
Domtar Inc.	Flat Bay	Closed in 1994.
Atlantic Gypsum, a division of Atlantic Group Limited	Corner Brook	Wallboard manufacture
<b>NOVA SCOTIA</b>		
Domtar Inc.	McKay Settlement	Open-pit mining
Fundy Gypsum Company Limited	Windsor	Plaster and "Gypcrete" manufacture
Georgia-Pacific Corporation	Wentworth and Miller Creek	Open-pit mining of gypsum and anhydrite
Little Narrows Gypsum Company Limited	Sugar Camp	Open-pit mining of gypsum
National Gypsum (Canada) Ltd.	Little Narrows	Open pit mining of gypsum and anhydrite
Louisiana-Pacific Corporation	Milford	Open-pit mining of gypsum
	Port Hawkesbury	Fibre-gypsum board manufacture
<b>NEW BRUNSWICK</b>		
Westroc Industries Limited	McAdam	Wallboard manufacture
<b>QUEBEC</b>		
CGC Inc.	Montréal	Wallboard manufacture
Domtar Inc.	St-Jerome	Wallboard plant mothballed
Westroc Industries Limited	Montréal	Distribution terminal only
	Montréal	Wallboard manufacture
<b>ONTARIO</b>		
CGC Inc.	Hagersville	Underground mining and wallboard manufacture
Domtar Inc.	Caledonia	Underground mining and wallboard manufacture
Westroc Industries Limited	Drumbo	Underground mining
	Clarkson	Wallboard manufacture
<b>MANITOBA</b>		
Domtar Inc.	Amaranth	Open-pit mining
Westroc Industries Limited	Winnipeg	Wallboard manufacture
	Amaranth	Open-pit mining
	Winnipeg	Wallboard manufacture
<b>ALBERTA</b>		
Domtar Inc.	Edmonton	Wallboard manufacture
Westroc Industries Limited	Calgary	Wallboard manufacture
<b>BRITISH COLUMBIA</b>		
Domtar Inc.	Canal Flats	Open-pit mining
Westroc Industries Limited	Vancouver	Gypsum products manufacture
	Vancouver	Gypsum products manufacture
	Windermere	Open-pit mining

Source: Natural Resources Canada.

**TABLE 3. CANADA, GYPSUM PRODUCTION, TRADE AND CONSUMPTION, 1975 AND 1980-94**

	Production <sup>1</sup>	Imports <sup>2</sup>	Exports	Apparent Consumption <sup>3</sup>
	(tonnes)			
1975	5 719 451	553 338	3 691 676	2 581 113
1980	7 336 000	154 717	4 960 240	2 530 477
1981	7 025 000	143 500	5 094 873	2 073 627
1982	5 987 000	93 843	4 775 755	1 305 088
1983	7 507 000	100 939	5 187 032	2 420 907
1984	7 775 082	131 809	6 224 574	1 682 317
1985	7 760 783	121 802	5 879 664	2 002 921
1986	8 802 805	221 644	5 921 982	3 102 467
1987	9 093 926	217 625	5 704 853	3 606 698
1988 <sup>a</sup>	8 813 760	274 917	5 651 286	3 437 391
1989	8 179 588	291 373	5 357 055	3 113 906
1990	7 977 685	318 114	5 757 327	2 538 472
1991	6 727 221	259 863	4 940 193	2 046 891 <sup>r</sup>
1992	7 294 700	260 505	5 010 649 <sup>r</sup>	2 544 556 <sup>r</sup>
1993	7 563 369	280 581	5 315 618	2 528 332
1994 <sup>p</sup>	8 109 890	292 156	5 942 572	2 459 474

Sources: Natural Resources Canada; Statistics Canada.

<sup>p</sup> Preliminary; <sup>r</sup> Revised.<sup>a</sup> Beginning in 1988, imports and exports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Imports and exports include HS class 2520.10.00 gypsum, anhydrite.<sup>1</sup> Producers' shipments, crude gypsum. <sup>2</sup> Includes crude and ground, but not calcined. <sup>3</sup> Production plus imports minus exports.**TABLE 4. CANADA, HOUSE CONSTRUCTION, BY PROVINCE, 1993 AND 1994**

	Starts			Completions			Under Construction		
	1993	1994	% Diff.	1993	1994	% Diff.	1993	1994	% Diff.
Newfoundland	2 405	2 243		2 457	2 590		2 378	1 991	
Prince Edward Island	645	669		674	742		296	207	
Nova Scotia	4 282	4 748		4 545	4 920		2 298	2 038	
New Brunswick	3 693	3 203		3 631	3 696		1 676	1 202	
Subtotal, Atlantic provinces	11 025	10 863	-1	11 307	11 948	+6	6 648	5 438	-18
Quebec	34 015	34 154	-	34 859	36 345	+4	9 811	7 730	-21
Ontario	45 140	46 645	+3	51 130	49 106	-4	25 047	22 444	-10
Manitoba	2 425	3 197		2 572	2 996		1 002	1 206	
Saskatchewan	1 880	2 098		2 020	1 851		710	836	
Alberta	18 151	17 692		17 859	18 671		7 595	6 703	
Subtotal, Prairie provinces	22 456	22 987	+2	22 451	23 518	+5	9 307	8 745	-6
British Columbia	42 807	39 408	-8	42 047	41 168	-2	28 998	27 205	-6
Total Canada	155 443	154 057	-1	161 794	162 085	-	79 761	71 562	-10

Source: Canada Mortgage and Housing Corporation.

**TABLE 5. CANADA, VALUE OF CONSTRUCTION BY TYPE,<sup>1</sup> 1991-93**

	1991	1992	1993
	(\$ millions)		
<b>BUILDING CONSTRUCTION<sup>2</sup></b>			
Residential	34 768	37 315	38 432
Industrial	3 642	2 777	2 594
Commercial	13 436	11 185	11 146
Institutional	5 845	5 964	6 205
Other building	3 210	2 707	2 937
Subtotal	60 901	59 948	61 315
<b>ENGINEERING CONSTRUCTION<sup>2</sup></b>			
Marine	553	556	576
Highways, airport runways	6 334	6 374	6 800
Waterworks, sewage systems	2 660	2 701	3 026
Dams, irrigation	399	306	334
Electric power	6 859	7 867	7 645
Railway, telephones	3 135	3 053	3 070
Gas and oil facilities	9 629	7 790	8 081
Other engineering	3 686	3 267	3 565
Subtotal	33 254	31 913	33 096
Total construction	94 154	91 861	94 411

Sources: Natural Resources Canada; Statistics Canada, Catalogue no. 64-201 discontinued, to be replaced with Catalogue no. 61-223.

<sup>1</sup> Actual expenditures 1991, preliminary 1992, intentions 1993. <sup>2</sup> Includes total value of new and repair work purchased.

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

**TABLE 6. WORLD PRODUCTION OF GYPSUM, 1993 AND 1994**

	1993	1994 <sup>e</sup>
	(000 tonnes)	
United States	15 800	17 300
People's Republic of China	10 600	11 000
Iran	8 600	8 600
Canada	7 600	8 100
Spain	7 500	7 500
Thailand	7 000	7 200
Mexico	5 800	6 000
Japan	5 500	5 500
France	5 000	5 000
United Kingdom	3 500	3 500
Australia	2 000	2 100
Other countries	23 800	23 800
Total world	102 700	110 700

Sources: Natural Resources Canada; U.S. Bureau of Mines' Mineral Commodity Summaries, January 1995.

<sup>e</sup> Estimated.