

Sulphur

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WORLD OVERVIEW

In 1995, the global sulphur market continued to firm up with a sustained strong demand in the fertilizer and industrial sectors. The reduced availability of sulphur from depleted inventories in Saudi Arabia and Poland led to accrued deliveries from Canada and the Commonwealth of Independent States (C.I.S.).

World elemental sulphur production rose by about 4% to 37.1 Mt. Increases were registered for both Frasch sulphur and recovered sulphur. Most major sulphur-producing countries increased production; the United Arab Emirates (U.A.E.), Canada and the C.I.S. were the most important contributors. In 1995, Frasch sulphur totalled 5.9 Mt, accounting for 16% of world elemental sulphur production. Besides Iraq and some mines in the C.I.S., all remaining Frasch sulphur producers in the United States and Poland operated at high rates. The production of recovered sulphur showed continued growth, totalling 31.3 Mt; increases occurred in Canada, the U.A.E., Saudi Arabia, the C.I.S., Japan, Kuwait and Germany. Recovered sulphur accounted for 84% of total elemental sulphur production; gas processing was in turn the source of 58% of recovered sulphur, while oil and heavy oil refining contributed 42%.

In 1995, world consumption of elemental sulphur continued its recovery that began in 1994. World demand rose by 2.2 Mt to 35.2 Mt. About 89% of the total elemental sulphur consumed is transformed into sulphuric acid. In 1995, world consumption of sulphuric acid was estimated at 149.2 Mt, of which two thirds was in the fertilizer sector. Strong demand prevailed for phosphate-based fertilizers in major consuming countries such as China and India, which together account for 66% of the global trade of processed phosphate products. Fertilizer demand continued to be firm in China for a second consecu-

tive year and sustained imports of di-ammonium phosphate fertilizers resulted in strong demand for sulphur in the United States. In India, phosphate demand also remained strong and resulted in important imports of phosphoric acid; accrued trade led to higher demand for sulphur in phosphate-producing and exporting countries such as Morocco, Tunisia, South Africa, Senegal and the C.I.S.

CANADIAN DEVELOPMENTS

Elemental Sulphur

In 1995, Canada was the world's second largest producer of elemental sulphur with a 22% share. It also remained the leading exporter with a 39% share of world trade, compared to 33% in 1994. In Canada, sulphur is recovered from the processing of sour natural gas with a high hydrogen sulphide content, and from the refining of high-sulphur crude oil and heavy oil; there is no production derived from Frasch mining. Canadian sulphur production from natural gas processing accounted for 87% of total production, while the remainder was from oil sands plants (8%) and oil refineries (5%). Most sulphur production occurs in Alberta and, to a lesser degree, in British Columbia and Saskatchewan. In eastern Canada, all sulphur production is derived from oil refining.

The production of sulphur in Canada in 1995 was estimated at 8.1 Mt, a marginal 1% increase over the previous year. Gas-related sulphur production remained at 7.1 Mt in Canada. High levels of sulphur recovery in 1995 were related to a strong performance by the natural gas sector in Canada. Marketable gas production grew by 9%, led by firm export sales to the United States and by stronger sales in the domestic commercial and residential sectors. However, upstream gas prices continued to remain soft due to oversupply, a build-up in gas reservoirs, limited pipeline availability to reach export markets, and low demand in the relatively warm winter of early 1995.

Sulphur production from oil sands operations reached another record level rising 7% over last year to 0.67 Mt. Oil-related sulphur production was estimated at 0.38 Mt, a 19% increase over 1994, with much higher sulphur output from refineries in Ontario and heavy oil upgraders in Saskatchewan.

Additional oil-related tonnage also came from the start-up of one sulphur recovery unit in Newfoundland.

In 1995, Canadian shipments of elemental sulphur rose by 22% to 7.1 Mt, mostly triggered by strong export sales, which accounted for 90% of Canadian sales. In 1995, exports to the United States, which was the dominant export destination for Canadian sulphur, increased significantly by 47% to 1.7 Mt and accounted for 31% of Canada's total exports (22% in 1994). Offshore exports rose for a second consecutive year to 4.7 Mt, a 1.0-Mt increase over the previous year. This growth resulted from a combination of strong demand in international markets, stable prices, and reduced output from traditional suppliers such as Poland and Saudi Arabia. Canadian sulphur was exported to more than 30 countries. In 1995, higher sales were reported in selective markets, including Latin America, Asia, Africa and Oceania; lower sales were registered in the Middle East. In Latin America, major increases were reported in Mexico, Brazil and Cuba; sales to this region accounted for 31% of Canada's offshore exports. Cuba emerged as an important market for Canadian sulphur, and sales to Africa accounted for about 40% of Canadian offshore exports. Morocco remained the largest single destination for Canadian sulphur with a 19% share of Canada's total offshore exports. Shipments to Morocco rose by one quarter, while sales to Tunisia dropped by two thirds. Strong sales were registered in South Africa. Canadian exports to Asia accounted for 22%, with exports to India doubling over last year. Strong gains were also registered in the Philippines and South Korea, while shipments to China and Indonesia were reduced.

In March 1995, Canadian sulphur exporters faced offshore sales disruptions to movements to ports caused by both rail and port strikes. The Port of Vancouver was closed for a week in mid-March because of a labour dispute involving the longshoremen foremen. Rail shipments in western Canada were disrupted the following week as rail carrier workers faced lock-outs and strikes. In both cases, the federal government passed back-to-work legislation.

Total Canadian sulphur stocks rose by 0.9 Mt to reach 8.7 Mt by year-end. On a yearly basis, additions to inventories averaged 100 000 t/m, compared to a rate of 220 000 t/m in 1994. Major additions to stocks occurred at Syncrude Canada Limited in Fort McMurray, Alberta, where more than 0.5 Mt were vatted during 1995. Canadian sulphur stocks in early January 1995 were distributed mainly amongst 18 sites in Alberta with the principal locations being Ram River, Waterton, Kaybob III, East Calgary, and Crossfield.

In 1995, Canada's production capacity for elemental sulphur was estimated at 13.3 Mt/y. Sulphur capacity from natural gas was estimated at about 12 Mt/y for 1995 with a utilization rate close to 60% due to strong gas sales. (Capacity utilization was close to

60% in Alberta and almost 75% in British Columbia.) Sulphur capacity from the oil sands has been quoted at 0.75 Mt/y since 1988; however, its utilization rate has been growing steadily from 65% in 1988 to 93% in 1995. Sulphur capacity utilization from oil refineries was about 60% in 1995, mostly due to very high operating rates at heavy oil upgraders. The overall Canadian utilization rate has been climbing, reaching 61% in 1995 compared to 53% in 1988. A large amount of capacity in the order of 5.2 Mt/y is unutilized, equating to two thirds of the current production level. Most of this unused capacity comes from the natural gas sector where annual production is exceeded by close to 4.9 Mt. However, this unused capacity is not totally available as many established gas fields are becoming depleted and connected sour gas plants are suffering from lower intake.

In 1995 the Canadian sulphur industry was affected by several major events, including: a major change in the Canadian exporting structure; a third anti-dumping review in the United States covering exports for the period December 1993 to November 1994, and the preliminary determination of the first anti-dumping review for the period December 1991 to November 1992; some major announcements and subsequent changes in plans by Westcoast Energy Inc. for two gas projects in northeastern British Columbia; and the purchase of Petrosul International by Procor Sulphur Services Inc.

As of January 1, 1995, Husky Oil Operations Ltd., Shell Canada Limited, and Amoco Canada Petroleum Company Ltd., three major members of PRISM Sulphur Corporation, withdrew from the export organization and began exporting independently to offshore destinations, thereby increasing the number of major Canadian exporters from two to five.

Late in 1994, Pennzoil Sulphur Company, a former U.S. Frasch producer, filed another request for an administrative review against several Canadian sulphur exporters to the United States for the period December 1993 to November 1994. This was the third consecutive request filed by Pennzoil since 1992. In July 1995, the U.S. Department of Commerce (DOC) released its preliminary results of the anti-dumping administrative review on sulphur sales from Canada to the United States. This review covered 15 Canadian sulphur exporters for the period December 1991 to November 1992. The DOC determined a preliminary dumping margin of 5.66% for three active sulphur exporters, a 28.9% rate for non-respondents, and a 5.56% rate for all other exporters who were not listed in any petitions or who have not received revocation. The final determination is expected in early 1996, while the preliminary determination for the second review is expected in mid-1996.

In early 1995, Westcoast Energy Inc. announced two major gas projects: the Grizzly Valley Expansion project with a new \$672 million plant at Tumbler Ridge

(near Pine River) to be completed by 1997, and another plant at Aitken Creek to be completed in 1996. In the spring of 1995, Westcoast announced a major downward revision of capacity, changing its plans at Tumbler Ridge into a third \$400 million expansion at Pine River. This \$400 million project, which is now slated for completion in late 1997, would add another 1050 t/d of sulphur recovery capacity. In June, the National Energy Board dismissed the \$400 million Aitken Creek-Fort St. John application on the basis that the Board could not regulate the extension of a project that was not perceived to be an integral part of Westcoast's transmission system. Westcoast has appealed this latter ruling and both projects are on hold as both cases have been referred to the Federal Court of Appeal. The Grizzly Valley project has since been further delayed to late 1998.

In mid-July 1995, Procor Sulphur Services Inc. of Calgary acquired the sulphur assets of sulphur trader Petrosul International of Vancouver from ConAgra Inc. of Omaha, Nebraska. The assets comprise sulphur forming and loading facilities in British Columbia as well as international sulphur marketing contracts. In March 1995, Procor bought a liquid sulphur handling terminal in Rotterdam in the Netherlands from Metallgesellschaft of Germany. Procor, who is a world leader in sulphur forming technologies, expects to handle close to 0.5 Mt/y of sulphur in the near future. Its expansion activities, which are expected to be completed before 1997, include a new 0.4-Mt/y granulation unit, additional sulphur storage, and new ship-loading equipment.

Alberta

Conwest Exploration Company Ltd. completed the construction of a new gas processing plant at Grand Prairie to exploit the Sexsmith/Valhalla sour gas field (8-10% H₂S); a sulphur recovery unit with a 450-500-t/d capacity was commissioned in the fall of 1995. Liquid sulphur is to be trucked to Amoco Canada Petroleum Company Limited's Kaybob I-II plant. Morrison Petroleum Ltd. is expected to complete an expansion at its Coleman gas plant in Savannah Creek in southeastern Alberta by mid-1996; the project calls for increasing its sulphur recovery rate from 96% to 98.5%, while its sulphur recovery capacity will increase by 300 t/d to 710 t/d. Morrison reactivated its Coleman plant late in October; the plant, which produced up to 135 000 t of sulphur in 1994, had been idle since January 1995 due to weak gas prices. Alberta Energy Company Limited is to increase its sulphur recovery rate from 50% to 81% of capacity, which will result in incremental sulphur production of 80 t/d by the first quarter of 1996. Petro-Canada Inc. is planning to increase its sulphur recovery capacity at Gold Creek pending approval from regulatory agencies. Sulphur production is expected to increase at Chevron's Kaybob III gas plant with new additional gas tied in from one well in the Berland River area; its incre-

mental sulphur production would increase by 360 t/d by 1996. (The sour gas discovery at Berland is considered to be the largest natural gas find in Canada since the 1986 discovery at Caroline.) Norcen Energy Resources Limited expanded its Progress gas plant in northwestern Alberta where its sulphur recovery capacity rose from 15 t/d to 50 t/d in April 1995. Later in the year, Norcen announced its intention to sell its Minnehick-Buck Lake gas processing plant which has a sulphur capacity of 45 t/d.

Shell Canada Limited carried out a two-month turn-around at its Caroline gas plant late in the summer and raised its effective sulphur recovery capacity by more than 20%. The capacity of its forming units was also expanded at Shantz and its export capability can now reach as much as 1.7 Mt/y. In October, Caroline's sulphur production peaked at 160 000 t/m, compared to an initial capacity of 120 000-140 000 t/m. Shell Canada also plans to increase its sulphur recovery capacity by 10% at Burnt Timber to 580 t/d with additional gas coming from the Benjamin gas field.

Several other activities occurred in the Alberta sulphur industry in 1995: Anderson Exploration Limited acquired Home Oil Limited in a massive \$800 million bid, creating one of the largest oil and gas companies in Canada; Alberta Energy Company Limited merged with Conwest Exploration Company Limited; Canadian 88 Energy Corporation of Calgary purchased the Olds gas processing plant from Amerada Hess Canada; and Torch Energy Advisors Inc. of Houston acquired the Government of Alberta's 11.74% interest in Syncrude Canada Limited.

British Columbia

Imperial Oil Ltd. closed its Ioco oil refinery at Port Moody in mid-1995. The site will continue to operate as a terminal for the storage and distribution of asphalt and other oil-related products. The Ioco plant's sulphur recovery capacity was rated at 20 t/d.

Pacific Coast Terminals (PCT) in Port Moody completed a dredging project in front of its berth for facilitating access to Panamax-size vessels. Late in 1995, PCT announced plans to install a new 5000-t/h quadrant ship-loader. Vancouver Wharves Limited in the Port of Vancouver is planning an expansion project at Berth 5, which would include a new 240 000-t integrated sulphur stockpiling system with separate stacking and reclaiming equipment.

Eastern Canada

In Newfoundland, North Atlantic Refinery Limited in Come-by-Chance reactivated its sulphur recovery unit in August 1995. Close to 85 t/d of sulphur were produced during the second half of 1995. Recovered sulphur is poured on block at the plant site. Alternative dispositions are currently being investigated.

In Nova Scotia, Imperial Oil Limited is considering the possibility of closing its Dartmouth refinery; the plant could be converted into an ocean terminal. This is the second time since 1992 that the company is assessing the future of this refinery, which has a sulphur recovery capacity of 76 t/d.

Sulphuric Acid

According to Natural Resources Canada's annual survey on sulphuric acid, Canadian sulphuric acid production in 1994 totalled 4.06 Mt, of which smelter acid contributed 2.63 Mt and elemental sulphur contributed 1.43 Mt. Domestic consumption was estimated at 2.4 Mt, a 4% increase over 1993. Sulphuric acid consumption in eastern Canada grew 5% to 0.77 Mt and contributed 32% of total Canadian consumption. Agricultural chemicals accounted for half of the sulphuric acid consumption, followed mainly by pulp and paper, inorganic chemicals, uranium mines, and nonferrous smelting and refining.

The 1994 consumption of sulphur dioxide (SO₂) in Canada was estimated at about 105 000 t, of which three quarters was used by pulp and paper plants. Exports totalled 77 000 t of SO₂. Demand for liquid sulphur dioxide rose significantly in pulping mills, while consumption declined slightly in the mining and smelting sectors. Increases were reported in all other end uses, but mainly for cleaning compounds and inorganic chemicals.

In 1995, the production of sulphur products (sulphuric acid, sulphur dioxide, and elemental sulphur) from smelters was estimated at 1.08 Mt of sulphur, a 3% increase from 1994. Sulphuric acid production from smelters was estimated at close to 3.0 Mt H₂SO₄, representing 89% of total sulphur product output from smelters. Increases in sulphuric acid production were reported in New Brunswick and British Columbia, while decreases were registered in Quebec and Ontario. In 1995, shipments to the domestic market increased as fairly strong sales were reported in the pulp and paper, oil refinery, gold mining, and uranium ore processing sectors. Higher sales were registered in the manufacture of ammonium phosphate due to stronger domestic demand for fertilizers. Sales of acid to the manufacturers of aluminum tri-fluoride and titanium dioxide pigments were also slightly higher, while acid sales to manufacturers of aluminum sulphate were stagnant. Exports to the United States remained strong (sales levels were similar to 1994's level during the first nine months of 1995).

Cominco Ltd. of Vancouver is expected to complete construction by 1996/97 of a new lead smelter using the Russian Kivcet smelting technology. Sulphuric acid capacity and production by the company is projected to increase by 10%.

Noranda Inc. acquired the remaining 27% interest that it did not already own in Brunswick Mining and

Smelting Corporation Limited at Belledune, New Brunswick; the company also announced its intention to permanently shut its nearby phosphate fertilizers plant by the end of the second quarter of 1996. All acid produced will be sold to the North American market. Noranda Mining and Exploration Inc. is expected to invest \$20 million to expand its copper mine and smelter at Mine Gaspé in Murdochville, Quebec; the project is expected to increase its sulphur recovery by 15% by 1996. Effective January 1996, Noranda Sales Corporation will become the exclusive agent for all sulphuric acid produced by Falconbridge Limited at Kidd Creek and Sudbury in Ontario, and will act as agent for all sales throughout Canada; four acid traders have been chosen to market Falconbridge's acid in the United States.

In a report released by Environment Canada in October 1995, it was concluded that the Eastern Canada Acid Rain Control Program met its initial SO₂ target in 1994. Collectively, the seven eastern provinces emitted around 1.7 Mt of SO₂, a 56% reduction from their 1980 level and still far below the 2.3-Mt cap. In 1994, smelters accounted for 50% of SO₂ emissions in eastern Canada, which was 22% lower than in 1993 and 33% below their collective regulatory limit of 1.27 Mt/y. Another cap is being discussed for the period beyond 2000.

WORLD DEVELOPMENTS

In 1995, world production of sulphur-in-all-forms rose 3% to 53.7 Mt. Of this amount, elemental sulphur accounted for 69%; sulphuric acid from smelters, 19%; and pyrites, 12%.

World trade of elemental sulphur was estimated at 16.5 Mt, an 11% increase from the previous year. Canada accounted for more than half of the increase in global trade, while the C.I.S. contributed one third. Exports from the U.A.E. tripled in 1995 to reach about 0.5 Mt. Declines in exports were registered in Saudi Arabia due to the exhaustion of their inventories, which were radically drawn down during 1994. Exports from Poland were 9% lower as well. Canada accounted for 39% of world trade. Other major exporters were Poland (10%) and Saudi Arabia (9%). The major event in global trade during 1995 was the resurgence of sulphur exports from the C.I.S.; in 1995 the C.I.S. exported close to 1.4 Mt compared to 0.45 Mt in 1994, and most of this tonnage was delivered in the Mediterranean region.

United States

In 1995, the United States was the world's largest sulphur producer accounting for 28% of world production; it was also the largest Frasch-producing country. U.S. production of elemental sulphur was estimated at 10.2 Mt; sulphur recovered from oil refineries and gas processing plants accounted for

71% of this total. Frasch sulphur production rose by 2% over the previous year to reach 3.0 Mt. The increase was mainly due to higher output from the Culberson Frasch operation in Texas where production grew to a rate of 2250 long tons per day (lt/d) compared to 2000 lt/d in 1994; total production was estimated at 0.8 Mt in 1995. Production at the Main Pass Frasch mine in Louisiana was maintained at the 6000-lt/d level for the whole year; its output reached 2.2 Mt of sulphur in 1995. The production of sulphur from gas processing totalled 2.2 Mt, a 2% reduction from last year. Sulphur recovery from oil refineries rose very marginally to 5.0 Mt, well under the expectations for the year due to a series of turn-arounds and unexpected interruptions during 1995. Higher sulphur production from oil refineries is expected in the short term as several refineries will undergo expansions to be commissioned over the next three years. Additional tonnages from refineries will be located close to the Tampa market and will compete directly with domestic Frasch deliveries and imports.

In 1995, sulphur was produced at 168 plants operating in 30 states. Elemental sulphur consumption rose by 3% to 11.5 Mt, of which 9.3 Mt was supplied from domestic deliveries. Consumption of sulphuric acid was estimated at 47.2 Mt for use mostly in fertilizers (67%), chemicals (8%), metal mining (6%), and petroleum refining (5%). Exports of elemental sulphur increased by 18% to 1.0 Mt. Imports rose for the first time in four years and reached 2.2 Mt, a 40% increase over the previous year; Canada supplied 77%, with the rest coming from Mexico.

In January 1995, Freeport-McMoRan Resource Partners, Ltd. completed the acquisition of Pennzoil Sulphur Co. Pennzoil's domestic assets included the Culberson mine; the sulphur terminal and loading facilities at Galveston, Texas, and Tampa, Florida; the charter of the Marine Duval sulphur tanker; and a fleet of railcars. In mid-1995, Noxco Corporation announced plans to proceed with a commercial demonstration unit to recover 98% of the sulphur dioxide emitted from the Warrick Power Plant No. 2 near Evansville, Indiana; close to 30 000 t/y of liquid sulphur dioxide will be generated. Noxco received about US\$41 million from the U.S. Department of Energy under its Clean Coal Technology Program.

Commonwealth of Independent States

In 1995, the C.I.S. was the world's third largest producer of sulphur with an 11% share of world production. Elemental sulphur production in the C.I.S. was estimated at 4.0 Mt, a 0.2-Mt increase over 1994. Most of this production came from gas processing (3.1 Mt), followed by Frasch mines (0.5 Mt), and oil refineries (0.25 Mt). Production is mainly generated in Russia (63%), Uzbekistan (10%), Ukraine (10%) and Kazakhstan (7%). In Russia, sulphur recovery was flat at the Astrakhan I gas plant and Mubarek gas plant, while it rose 25% at the Orenburg gas

plant. Frasch sulphur production increased one third at Yavorov in Ukraine. The commissioning of the Astrakhan II sour gas plant is reported to be delayed again; its start-up was expected in early 1996 with a projected sulphur recovery rate of 1.5 Mt/y by 1997.

In 1995, sulphur exports from the C.I.S. almost tripled over the previous year, totalling 1.4 Mt. Most of this tonnage was reportedly sourced from Astrakhan's current production and adjacent stocks, supplemented with production from Orenburg and Yavorov. Exports were mostly shipped to Tunisia and Morocco from the Port of Mariupol and the Ukrainian ports of Kherson and Kersh. Barge movements to Mariupol have been stopped since October 1995 due to the freezing of the Volga River; tonnage has been routed through the rail system. Exports from the C.I.S. are projected to be lower in 1996 due to higher domestic deliveries within Ukraine and the drawdown of stocks at Astrakhan I. Late in 1995, it was reported that a 0.75-Mt/y sulphur forming unit is being planned at Astrakhan for completion by mid-1996, signalling a potential intensification of strong competition in the Mediterranean and North African markets in the very near future.

Poland

Poland was the fourth largest world producer of elemental sulphur in 1995 accounting for 6% of world production. Poland produced Frasch sulphur at two mines and one industrial plant at Baznia. The major mines are located at Jeziorko and Osiek, while some production occurs at Grzybow for feeding a nearby carbon disulphide plant. In 1995, sulphur production in Poland rose by 5% to 2.2 Mt. Exports of crushed lumped sulphur ceased in 1995; all sulphur exports are now in liquid or granulated form. Polish sulphur exports declined by 9% to 1.7 Mt as a result of the reduced availability of stocks that were virtually exhausted last year. The main export destinations in 1995 were North Africa (Morocco and Tunisia) and Latin America (Brazil).

Saudi Arabia

Saudi Arabia was the fifth largest sulphur producer in the world in 1995 with a 5% share. Saudi Arabian sulphur production was reported at 1.75 Mt, a 7% increase over 1994. Close to 86% came from natural gas processing. Production from oil refineries has been flat at 0.25 Mt/y for the last three years. Sulphur exports, which have been highly supplemented by massive withdrawals from sulphur stocks in 1993 and 1994, dropped by 36% to 1.5 Mt in 1995. Stocks were reported to be near depletion by the first quarter of 1995. The bulk of Saudi Arabia's sulphur exports was shipped to Morocco, India and Jordan. In the near term, sulphur production is expected to increase by 6% to 1.9 Mt/y with the commissioning of a series of expansions at Saudi Aramco's gas processing plants at Uthmaniyah (1100 t/d in 1999),

Shedgum and Berri; another expansion is planned for completion by 1998 at the Ras Tanura oil refinery where sulphur recovery capacity is to increase from 80 t/d to 400 t/d.

PRICES

Entering 1995, sulphur price quotations on a free on board (f.o.b.) Vancouver basis were between US\$52 and \$63/t. In the first six months, despite a strong demand, offshore prices declined due to substantial increases in ocean freight rates. By June, prices fluctuated around US\$52-\$58/t. During the summer, prices further decreased as a result of a higher availability of lower-priced sulphur exports that had been emerging from the C.I.S. since the beginning of the year. In the second half, Canadian sulphur export volumes weakened and lower prices prevailed during the fourth quarter. By year-end, f.o.b. Vancouver contract prices ranged between US\$48 and \$52/t. Overall, the net decrease in prices during 1995 was about US\$5-\$7/t. The gap between spot and contract prices fluctuated around US\$2/t during the first and third quarters, leading to consequent downward revisions during July and November; by year-end, the gap was close to US\$2/t, signalling weaker prices for early 1996.

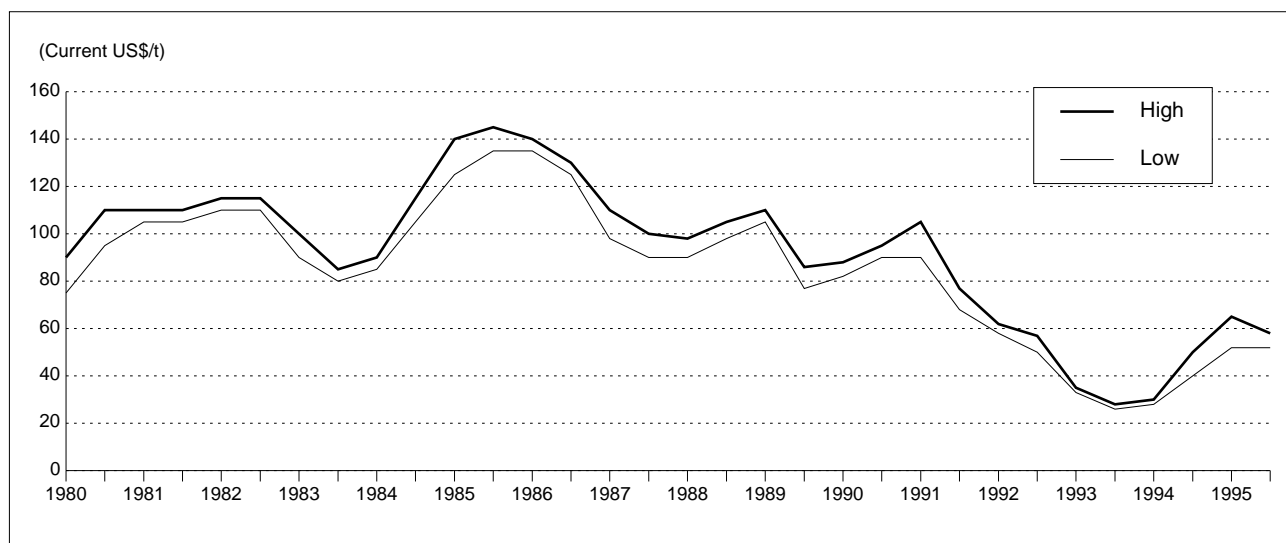
Prices in North American markets were quite strong in 1995. At the beginning of 1995, prices for liquid sulphur (free on rail (f.o.r.) Alberta) varied between US\$8 and \$15/t. Quotations remained unchanged

during the first quarter until new prices reflected the strong demand for sulphur in the United States, especially in North Carolina and Florida, as a consequence of high demand for phosphate fertilizer manufacturing. In April, f.o.r. Alberta prices rose by US\$5/t to reach US\$13-\$20/t, a level that remained unchanged for the balance of the year despite some tightness in supply in the United States and sustained strong demand from phosphate fertilizer producers during the fourth quarter of 1995.

USES

The principal use of about 60% of all sulphur consumed in the world is as a process agent in the manufacture of fertilizers such as superphosphate, ammonium phosphate, and ammonium sulphate. 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 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.

Figure 1
Canada, Offshore Sulphur Price Quotations, 1980-95
f.o.b. Vancouver Contract



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

OUTLOOK

World sulphur demand in 1996 is expected to remain strong, led by a sustained demand in both the fertilizer and industrial sectors. The consumption of phosphate fertilizers is forecast to grow in the United States, where crop acreages are projected to increase by 7-8%. Fertilizer demand in China and India has the potential for continued growth, assuming that ad-hoc subsidies on phosphate products are maintained in India and that favourable policies toward agricultural self-sufficiency are persistent in China. Increased production and trade in finished and semi-finished phosphate fertilizers will translate into additional demand for elemental sulphur, particularly in Morocco, Tunisia, South Africa, Senegal, Russia and Jordan. Sulphur consumption in the fertilizer sector is forecast to increase by 3.5% in 1996, while a 3% growth rate is projected in the industrial sector. World consumption of elemental sulphur is expected to increase by 3.5% to 36.4 Mt.

In 1996, world elemental sulphur production is forecast to continue to grow by 6% to reach 39.6 Mt. Frasch sulphur production is expected to increase marginally to 6.0 Mt with some incremental production coming from Iraq, which has been facing trade sanctions by the United Nations since 1991. Recovered sulphur production will continue to grow as more gas- and oil-related projects are developed worldwide, and it is expected to reach 33.5 Mt in 1996. This additional tonnage will come from both gas processing (+1.2 Mt) and oil refining (+1.0 Mt). Higher sulphur production is anticipated in 1996 from Russia (assuming the commissioning of Astrakhan II), the U.A.E., South Korea and Venezuela. Exports from the C.I.S. are expected to decrease in 1996, while higher levels of shipments are predicted from the U.A.E. and Kuwait. Exports from Iran should be flat, despite large stocks being reported in the remote location of Khangiran. Exports of Venezuelan sulphur could access the Tampa market as more than 0.1 Mt of sulphur will become exportable. Abu Dhabi is planning to produce over 1.0 Mt in 1996 with the completion of a major onshore gas project that would yield 0.7 Mt/y; Abu Dhabi will become the second largest sulphur exporter in the Middle East. Accrued production from the Middle East will likely compensate for a reduction in export capability from the C.I.S. and squeeze Canadian exports in major consuming countries such as India, South Africa and Morocco. Despite the higher demand and related trade projected for 1996, the world elemental sulphur market will remain well balanced with a sustained surplus fluctuating around 3.0 Mt. One third of this surplus is deemed not readily available to the marketplace. However, close to half may have to be stocked in Canada given prevailing market and economic conditions.

In 1996, Canadian sulphur production is projected to be 8.25 Mt. The production of smelter acid is also

anticipated to grow due to a combination of further capture of SO₂ emissions through higher recovery rates, the roasting of new sulphur-rich ores, and higher metal production in Canada over 1995.

For the next eight years, Canadian sulphur production is forecast to continue to increase. Much of this growth is anticipated from the natural gas sector as the result of sustained demand being forecast for Canadian gas in both domestic and U.S. markets. Gas production is projected to increase 16% between 1995 and 2003, reaching close to 176 000 million m³. Gas-derived sulphur production is projected to increase from 7.2 Mt to 9.1 Mt in 2003. Sulphur produced from Alberta gas will fluctuate between 6.4 and 6.8 Mt/y for the rest of the decade. In British Columbia, production is forecast to reach 1.0 Mt in 2000. Sulphur recovery from oil sands is projected to increase marginally with the recent announcement of major investments at both oil sands operations; production is expected to reach 0.8 Mt/y by 2000, while sulphur production from oil refining is projected to increase by 15% to 0.4 Mt/y. Overall Canadian sulphur production is forecast to increase to 8.4 Mt in 1998, to 8.6 Mt in 2000, and to about 10 Mt in 2003. The natural gas sector will contribute 97% of this increase.

Canadian sulphuric acid production from smelters is also forecast to increase gradually between 1995 and 2000 to reach 3.4 Mt H₂SO₄, a 26% net increase (equating to 230 000 t of elemental sulphur). Operating rates at sulphuric acid plants associated with smelters will rise from the mid-70% to mid-80% range. Most major smelters have already signalled future plans to further limit their emissions of sulphur dioxide which, in part, would translate into additional sulphur recovery. Between 1995 and 2000, smelter acid capacity is projected to increase by an overall 6% to reach 3.9 Mt/y H₂SO₄; this additional capacity will come from expansions and debottlenecking at existing smelters. Another potential increment that has not been included in the capacity projection would come from a possible new smelter for treating nickel ore from the Voisey's Bay deposits in Newfoundland.

In the medium term, the International Fertilizer Industry Association based in Paris forecasts that world elemental sulphur production will continue to exceed demand; annual surpluses are projected at an average of 6.6 Mt. These surpluses are expected to occur in North America (mostly Canada), the C.I.S. (Russia), the Middle East (Iraq), and Western Europe (Poland). North America will remain the largest surplus region, accounting for half of the world surplus. Increasing production of recovered sulphur and smelter acid in developed and developing countries will likely displace traditional deliveries of elemental sulphur and might, in the near term, squeeze Frasch sulphur from its current elaborate global trading patterns.

In the foreseeable future, Canadian producers and exporters will be faced with the complexity of maintaining a delicate balance between positive returns and a growing surplus. At today's level of sales, Canadian sulphur production will continue to exceed shipments and will add surplus to rising stocks, which could reach 15 Mt by 2000. On the demand side, world consumption would be expanded if efforts were further invested in research and development

activities to find and promote new uses, and to develop and foster sales in potential markets. On the supply side, new technologies that limit the recovery of non-discretionary sulphur are being investigated.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 70. (2) Information in this review was current as of January 10, 1996.

TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2503.00	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 1996, Revenue Canada; Harmonized Tariff Schedule of the United States, 1996.

TABLE 1. CANADA, SULPHUR SHIPMENTS AND TRADE, 1994 AND 1995

Item No.	1994		1995P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
SHIPMENTS¹					
	Sulphur in smelter gases ²	1 025 561	57 086	1 064 884	75 645
	Elemental sulphur ³	5 791 482	89 197	7 082 665	183 356
	Total sulphur content ²	6 817 043	146 283	8 147 549	259 001
PRODUCTION					
	Sulphur in smelter gases ²	1 048 341	..	1 075 441	..
	Elemental sulphur ³	7 974 838	..	8 079 351	..
	Total sulphur content	9 023 179	..	9 154 792	..
IMPORTS					
2503.10	Sulphur, crude or unrefined				
	United States	370	51	8 992	578
	Total	370	51	8 992	578
2503.90	Sulphur, n.e.s.				
	United States	1 596	444	16 565	3 420
	Germany	—	—	24	8
	Spain	—	—	12	4
	United Kingdom	11	4	—	—
	Netherlands	2	—	—	—
	Total	1 609	449	16 601	3 433
2802.00	Sulphur sublimed or precipitated; colloidal sulphur				
	United States	895	316	920	346
	France	378	283	831	620
	Germany	7	5	6	4
	Total	1 280	605	1 756	972
2807.00	Sulphuric acid; oleum				
	United States	68 130	5 891	70 657	6 315
	Taiwan	76	9	124	16
	United Kingdom	5	..	13	1
	Germany	28	3	11	1
	Canada	—	—	3	..
	Japan	1	..	3	..
	Singapore	1	..	3	..
	Switzerland	7	..	1	..
	Mauritius	9	1	—	—
	Portugal	4	..	—	—
	Total	68 261	5 908	70 816	6 336
2811.23	Sulphur dioxide				
	United States	252	96	1 432	507
	France	—	—	82	29
	United Kingdom	2	1	10	5
	Chile	—	—	3	1
	Germany	—	—	2	1
	Switzerland	9	5	—	—
	Total	262	102	1 528	546

TABLE 1 (cont'd)

Item No.		1994		1995 ^P	
		(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS					
2503.10	Sulphur, crude or unrefined				
	United States	1 113 091	67 522	1 627 508	112 933
	Morocco	855 098	41 351	930 036	66 782
	Brazil	542 416	34 467	795 337	68 996
	South Africa	369 634	19 141	484 109	33 767
	Mexico	117 763	6 811	275 834	18 584
	India	112 201	5 365	229 495	17 803
	New Zealand	189 242	8 748	228 537	16 033
	Israel	220 887	8 469	194 897	11 645
	Indonesia	339 030	16 195	193 458	14 837
	Cuba	18 680	991	129 033	9 557
	Australia	108 982	6 217	120 198	8 754
	Tunisia	297 187	18 417	116 012	8 507
	Philippines	19 267	1 513	108 502	8 984
	South Korea	55 311	4 002	105 355	7 279
	Chile	80 813	4 586	84 951	7 839
	People's Republic of China	246 422	11 812	74 507	6 388
	Senegal	96 911	3 751	64 772	5 128
	Thailand	81 546	4 297	53 933	4 221
	Japan	—	—	43 909	2 977
	Vietnam	17 497	723	39 861	1 791
	Argentina	55 837	3 362	35 322	2 050
	Italy	—	—	17 241	1 468
	Uruguay	—	—	15 550	1 020
	Taiwan	5 889	142	5 426	443
	Total	4 943 704	267 893	5 973 783	437 800
2503.90	Sulphur, n.e.s.				
	United States	39 553	4 059	37 175	3 710
	New Zealand	—	—	5 010	503
	Total	39 553	4 059	42 185	4 216
2802.00	Sulphur, sublimed or precipitated; colloidal sulphur				
	United States	159	46	—	—
	Total	159	46	—	—
2807.00	Sulphuric acid; oleum				
	United States	1 675 009	92 899	1 658 719	92 455
	People's Republic of China	—	—	83	62
	Nicaragua	—	—	19	17
	Bermuda	259	34	3	1
	Grenada	5	2	2	1
	Taiwan	16	39	—	—
	St. Vincent and the Grenadines	3	1	—	—
	Costa Rica	2	2	—	—
	Other countries	12	...	16	...
	Total	1 675 305	92 982	1 658 843	92 540
2811.23	Sulphur dioxide				
	United States	66 243	15 780	71 570	18 612
	Total	66 243	15 780	71 570	18 612

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 liquid SO₂ and H₂SO₄recovered 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, 1983-95

	Shipments ¹			Imports ²	Exports ²
	Pyrites	In Smelter Gases	Elemental Sulphur	Elemental Sulphur	Elemental Sulphur
(tonnes)					
1983	–	678 286	6 631 123	2 365	5 670 275
1984	–	844 276	8 352 978	3 019	7 326 847
1985	–	822 359	8 102 163	3 167	7 848 380
1986	–	758 141	6 953 298	10 763	6 257 054
1987	–	783 115	7 322 791	24 711	6 571 800
1988	–	867 800	8 106 641	21 825	7 384 160
1989	–	831 503	6 868 930	18 311	5 514 059
1990	–	879 149	6 873 495	13 203	6 057 523
1991	–	883 565	6 937 884	9 026	5 845 372
1992	–	914 978	6 393 932	8 645	5 653 506
1993	–	856 236	5 220 304	7 532	4 193 877
1994	–	1 025 561	5 791 482	3 559	4 983 416
1995p	–	1 064 884	7 082 665	27 349	6 015 968

Sources: Natural Resources Canada; Statistics Canada.

– Nil; 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, CRUDE OIL AND OIL SANDS REFINERY SULPHUR CAPACITIES OPERATING IN 1993-95**

Operating Company	Location	Daily Capacity		
		1993	1994	1995
(tonnes)				
CRUDE OIL REFINERIES				
Canadian Ultramar Limited	St. Romuald, Quebec	50	50	50
Chevron Canada Limited	Burnaby, British Columbia	10	10	10
Imperial Oil Limited	Dartmouth, Nova Scotia	76	76	76
	Edmonton, Alberta	40	40	40
	Nanticoke, Ontario	35	35	35
	loco, British Columbia	20	20	–
	Sarnia, Ontario	140	140	140
Irving Oil Limited	Saint John, New Brunswick	100	100	100
North Atlantic Refinery Limited	Come-By-Chance, Newfoundland	–	–	200
Petro-Canada Products Inc.	Edmonton, Alberta	56	56	56
	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	300	300	300
Suncor Inc.	Sarnia, Ontario	50	50	50
Total effective capacity		1 010	1 010	1 190
HEAVY OIL UPGRADERS				
Consumers' Co-operative Refineries Limited	Regina, Saskatchewan	220	220	220
Husky Oil Operations Ltd.	Lloydminster, Saskatchewan	250	250	250
Total effective capacity		470	470	470
OIL SANDS PLANTS				
Suncor Inc.	Mildred Lake, Alberta	850	850	850
Syncrude Canada	Fort McMurray, Alberta	1 255	1 255	1 255
Total effective capacity		2 105	2 105	2 105

Sources: Natural Resources Canada; company interviews, 1995.

– Nil.

TABLE 4. CANADA, NATURAL SOUR GAS PROCESSING PLANTS, SULPHUR CAPACITY, 1993-95

Operating Company	Source Field or Plant Location	H ₂ S in Raw Gas (%)	Daily Sulphur Capacity ¹ (tonnes/day)		
			1993	1994	1995
SOUR GAS, ALBERTA					
Alberta Energy Company Ltd.	Sinclair-Hythe	3	256	256	256
Amoco Canada Petroleum Company Ltd.	Bigstone Creek	15	385	385	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.	East Crossfield-Elkton	34	1 797	1 797	1797
Amoco Canada Petroleum Company Ltd.	Kaybob I/II-Fir	8	1 090	1 090	1090
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	389	389
Canadian Occidental Petroleum Ltd.	East Calgary-Balzac	16	1 696	1 696	1 696
Canadian Occidental Petroleum Ltd.	Mazeppa-Okotoks-Medallion	25	577	577	588
Canadian Occidental Petroleum Ltd.	Paddle River	0.1	19.4	19.4	19.4
Chevron Canada Resources Limited	Kaybob South III-Obed	8	3 557	3 557	3 557
Chevron Canada Resources Limited	Medicine Lodge	7.5	55.9	55.9	55.9
Conwest Exploration Company Ltd.	Valhalla-Sexsmith	10	—	—	475.4
Gulf Canada Limited	Brazeau River-Nordegg	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
Mobil Oil Canada, Ltd.	Harmattan-Elkton-Leduc	52	66.2	66.2	66.2
Mobil Oil Canada, Ltd.	Lone Pine Creek	13.5	162	162	162
Mobil Oil Canada, Ltd.	Wimborne	10.5	182	182	182
Morisson Petroleum Limited	Nevis	4	245.8	245.8	245.8
Morrison Petroleum Limited	Savannah Creek (Coleman)	12	389	389	696.4
Norcen Energy Resources Limited	Progress	0.7	14.5	49.5	49.5
Pembina Corporation	Turner Valley	1.2	15.5	15.5	15.5
Penn West Petroleum Ltd.	Minnehik-Buck Lake	0.1	45	45	45
Pennzoil Petroleum Ltd.	Zama	4	74	74	74
Petro-Canada Inc.	Brazeau River-Peco	21	447.3	447.3	447.3
Petro-Canada Inc.	Gold Creek	2.4	43	43	43
Petro-Canada Inc.	Hanlan Robb	8	1 092	1 092	1 092
Petro-Canada Inc.	Wildcat Hills	7	280.3	280.3	280.3
Poco Petroleum Ltd.	Sturgeon Lake South	9.5	98	98	98
Shell Canada Limited	Burnt Timber Creek	13	489	489	560
Shell Canada Limited	Caroline	25	4 504	4 504	4 504
Shell Canada Limited	Jumping Pound	7.5	597	597	597
Shell Canada Limited	Waterton	15	3 107	3 107	3 107
Suncor Inc.	Rosevear North	8	111.3	111.3	111.3
Suncor Inc.	Rosevear South	6.5	171	171	171
Suncor Inc.	Simonette River	5.5	95	95	115.8
Talisman Energy Inc.	Edson-Pine Creek	1.4	292	292	292
Talisman Energy Inc.	Teepee Creek	0.4	23	23	23
Wolcott Gas Processing Ltd.	W. Pembina-Brazeau	11	520	520	520
SOUR GAS, BRITISH COLUMBIA					
Amerada Hess Corporation	Boundary Lake	—	3.7	3.7	3.7
Amoco Canada Petroleum Company Ltd.	Cypress	—	14.1	14.1	14.1
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	1 085	2 000	2 000

Source: Energy Resources Conservation Board publication, January 1996.

— Nil.

¹ Maximum design capacity.

TABLE 5. CANADA, PRINCIPAL SULPHUR DIOXIDE AND SULPHURIC ACID PRODUCTION CAPACITIES, 1995

Operating Company	Plant Location	Raw Material	Annual Capacity		
			Liquefied SO ₂	Sulphuric Acid ¹	Sulphur Equivalent ²
(000 tonnes)					
EASTERN CANADA					
Brunswick Mining and Smelting Corporation Limited	Belledune, N.B.	SO ₂ lead and zinc conc.		176	57
CE Zinc	Valleyfield, Que.	SO ₂ zinc conc.		430	140
Falconbridge Limited	Kidd Creek, Ont.	SO ₂ zinc conc.		220	72
	Kidd Creek, Ont.	SO ₂ copper conc.	30	470	168
	Sudbury, Ont.	SO ₂ nickel conc.		355	116
Gaspé Copper Mines, Limited	Murdochville, Que.	SO ₂ copper conc.		165	54
Inco Limited	Copper Cliff, Ont.	SO ₂ nickel conc.	100	1 000	377
Noranda Copper Smelting and Refining	Rouyn-Noranda, Que.	SO ₂ copper conc.		450	147
Sulco Chemicals Ltd.	Elmira, Ont.	Elem. sulphur		33	11
Subtotal			130	3 299	1 142
WESTERN CANADA³					
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. ⁴	Trail, B.C.	SO ₂ lead and zinc conc.	80	430	210
Hudson Bay Mining and Smelting Co.	Flin Flon, Man.	SO ₂ zinc conc.		n.a.	35
Sherritt Inc.	Fort Saskatchewan, Alta.	Elem. sulphur		233	76
Sherritt Inc.	Redwater, Alta.	Elem. sulphur		910	297
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, 1995.

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 Cominco operation at Trail also has a 30 000-t/y production capacity for elemental sulphur, which has been added to the total sulphur equivalent production capacity of Cominco.

TABLE 6. CANADA, SULPHURIC ACID PRODUCTION, TRADE AND APPARENT CONSUMPTION, 1984-94

	Production	Imports	Exports	Apparent Consumption
	(tonnes, 100% acid)			
1984	4 043 389	28 330	553 780	3 517 939
1985	3 890 092	17 306	744 732	3 162 666
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

Sources: Natural Resources Canada; Statistics Canada.

TABLE 7. CANADA, SULPHURIC ACID, REPORTED CONSUMPTION BY END USE, 1992-94

	1992	1993 ^a	1994 ^{p,a}
	(tonnes)		
Agricultural chemicals and fertilizers	1 164 240	1 175 250 ^r	1 263 082
Pulp and paper	338 411	395 835 ^r	449 580
Industrial inorganic chemicals	336 211	285 936 ^r	261 009
Uranium mines	122 723	111 830	114 283
Nonferrous smelting and refining	118 712	129 923	110 530
Crude and refined petroleum products	34 812	38 290	60 478
Other mines, metal and nonmetal	25 261	30 722 ^r	40 399
Soap and cleaning compounds	25 542	x ^r	x
Metal rolling and extruding	7 120	5 949 ^r	6 580
Food, brewery and distillery	2 077	3 261 ^r	x
Electrical products	3 529	3 298	x
Leather and textile	20 302	x	x
Plastics and synthetic resins	2 747	x	x
Other end uses	99 943	103 253 ^r	90 010
Total	2 301 630	2 296 552 ^r	2 416 600

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

^p Preliminary; ^r Revised; ^x Confidential.

^a Confidential numbers are included in total.

TABLE 8. WORLD PRODUCTION OF SULPHUR, 1992-94

	1992r		1993r		1994p	
	All Forms ¹	Elemental	All Forms	Elemental	All Forms	Elemental
(000 tonnes)						
WESTERN EUROPE						
Finland	617	46	612	32	636	40
France	1 232	988	1 326	1 073	1 369	1 084
Germany	2 140	1 350	2 206	1 451	2 131	1 400
Italy	630	310	639	350	590	345
Netherlands	401	273	441	318	440	323
Spain	889	159	822	180	798	160
Others	1 205	589	1 073	587	982	537
Total, Western Europe	7 114	3 715	7 119	3 991	6 946	3 889
CENTRAL EUROPE						
Poland	3 149	2 952	2 105	1 901	2 360	2 160
Others	822	130	676	155	703	175
Total, Central Europe	3 971	3 082	2 781	2 056	3 063	2 335
FORMER SOVIET UNION						
	8 114	5 284	6 523	3 941	5 858	3 589
AFRICA						
South Africa	575	167	618	171	572	190
Others	227	3	183	3	193	3
Total, Africa	802	170	801	174	765	193
NORTH AMERICA						
Canada	7 409	6 521	8 474	7 567	8 993	8 048
United States	11 604	9 368	11 779	9 568	12 252	10 101
Total, North America	19 010	15 889	20 253	17 135	21 245	18 149
LATIN AMERICA						
Mexico	1 893	1 593	1 252	912	1 212	860
Others	1 024	376	1 106	428	1 273	468
Total, Latin America	2 917	1 969	2 358	1 340	2 485	1 328
MIDDLE EAST						
Iran	763	763	881	881	935	935
Iraq	375	375	375	375	375	375
Kuwait	—	—	246	246	490	490
Saudi Arabia	1 650	1 650	1 650	1 650	1 680	1 680
Other	412	313	537	430	782	627
Total, Middle East	3 200	3 101	3 689	3 582	4 262	4 107
ASIA						
China	6 544	312	6 323	262	6 479	197
Japan	2 921	1 375	3 114	1 560	3 068	1 667
South Korea	375	124	508	222	523	239
Others	1 012	371	1 083	453	1 210	585
Total, Asia	10 852	2 182	11 028	2 497	11 280	2 688
OCEANIA						
	351	43	379	57	387	73
Total World	56 331	35 435	54 931	34 773	56 291	36 351

Source: The British Sulphur Corporation Limited, 1995.

— Nil; 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.