

Aluminum

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Aluminum markets continued the decline in the first half of the year that had started in the second half of 1995. Demand in aluminum's key market sectors improved somewhat in the second half and further strengthened towards year-end, reflecting the end of a customer destocking period and generally improved economic conditions. Production levels increased throughout the year as companies restarted idled capacity, particularly in Europe and Australia, and as the new Hillside smelter in South Africa, the only major greenfield project in 1996, continued to bring its new capacity on line.

Aluminum settlement prices decreased 17% to average US\$1505/t (US68¢/lb) on the London Metal Exchange (LME) compared to an average of \$1806/t (82¢/lb) in 1995. Primary aluminum stocks on the LME climbed steadily from about 590 000 t at the start of the year, peaking in October at over 970 000 t, and then fell back slightly to just over 950 000 t by the end of the year. In contrast to the LME stocks, the International Primary Aluminium Institute (IPAI) reported that unwrought aluminum inventories held by IPAI members decreased steadily over the year to 1.691 Mt in December 1996 compared to 1.996 Mt in December 1995. Together the aggregated stock figures indicate a slight increase for total stocks in 1996 over 1995.

CANADIAN DEVELOPMENTS

The production of primary aluminum increased by 4.8% to 2.283 Mt in 1996, compared to 2.172 Mt in 1995, ranking Canada third after the United States and Russia in terms of world production. Canadian exports of primary smelter products in 1996 also rose to 1.817 Mt valued at \$4.1 billion, compared with 1.717 Mt valued at \$4.5 billion in 1995. Of this amount, exports to the United States totalled 1.326 Mt valued at \$3.0 billion, compared to 1.276 Mt worth \$3.5 billion in 1995. Canada is the second largest

aluminum-exporting country in the world after Russia.

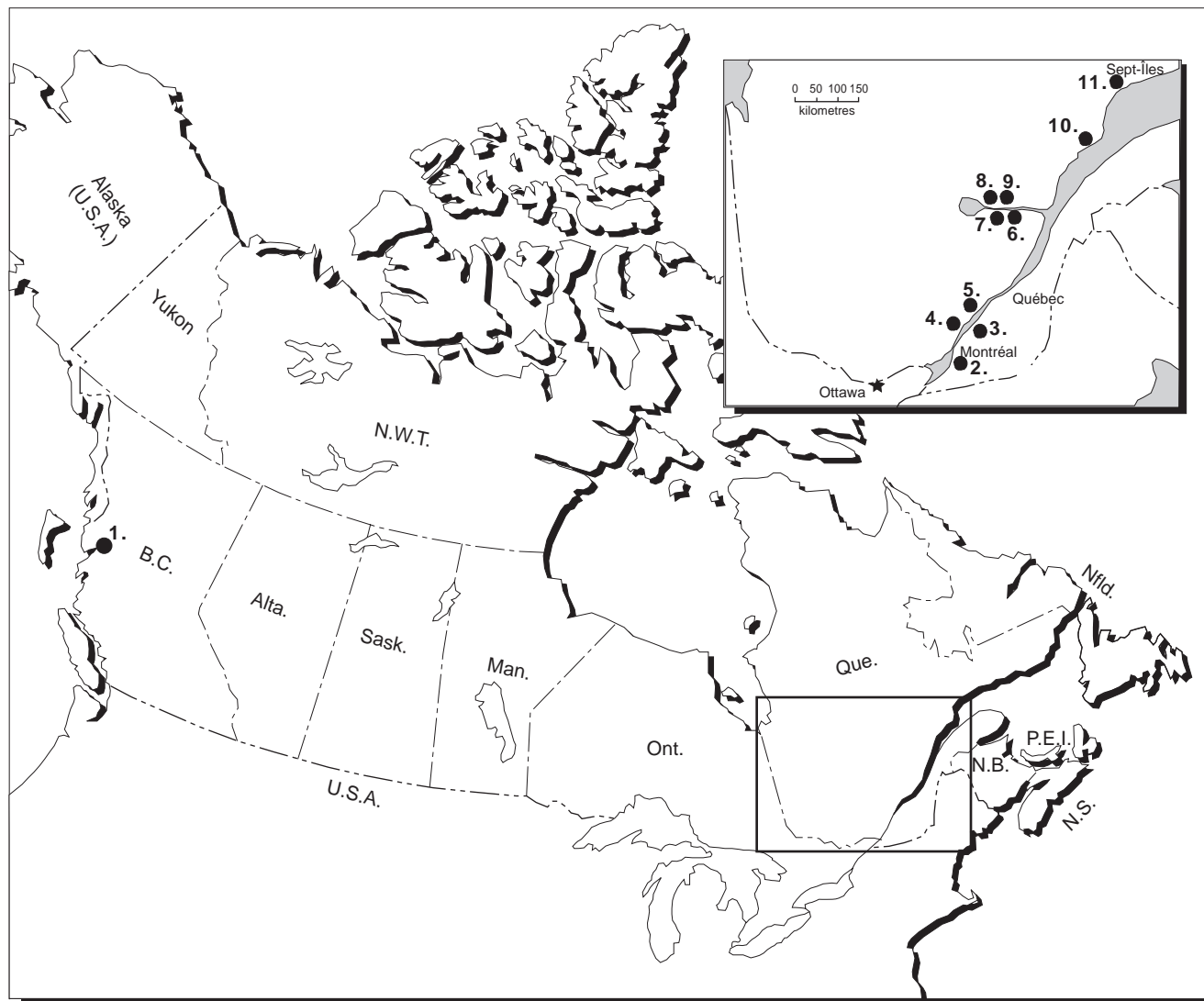
The floods that devastated parts of the Saguenay-Lac-St-Jean region of Quebec in mid-July did not damage any of Alcan's four smelters and hydro-electric network in the area. The floods did, however, severely damage bridges, roads and rail lines owned and operated by Alcan in the region and caused the temporary shut-down of Alcan's alumina production. By year-end, most of Alcan's infrastructure that had been damaged by the floods was back in service.

In July, Alcan and Hydro-Québec signed an agreement in principle on a proposed 22-year power contract. Under the proposed contract, Hydro-Québec will provide the additional power Alcan may need for the modernization and expansion of its aluminum smelters in Quebec while retaining the possibility of benefiting from Alcan's hydro-electric system. The agreement with Hydro-Québec is one of a series of steps in the planning of the Quebec smelter modernization and expansion program. A number of steps, however, remain to be cleared before a decision will be made on whether or not to build a new smelter at Alma, Quebec.

Canadian Reynolds announced in early 1996 that it had shipped a record 414 460 t of primary aluminum from its 400 000-t/y Baie-Comeau smelter in 1995. Exports represented 82% of total shipments, with 70% destined for markets in the United States and 12% to Europe. In December, the Baie-Comeau smelter became the first facility in the world to achieve QS 9000 registration required by the "Big Three" U.S. automobile manufacturers (General Motors, Ford and Chrysler). Along with the QS 9000 registration, the smelter also received ISO 9002 certification. The registration certifies that the smelter's quality systems conform to QS 9000 and ISO 9002 standards. Close to 20% of the Baie-Comeau smelter's annual shipments are automotive-related. The plant supplies aluminum cast sheet and alloy T-ingot to Reynolds' fabricating plants and independent customers in Canada and the United States.

Work continued on a three-year project to increase capacity at the Aluminerie Alouette Inc. smelter at Sept-Îles. The \$36.9 million project involves changing the smelter's potlines from carbon to graphitized cathodes. The change will increase the smelter's

Figure 1
Aluminum Smelters, 1996



SMELTER	COMPANY	CAPACITY (t/y)
1. Kitimat, B.C.	Alcan	272 000
2. Beauharnois, Que.	Alcan	48 000
3. Bécancour, Que.	A.B.I.	360 000
4. Shawinigan, Que.	Alcan	84 000
5. Deschambault, Que.	Lauralco	215 000
6. Grande-Baie, Que.	Alcan	180 000
7. Laterrière, Que.	Alcan	204 000
8. Isle-Maligne, Que.	Alcan	73 000
9. Arvida, Que.	Alcan	232 000
10. Baie-Comeau, Que.	Reynolds	400 000
11. Sept-Îles, Que.	Alouette	215 000

capacity to 229 000 t/y from the current 218 000 t/y by increasing its amperage to 315 000 amps from the current 300 000 amps.

Work was completed this year on a new \$16 million potline refurbishing centre at the 215 000-t/y Aluminerie Lauralco Inc. smelter at Deschambault, Quebec. The centre created 15 new permanent jobs and will maintain and refurbish the smelter's 264 pots.

Aluminerie de Bécancour Inc. (ABI) operated at full capacity in 1996. The smelter, located at Bécancour, Quebec, has an operating capacity of 360 000 t/y. ABI is owned by three companies: Reynolds Metals Company Limited (50%), Alumax Inc. (24.95%) and Pechiney Corporation (25.05%).

Solv-ex continued work on bench-scale tests of a new process that will reportedly produce aluminum from metallurgical-grade alumina as a by-product from the company's tar sands oil production in Alberta. The process reportedly operates at a lower temperature than conventional cells, uses non-consumable anodes and cathodes, and could significantly lower operating costs by reducing power consumption and capital expenditures.

WORLD DEVELOPMENTS

World production of primary and secondary aluminum reached an estimated 27.6 Mt in 1996, of which 20.8 Mt was primary material. Western World smelter production was reportedly higher in Europe, Africa, and North and South America, while it declined slightly in Asia. Total Western World smelter production reached an estimated 15.5 Mt in 1996, up from 14.7 Mt in 1995. Amongst IPAI members, the primary aluminum daily production rate increased from an average of 50 100 t in January to 51 900 t in December. The average rate for all of 1996 was 50 800 t/d compared with 47 500 t/d in 1995.

United States

The United States, which is the world's largest producer of primary and secondary aluminum, produced a total of 3.577 Mt of primary aluminum in 1996, up from 3.375 Mt in 1995. In addition to primary production, secondary aluminum production totalled 3.200 Mt in 1996, representing roughly 47% of the total secondary aluminum produced worldwide.

Northwest Aluminum Co. completed an agreement to acquire a 60% equity interest in the Columbia Aluminum Corp. Northwest Aluminum, which owns and operates the 82 000-t/y Dalles smelter, will now own and operate the 168 000-t/y Goldendale smelter as well as an alumina unloading facility in Portland, Oregon.

In January, Glencore Primary Aluminium Co. LLC, a subsidiary of Glencore International AG, purchased from Alumax Inc. an additional 23% equity share in the 182 000-t/y Mt. Holly primary aluminum smelter in Goose Creek, South Carolina. Alumax retains a 50.33% interest in the smelter and continues to act as the plant's operator.

In July, Reynolds Metals Company began to temporarily close down 250 000 t of alumina production capacity at its 1.6-Mt/y Sherwin, Texas, plant because of poor market conditions. Elsewhere in the United States, Reynolds announced that work continued on a US\$150 million-\$200 million environmental improvement and modernization program for its primary aluminum smelter at Massena, New York. The program includes the replacement of the smelter's carbon anodes combined with a specially designed emission control system. A waste-water treatment facility is also part of the program.

Intalco Aluminum Corporation of Ferndale, Washington, entered into a five-year power agreement with Powerex, the export division of B.C. Hydro. The agreement will allow Intalco to purchase power to supply its 272 000-t/y Ferndale aluminum smelter.

Jamaica

Low world prices for aluminum forced two of Jamaica's four bauxite mining firms to lay off a total of 350 workers. Alcan Jamaica, a subsidiary of Alcan Aluminium Limited, laid off 270 workers at its Kirkvine and Ewarton plants and at its Port Esquivel facility. Alumina Partners (Alpart), a joint venture between the Jamaican government, Kaiser Aluminum and Chemicals, and Norsk Hydro AS, was also expected to lay off 80 workers, mostly clerical and administrative workers. Low world prices for aluminum were cited as a major factor behind the cuts. For the first nine months of 1996, total crude bauxite shipments rose 9.8% from 2.69 Mt to 2.96 Mt. Total alumina shipments climbed 8.9% from 2.25 Mt to 2.45 Mt. However, gross earnings for the first six months of the year declined 4.3% from US\$353.4 million in 1995 to \$338.1 million in 1996. This trend was expected to continue.

South America

In August, Noranda Inc. and Comalco Inc. announced an agreement under which Comalco could earn up to a 50% equity share in Noranda's Alumysa project in southern Chile. The project involves the construction of a 270 000-t/y aluminum smelter and hydro-electric project. By December, however, Comalco announced that it was withdrawing from its option to buy into the project. Comalco announced that its withdrawal from the project was not a reflection of the project's potential, but rather it represented a change in the company's focus on completing a major expansion at

the company's Boyne Island smelter in Queensland, Australia, and an upgrade at its Tiwai Point aluminum smelter in New Zealand. Noranda remains committed to the project and is seeking a new partner. Noranda will also continue trying to purchase additional water rights that will allow an expansion of the project's capacity to 420 000 t/y.

In August, Argentine aluminum producer Aluminio Argentino SAIC (Aluar) announced that it had reached a preliminary agreement with Alcan Aluminium Limited to buy its 50% equity interest in the C y K joint-venture project. The purchase will increase Aluar's share in the project to 100%. The C y K project manufactures laminated aluminum products with sales totalling US\$120 million annually.

In a separate announcement in December, Aluar announced that it will begin a US\$300 million expansion of its Puerto Madryn smelter. The expansion will increase the company's annual output by 72 000 t to 258 000 t/y. The additional output will be powered by a 120-MW combined-cycle thermoelectric generator to be acquired by Aluar. Technology for the expansion will be provided by Pechiney of France. The extra output from the smelter will target export sales and is expected to be completed by July 1999.

Hydro Aluminium AS, a subsidiary of Norway's Norsk Hydro AS, announced that it is investigating the possibility of building a 200 000-t/y smelter in Trinidad and Tobago. The proposed smelter complex would include a 400-MW gas-fired power station. A decision on whether or not to go ahead with the project is not expected before late 1998.

Europe

Alcan Smelting & Power UK, part of British Alcan Aluminium Plc, announced that it will invest £50 million over two years to upgrade and refurbish Potline One at its 130 000-t/y Lynemouth aluminum smelter. The project will also include the elimination of pitch fume emissions, refurbishment of the ring furnace, installation of a cleaning and recycling plant for anodes, and the upgrading of the scrubber units in the second potline. The investment program is the largest since the smelter opened in 1972 and will restore the plant to full capacity once market conditions allow. Potline One has been closed since 1991.

In a separate move to further divest itself of non-strategic investments, Alcan Aluminium Ltd. announced the sale of its British downstream business that resulted in the formation of a new company called British Aluminium Ltd., which is owned by a group of institutional investors and management. The new private company, which includes Luxfer Gas Cylinders, MEL Chemicals, and Magnesium Elektron, is based in Manchester.

Slovalko a.s. completed the transition to full production at its new 108 000-t/y smelter that is based on a design by Norway's Hydro Aluminium. The new pre-bake smelter replaces the older 70 000-t/y Söderberg smelter.

In January, the Dutch steel and aluminum group Hoogovens NV announced that it had completely reactivated its 42 000 t of annual aluminum capacity that had been closed over the last two years as a result of poor market conditions. Hoogovens announced in February that it had secured a new electricity supply contract that would keep its 97 000-t/y Delfzijl aluminum smelter in the Netherlands open until at least the end of 2005.

The Aluminum Company of America (Alcoa) concluded its purchase of Italy's state-owned aluminum company, Alumix Spa, for US\$280 million. With the purchase of Alumix, Alcoa has acquired two primary aluminum smelters (the 130 000-t/y Porto Vesme smelter and the 36 000-t/y Fusina 1 smelter), a 140 000-t/y rolling mill, four extrusion plants, an extrusion die shop, a 6% share in the bauxite mining consortium Halco Mining, metal distribution centres across Italy, and sales and administrative offices in Europe.

Hydro Aluminium AS, a subsidiary of Norsk Hydro AS, announced a US\$87 million expansion project at its 220 000-t/y smelter in Karmoy, Norway. The project will add 66 new pots and increase the smelter's capacity by 35 000 t/y. The company also announced plans to upgrade the casthouse at its 185 000-t/y Ardal smelter.

In November, Iceland's energy marketing body announced that it expected to finalize a contract for a new aluminum smelter with the U.S.-based Columbia Ventures Corporation by year-end. If approved, construction could start in 1997, with initial production capacity of 60 000 t/y scheduled to begin in May 1998. Elsewhere in Iceland, work continued on a two-year US\$200 million expansion project to increase capacity from the current 100 000 t/y to 160 000 t/y at the Straumsvik smelter. The smelter is currently the only one operating in Iceland; it is owned and operated by Swiss-based Alusuisse-Lonza Holdings AG.

Russian Federation

Russian production of primary aluminum in 1996 was 2.87 Mt, according to figures released by Russia's aluminum producers group Kontsern Aluminii. The Group also expects that Russian aluminum production for 1997 will increase by 1.5-2.0% over 1996's level. Total primary aluminum output in the Commonwealth of Independent States was reported to be 3.16 Mt in 1996, including 198 300 t in Tajikistan and 89 900 t in Ukraine. Preliminary export figures released in December put Russia's 1996 primary aluminum exports at 2.37 Mt, up from 2.11 Mt in 1995.

Two Russian aluminum smelters announced plans to form a key alliance in April. The Siberian Irkutsk aluminum smelter and the Urals aluminum plant agreed to form a strategic alliance called the Sibir-Urals Aluminium Company. The Irkutsk smelter is reportedly operating at slightly above its average annual production capacity of about 250 000 t of primary aluminum. The Urals plant's average capacity is 67 000 t/y of primary aluminum and it has an annual alumina output of 650 000 t.

In a similar move to vertically integrate some of Russia's aluminum industry, a new group called Siberian Aluminium was formed in July. The group includes two Russian smelters, the 850 000-t/y Bratsk and 323 000-t/y Sayansk smelters, the 1-Mt/y Pavlodar alumina refinery in Kazakstan, Trans-World Aluminium Corporation, and the Russian commercial bank Zalogbank. The group will reportedly seek to modernize its facilities and increase capacity, and work towards developing packaging markets in Russia and reducing dependence on export markets.

Russia's Volkhov aluminum complex announced plans to double its primary aluminum production in 1997 to about 20 000 t. The smelter operators plan to use idled capacity in order to increase production. B & D Industrial Group B.V. of Antwerp, which has a 57.6% equity share in the smelter, is upgrading and replacing some of the smelter's old potlines. Both B & D Industrial and Vysokoskorostnye Magistraly (VSM), a Russian concern with a stake in the Volkhov plant, have proposed to take a 25-year lease on the Volkhov power plant to try to bring down electricity costs. The refinery and smelter hope to produce, in addition to aluminum, at least 36 000 t/y of alumina.

Middle East

A US\$130 million expansion project at the 460 000-t/y Aluminium Bahrain BSC (Alba) smelter came on stream January 1. Seventy-six new cells were added to the third potline, increasing the smelter's capacity by 25 000 t/y. Its total capacity will increase by 36 500 t/y when part of the overall expansion to upgrade the smelter's power plant is completed in May 1997. Alba awarded ABB Kraftwerke, part of Asea Brown Boveri AG, a US\$58.5 million contract in 1995 to install a 146-MW gas turbine and associated equipment as part of the smelter expansion project. Alba is 77% owned by the Bahraini government and 20% of the company is held by Saudi Arabia's Public Investment Fund. The German group Breton Investments holds the balance.

In June, Alba announced plans to build a new US\$18.3 million shipping terminal. The project follows Alba's decision to switch from solid pitch to the liquid form because of environmental benefits during transportation, storage and handling. Alba has also invested US\$250 million in advanced fume treatment systems to minimize the environmental impact of its

operations. Work on the new terminal, which will be built alongside existing facilities that handle alumina and petroleum coke, is scheduled to be completed by the end of 1997.

Dubai Aluminium Co. Ltd. (Dubal) started the first two production cells of a 240-cell potline expansion project ahead of schedule and below budget in September. Dubal's US\$500 million expansion program will expand the smelter's capacity by over 50% to 375 000 t/y. The new potline is expected to be completely on line by March 1997.

Kuwait approved a plan by a U.S. company, Raytheon Co., to build a 230 000-t/y aluminum smelter valued at US\$1 billion in a joint venture with local and foreign partners. If approved, this would be the first aluminum smelter built in Kuwait.

Two smelter projects under way in Iran are now expected to come on stream in early 1997. Work continued in 1996 on construction of the greenfield project to build the 110 000-t/y Bandar Abbas smelter. A second project to refurbish and install the Söderberg potline acquired from Slovalco at the 33 000-t/y Qeshm Island smelter was experiencing delays, but is expected to be completed sometime in mid-1997.

Asia

Alcan Aluminium Ltd. and Nippon Light Metal Co. (NLM) formed a holding company and a management company for their joint ventures in Southeast Asia and China in December. The move followed an announcement in July that the two companies would restructure their holdings in Japan and Asia, and that Alcan would acquire a 60% share in Asian subsidiaries that several years earlier had been transferred to NLM's ownership. Alcan holds a 47.4% share in NLM, one of Japan's leading aluminum producers and fabricators. Alcan Nikkei Asia Holdings Ltd. (ANAH) was established by Alcan and NLM as a regional holding company for joint ventures in Malaysia, Thailand and China. A second company, Alcan Nikkei Asia Co. (ANAC), was created as a regional management company to provide overall direction for ANAH's companies. In addition, NLM will purchase Alcan's 48.8% share in Toyo Aluminium, thereby consolidating all of Alcan's Japanese investments.

Hindalco Ltd., India's largest private aluminum company, announced plans to increase capacity at its 170 000-t/y Renukoot smelter to 210 000 t/y in 1997, with a further capacity increase of 32 000 t/y at a later date. The company was also reportedly studying proposals to build a 250 000-t/y greenfield smelter.

China's 100 000-t/y Pingguo smelter reached full production capacity in 1996. The smelter was first commissioned in 1994 and reached full production with the final commissioning of four potlines with a total

of 246 pots. A planned second phase expansion project is expected to eventually bring the smelter's capacity to 300 000 t/y.

The metal trading company Trans-World Group announced that it had signed an agreement to launch two major aluminum investments in Kazakhstan totalling between US\$1.2 billion and \$1.5 billion. One project will be for a 250 000-t/y aluminum smelter that could be expanded to 400 000 t/y, while the other will increase alumina production capacity at the existing Pavlodar plant to 2 Mt/y from the current 1.1 Mt/y.

Turkish primary aluminum producer Etibank General Management announced its intention to revive a plan that will increase the smelter's capacity. The Seydisehir smelter plan, postponed in 1992 because of financial difficulties, plans to increase the production capacity of the smelter to 100 000 t/y from the current 60 000 t/y at a cost of about US\$255 million. The project, once approved, is expected to be completed within 2.5 years. The project also plans to convert the smelter's existing 248 pots from Söderberg technology to a prebake system.

Vietnam approved a prefeasibility study for the construction of an aluminum project with an annual output of 150 000-200 000 t/y of alumina and 75 000 t/y of primary aluminum. The plant, to be located in the south-central province of Lam Dong, would use bauxite from a local mine that has reserves of 300 Mt. Domestic capital will be used to finance the US\$400 million project. No target date for completion of the project was announced.

Africa

Nigeria's US\$1.5 billion Ikot Abasi smelter project is now expected to begin production in the first quarter of 1997. The smelter will have a capacity of 180 000 t/y and is 70% owned by the Nigerian government; the remaining 30% is shared between the main contractor, Ferrostaal Ag of Germany, and Reynolds International of the United States. A subsidiary firm, EBE and Reynolds, was formed by the two technical partners to manage the project for 10 years after production begins. In July, a gas pipeline to supply the new smelter was completed by the Nigerian Gas Company, a subsidiary of the Nigerian National Petroleum Corporation. Up to 33.6 billion cubic feet of natural gas per year, which would otherwise be flared off, will be supplied from Royal Dutch-Shell's Nigeria gas fields.

Egypt's only aluminum producer, The Aluminium Company of Egypt (Egyptalum), announced plans to complete a 92-pot expansion at its 180 000-t/y smelter in 1997. The new pots will use prebake technology and will add 55 000 t/y of capacity. Other plans are also in the works to eventually convert the smelter's existing Söderberg pots to prebake technology and raise the smelter's capacity to 300 000 t/y.

Gencor Ltd. announced plans to study the possibility of building a 245 000-t/y smelter at Maputo in Mozambique. Gencor's Alusaf subsidiary already runs two smelters at Richard's Bay in South Africa. Electricity for the smelter would come from the Cahora Bassa hydro-electric project, but a final decision on whether or not to go ahead with the project would depend on power rates.

The South African aluminum producer Alusaf Ltd. finalized the one-year commissioning of its new Hillside smelter in June. The capacity of the new smelter at Richard's Bay is 466 000 t/y. Alusaf, which is owned 44.43% by Gencor Ltd., announced that the start-up of the last of the 576 cells was completed more than four months ahead of schedule.

Australia

Expansion work at the Boyne Island smelter in Australia is reportedly running several months ahead of schedule. The addition of a third potline will raise the smelter's capacity by 217 000 t/y to 480 000 t/y by June 1997.

In addition to expansion projects, a number of Australian smelters announced restarts of capacity that had been idled due to the poor market conditions that persisted in 1994. Comalco Ltd. announced that its 140 000-t/y Bell Bay aluminum smelter in Tasmania reached full capacity in August after operating at about 28 000 t below capacity since February 1994. Similarly, Capral Aluminium Ltd. also returned to full production at its 150 000-t/y Kurri Kurri smelter in New South Wales by restarting the 15 000 t it had previously shut down. All four partners in the Tomago aluminum smelter in New South Wales also restarted capacity at the 380 000-t/y smelter.

Alcan Aluminium Ltd. commissioned its Australian subsidiary, Alcan South Pacific Pty Ltd., to carry out a detailed feasibility study and prepare an environmental impact statement on the development of its Cape York Peninsula bauxite reserves in Northern Queensland. The Cape York studies should be completed by early 1997 and, if viable, Alcan would start construction later that year. Mining could start in late 1999. The site contains about 175 Mt of proven bauxite reserves. The Cape York ore would be primarily dedicated to Alcan's alumina production requirements at its nearby 21.4%-owned Queensland Alumina Ltd. refinery in Australia and at its wholly owned Aughinish Alumina Ltd. refinery in Ireland.

Hunter Douglas Holdings Ltd. sold its 3% share in the 380 000-t/y Tomago aluminum smelter to the other four partners in the joint-venture operation. The new partnership includes Gove Aluminium Finance Ltd. (36.05%), Pechiney (36.05%), VAW (12.4%), and Toa Pty Ltd. (15.5%).

RECYCLING

Secondary aluminum production continues to increase worldwide. Western World production of secondary aluminum reached 6.69 Mt in 1995, compared to 6.44 Mt in 1994. Production in the first six months of 1996 was about 3.34 Mt, and was expected to reach over 6.9 Mt by year-end. The increase in secondary production can be attributed to continuing improvements in scrap collection systems and increased recycling rates.

Recycling aluminum requires less than 5% of the energy used to make the original metal. As a result, energy represents only 2% of a secondary aluminum smelter's operating cost, compared to about 26% for a primary smelter. The automotive industry is the largest consumer of secondary aluminum, consuming some 80% of secondary production either through direct sales or to casters supplying the automotive industry. As requirements for lighter vehicles increase, it is likely that demand for secondary aluminum will increase significantly.

In 1995, the largest secondary producers were the United States at 3.15 Mt, Japan at 1.18 Mt, and Germany at 0.44 Mt. Canada produced about 95 000 t of secondary aluminum in 1995 and is expected to produce about the same amount in 1996. Consumption of aluminum metal (excluding the direct use of scrap) for the production of secondary aluminum in Canada increased to 146 987 t in 1995 from 145 661 t in 1994.

In Canada, about 1.5 billion scrap aluminum cans are recovered and exported annually to the United States to be recycled, for a recycling rate of about 80%. There are no facilities in Canada to recycle aluminum beverage cans. Cans are collected and then shipped to the United States for recycling into can sheet.

The most important sources of aluminum scrap in the United States are from the packaging (principally used beverage containers) and transportation sectors. The U.S. recycling rate of aluminum cans decreased in 1995 to 62.2% of can shipments, down slightly from 65.4% in 1994. Some 915 000 t of used beverage can scrap were generated from the 62.6 billion cans recycled in 1995.

European aluminum producers hope to raise the recycling rate in Europe to at least 50% by the year 2000 from the current overall rate of 35%. While recycling rates are high in countries like Sweden (90%), much work remains to be done in other countries where recycling rates are considerably lower, such as in Italy (28%) and the United Kingdom (24%). In Japan, recycling rates hit a record high of 65.7% in 1995.

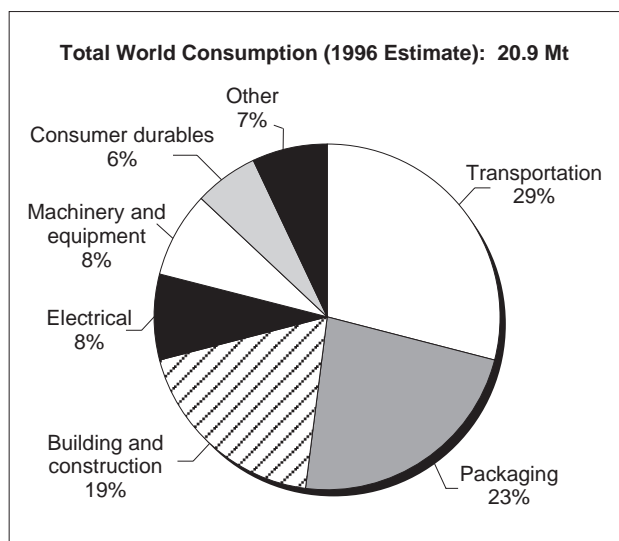
CONSUMPTION AND USES

Total world consumption of primary aluminum is expected to be an estimated 20.9 Mt in 1996, about 1.5% higher than the 20.3 Mt recorded in 1995. Western World demand is expected to increase by about 1% to 17.7 Mt in 1996. Total reported Canadian consumption of aluminum metal at the first processing stage, including secondary aluminum, was 673 481 t in 1995, up from 667 384 t in 1994.

Aluminum is the most abundant metal in the earth's crust. Unlike most of the other major metals, aluminum does not occur in its native state, but mainly as an oxide. When combined with water and other impurities, it produces the main ore of aluminum known as bauxite. Pure aluminum is a silver-white, malleable, ductile metal with one third the density of steel. Aluminum's dull lustre results from a thin coating of oxygen that forms when it is exposed to air. It is this characteristic that accounts for aluminum's resistance to corrosion. Aluminum is an excellent conductor of electricity. Gram for gram, aluminum has twice the electrical conductance of copper. It is also an efficient conductor of heat and a good reflector of light and radiant heat.

Combining aluminum with other metals to produce alloys enhances its characteristics and increases its versatility. The most common metals used in combination with aluminum are copper, magnesium, manganese, silicon and zinc. Aluminum's tensile strength, hardness, corrosion resistance, and heat-treatment properties improve when alloyed with one

Figure 2
Aluminum Markets, 1996



Source: Natural Resources Canada.

or more of these metals. Some copper-aluminum alloys, for example, can exceed the tensile strength of mild steel by as much as 50%.

In both its pure and alloyed forms, aluminum is used to make a variety of products for the consumer and capital goods markets. The largest markets for aluminum are transportation (29%), packaging (23%), building and construction (19%), electrical (8%), machinery and equipment (8%), and consumer goods (6%). Geographically, North America is the largest consuming region accounting for 33% of total Western World consumption, followed by Europe at 30% and Asia at 27%.

HEALTH, SAFETY AND THE ENVIRONMENT

Aluminum is a naturally occurring element that is found ubiquitously in the environment as silicates, oxides and hydroxides in combination with other elements such as sodium and fluorine, and as complexes with organic matter. It is redistributed throughout the environment by both natural processes and anthropogenic (human) activities. Igneous rocks can contain anywhere between 0.1% and 21% aluminum oxide (Al_2O_3). Aluminum silicates (clay minerals) are a major component of soils.

Natural processes far outweigh the direct anthropogenic redistribution of aluminum in the environment. The mobility and subsequent transportation of aluminum is dependent on a number of factors, including chemical speciation, hydrological pathways, soil-water interaction, and the composition of the underlying bedrock. Mobilization of aluminum in the environment by humans is usually the result of indirect activities and can occur as the result of emissions of acidifying agents. In general, a lowering of pH results in the increased mobility of some forms of aluminum.

PRICES AND STOCKS

Settlement prices on the LME for primary aluminum averaged US\$1505/t (US68¢/lb) in 1996, a decrease of 17% compared to \$1806/t (82¢/lb) in 1995. The LME settlement price for aluminum began the year at just over US\$1670/t but fell back quickly to trade in the \$1550-\$1650/t range until mid-May, when the price fell again to the \$1400/t range until September. Prices continued to slide and reached their lowest point for the year at \$1170/t in October, reversing the trend to finish the year at just over \$1500/t. The declines were attributed to poor consumer demand coupled with fund-selling activity. Price increases in the third quarter reflected the end of a customer destocking period and generally improved economic conditions.

The International Primary Aluminium Institute reported that Western World primary aluminum inventories had decreased to 1.691 Mt at the end of December 1996, compared to 1.996 Mt in December 1995. Total stocks, including all forms of aluminum scrap, primary and secondary ingot, and metal in process, totalled 3.138 Mt at the end of 1996, compared with 3.567 Mt at the end of 1995. Primary stocks on the LME followed a steady climb from about 590 000 t at the start of the year, peaking in October at over 970 000 t, and then fell back slightly to end the year at just over 950 000 t.

Prices on the LME for aluminum alloy also traded weaker in 1996. Aluminum alloy started trading at US\$1465/t (US66.5¢/lb), falling back to a low of \$1170/t in October, but then followed the primary aluminum trend, recovering some of the losses to end the year stronger at \$1385/t (62.8¢/lb) as alloy stocks on the LME decreased. For 1996, alloy prices averaged \$1302.8/t (59.1¢/lb), compared to an average of \$1656.0/t (75.1¢/lb) in 1995. LME aluminum alloy stocks started the year at 62 860 t and peaked in August at 86 380 t before falling back to end the year at 74 440 t.

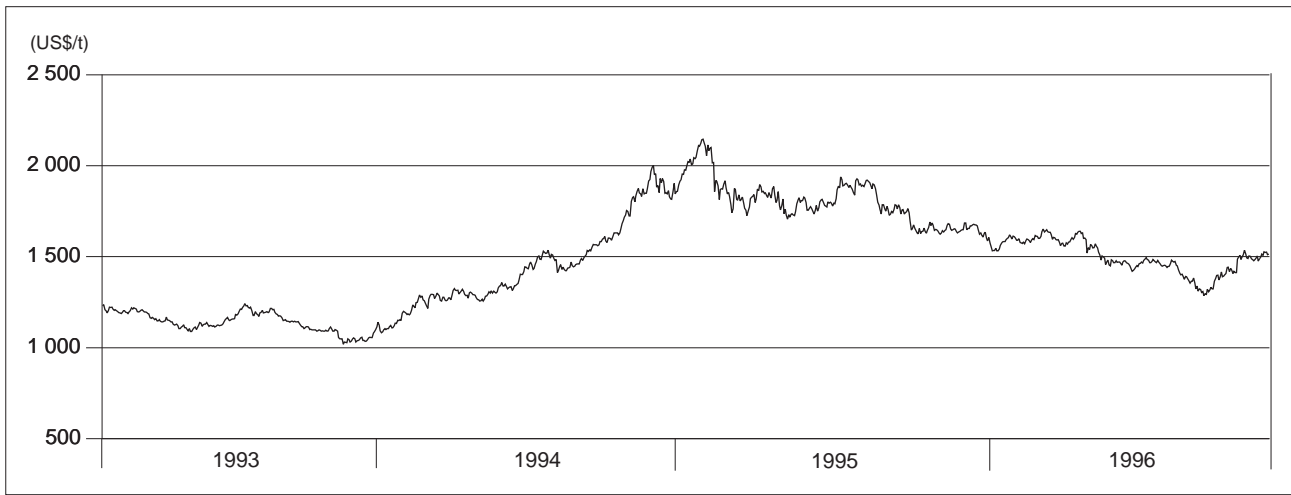
Spot prices for metallurgical-grade alumina continued a downward trend for most of the year with a gradual recovery beginning at year-end. Spot prices stabilized in the US\$150-\$160/t (f.o.b.) range in October, down from the \$240/t average seen at the end of 1995. By year-end, spot prices had firmed somewhat to the US\$155-\$165/t range. Announcements that a number of alumina refineries were cutting prices, together with stronger demand in the West and from China, will lead to a tighter market in 1997. Prices are expected to remain in the US\$170-\$180/t range in 1997.

OUTLOOK

Canada is forecast to produce about 2.280 Mt of aluminum in 1997. Canada's aluminum production capacity increased substantially during the latter half of the 1980s, but is forecast to increase at a slower rate to the year 2005 with gains expected mainly from improved efficiencies at existing facilities. In the longer term, Alcan plans to build new smelters in Quebec to replace older Söderberg smelters, which will result in a slight increase in total capacity.

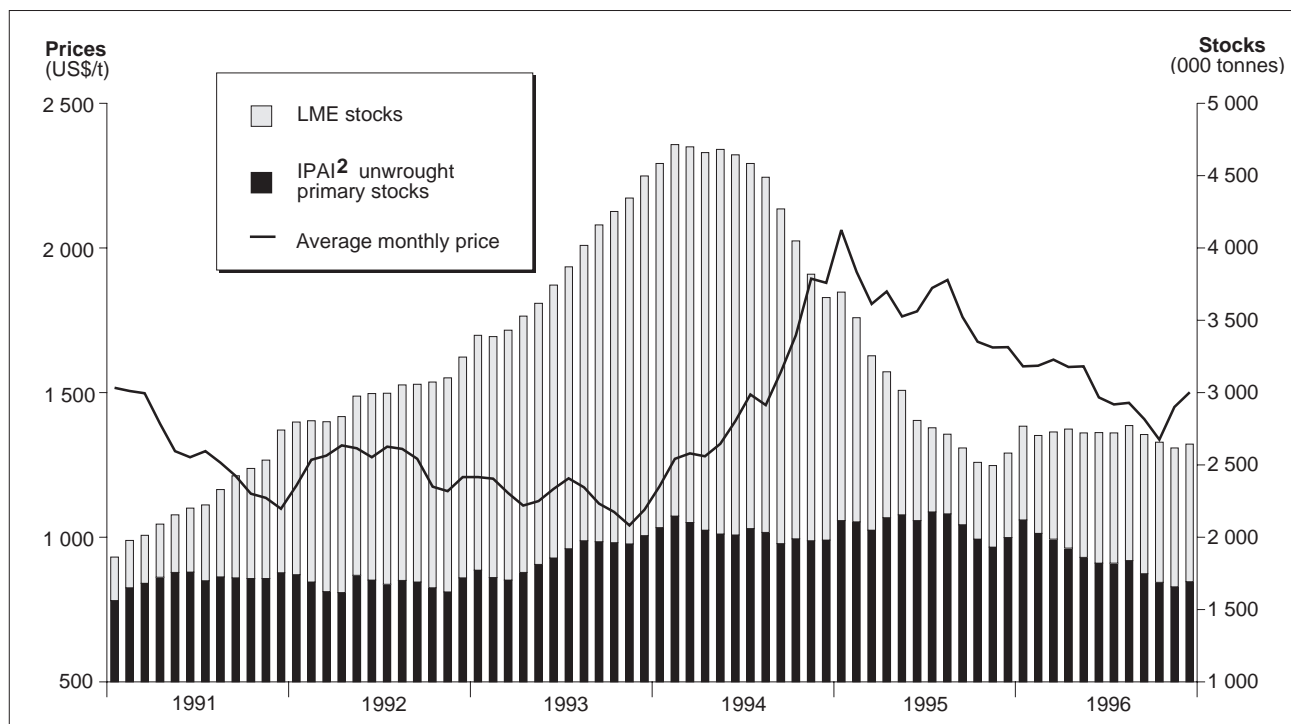
World production is expected to increase to 20.9 Mt in 1996 from 19.7 Mt in 1995. Western World production will increase to 15.5 Mt, up from 14.6 Mt in 1995. Aluminum production is expected to reach 3.6 Mt in the United States, 3.2 Mt in Western Europe, and 2.7 Mt in Russia in 1996. Expected increases in Western World capacity in 1997 will come from expansions in Australia and new smelters in Nigeria and Iran.

Figure 3
London Metal Exchange Aluminum Prices, 1993-96
 Daily Official Settlement Prices



Source: Natural Resources Canada.

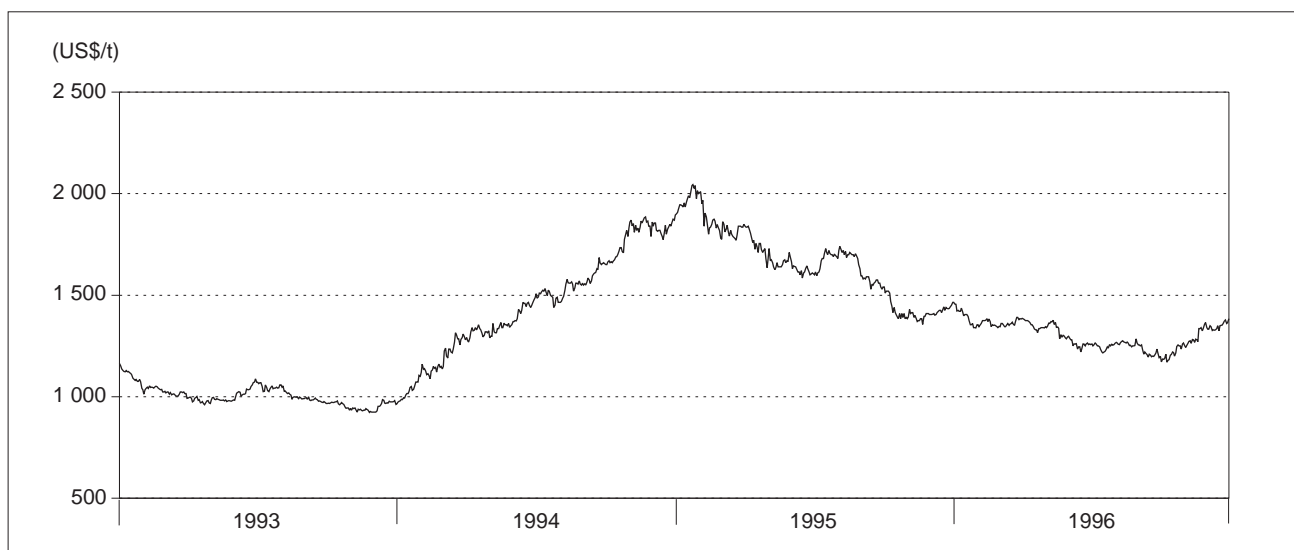
Figure 4
Aluminum Prices and Stocks, 1991-96
 LME¹ Settlement Prices and Primary Stocks



Source: Natural Resources Canada.

¹London Metal Exchange. ²International Primary Aluminium Institute.

Figure 5
London Metal Exchange Aluminum Alloy Prices, 1993-96
 Daily Settlement Prices



Source: Natural Resources Canada.

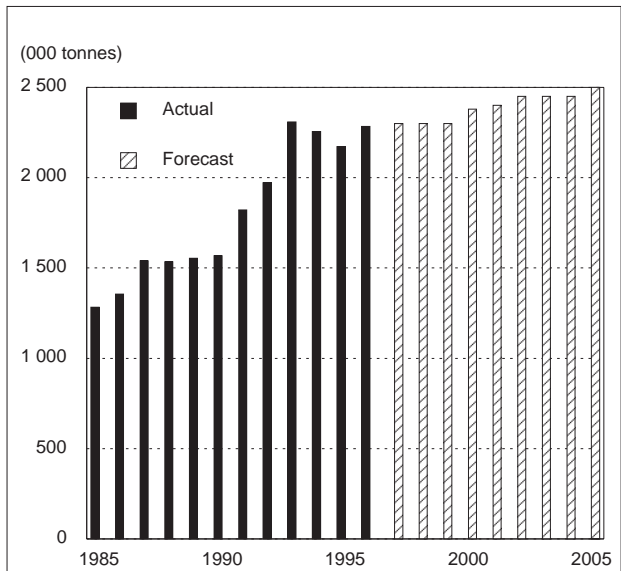
Total world consumption of primary aluminum is expected to be an estimated 20.5 Mt in 1996, about 1.5% higher than the 20.2 Mt recorded in 1995. Western World demand is expected to increase by about 1% to 17.7 Mt in 1996. In 1997, demand for primary aluminum is expected to be 2.0% higher in the United States, 1.5% higher in Europe and 3.0% higher in Japan. Total world demand for aluminum is expected to increase by about 3% to 21.2 Mt in 1997. Strong annual growth of about 3% is forecast for the remainder of the decade. The transportation and packaging (in particular, beverage can) markets are expected to lead the increase in demand for aluminum to the year 2005. Canadian consumption in 1997 is expected to remain strong at about 595 000 t/y.

Cash settlement LME prices started the year high at US\$1670/t (US76¢/lb) and continued to fall throughout the year to an average of \$1522/t (69¢/lb) by the end of October. Shipments were strong worldwide in the first six months of the year, partially in response to a build-up of stocks after several years of low consumer inventories. The slow recovery of aluminum markets in the first two quarters of 1996 and weak demand helped push stocks on the LME up from 647 000 t in January to 960 000 t by October. Slower-than-expected shipments in the third quarter and the increase in the volume of stocks entering the LME kept prices in the US\$1400/t range for the remainder of the year for a yearly average of

US\$1505/t. Prices are forecast to average between US\$1500 and \$1600/t in 1997. In the longer term, prices are expected to average between US\$1650 and \$1850/t (75¢ and 85¢/lb) in constant 1995 dollars.

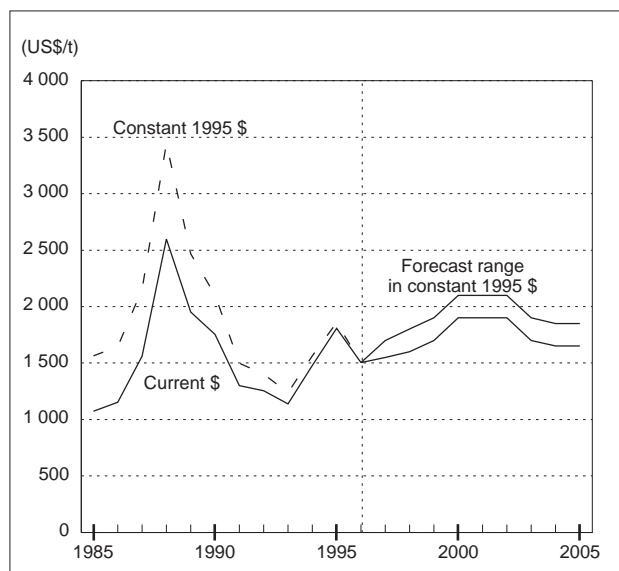
Note: Information in this review was current as of January 31, 1997.

Figure 6
Canadian Primary Aluminum Production, 1985-2005



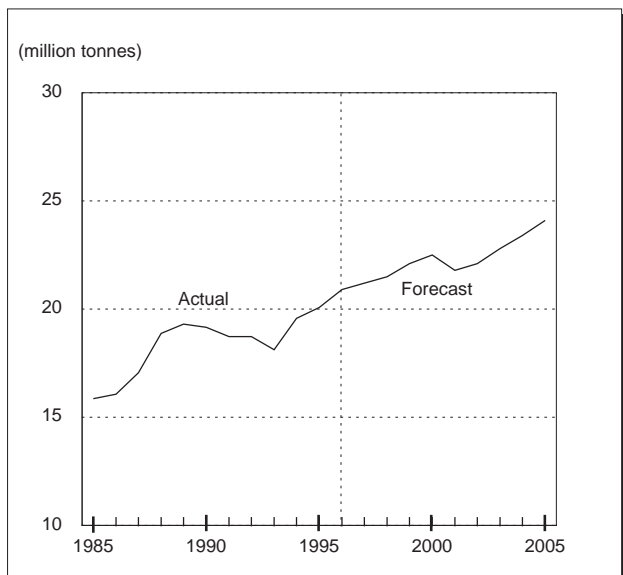
Source: Natural Resources Canada.

Figure 8
Aluminum Prices, 1985-2005
 Annual London Metal Exchange Settlement Prices



Source: Natural Resources Canada.

Figure 7
World Aluminum Consumption, 1985-2005



Source: Natural Resources Canada.

TARIFFS

Item No.	Description	Canada			United States
		MFN	GPT	USA	Canada
2606.00.00	Aluminum ores and concentrates	Free	Free	Free	Free
2818.20.00	Aluminum oxide, other than artificial corundum	Free	Free	Free	Free
7601.10	Unwrought aluminum, not alloyed				
7601.10.10	Billets, blocks, ingots, notched bars, pigs, slabs and wire bars	Free	Free	Free	Free
7601.10.91	Granules, cut from ingots, for use in the manufacture of cleaning compounds	1.58¢/kg	Free	Free	Free
7601.10.99	Other	Free	Free	Free	Free
7601.20	Unwrought aluminum alloys				
7601.20.10	Billets, blocks, ingots, notched bars, pigs, slabs and wire bars	Free	Free	Free	Free
7601.20.91	Granules, cut from ingots, for use in the manufacture of cleaning compounds	1.53¢/kg	Free	Free	Free
7601.20.99	Other	Free	Free	Free	Free
7602.00	Aluminum waste and scrap	Free	Free	Free	Free
76.03	Aluminum powders and flakes	3.5-5.2%	Free-1%	Free	Free
76.04	Aluminum bars, rods and profiles	1.7-8.2% BPT-Free	Free-4%	Free	Free
76.05	Aluminum wire	1.7-4%	Free-1%	Free	Free
76.06	Aluminum plates, sheets and strip, of a thickness exceeding 0.2 mm	Free-8.2%	Free-5%	Free-1%	Free-0.6%
76.07	Aluminum foil not exceeding 0.2 mm	Free-9.7%	Free-6%	Free-1.2%	0.3-0.5%
76.08	Aluminum tubes and pipes	3.2-5.5% BPT-Free	Free	Free	Free
7609.00	Aluminum tube or pipe fittings	5.5%	3%	Free	Free
76.10	Aluminum structures (excluding prefabricated buildings of heading no. 94.06) and parts of structures, aluminum plates, rods, profiles, tubes and the like, prepared for use in structures	8.2%	5%	1%	0.5%
7611.00	Aluminum reservoirs, tanks, vats and similar containers, for any material	Free-8.2%	Free-5%	Free-1%	0.2%
76.12	Aluminum casks, drums, cans, boxes and similar containers, for any material	8.2%	5%	1%	0.2-0.5%
7613.00	Aluminum containers for compressed or liquefied gas	8.2%	5%	1%	0.5%
76.14	Stranded wire, cables, plaited bands and the like, of aluminum, not electrically insulated	4.5%	3%	1%	0.4-0.5%
76.15	Table, kitchen or other household articles and parts thereof, of aluminum	8.1-9.1%	Free-5%	1-1.1%	0.3-0.5%
76.16	Other articles of aluminum	Free-8.2%	Free-5%	Free-1%	Free-0.6%

Sources: Customs Tariff, effective January 1997, Revenue Canada; Harmonized Tariff Schedule of the United States, 1997.
BPT British Preferential Tariff.

TABLE 1. CANADA, ALUMINUM PRODUCTION AND TRADE, 1995 AND 1996

Item No.	1995		1996 ^p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
PRODUCTION	2 171 992	..	2 283 212	..	
IMPORTS					
2606.00	Aluminum ores and concentrates				
	Brazil	1 584 934	54 580	1 385 148	51 062
	Guinea	370 186	13 184	609 700	24 391
	Guyana	43 079	4 255	265 506	9 790
	Australia	188 599	7 116	181 160	9 355
	United States	95 726	9 853	82 338	8 648
	China	116 182	8 517	34 491	2 696
	Other countries	224 916	7 651	15 863	991
	Total	2 623 622	105 156	2 574 206	106 933
2620.40	Ash and residues containing mainly aluminum	3 182	1 743	3 305	1 951
2818.20	Aluminum oxide (excluding artificial corundum)				
	Australia	1 644 720	447 877	1 716 573	464 223
	United States	842 553	236 101	878 139	238 193
	Jamaica	631 680	161 004	829 392	201 454
	Sierra Leone	—	—	36 610	12 456
	Brazil	32	50	41 915	11 148
	Japan	789	679	30 952	8 736
	Iran	—	—	25 256	6 882
	Ireland	33 562	10 508	10 431	2 840
	Germany	836	3 067	735	2 595
	Other countries	4 316	3 031	2 569	3 387
	Total	3 158 488	862 317	3 572 572	951 914
2818.30	Aluminum hydroxide	13 596	7 752	14 321	7 165
7601.10	Unwrought aluminum, not alloyed				
7601.10.10	Billets, blocks, ingots, notched bars, pigs, slabs and wire bars				
	United States	21 832	63 798	21 869	55 696
	Russia	1 359	3 623	75	160
	United Kingdom	1 578	3 933	19	68
	Other countries	378	1 055	—	—
	Total	25 147	72 409	21 963	55 924
7601.10.91	Aluminum granules, unwrought, not alloyed, cut from ingots, for use in the manufacture of cleaning compounds	—	—	—	—
7601.10.99	Other	732	1 985	1 602	4 133
7601.20	Unwrought aluminum, alloyed				
7601.20.10	Billets, blocks, ingots, notched bars, pigs, slabs and wire bars				
	United States	90 840 ^r	187 644 ^r	95 403	163 639
	Russia	3 171	6 968	4 458	7 211
	United Kingdom	541	2 589	428	1 773
	Netherlands	36	202	138	540
	France	12	119	34	191
	Other countries	115	317	26	58
	Total	94 715 ^r	197 839 ^r	100 487	173 412
7601.20.91	Granules, cut from ingots, for use in the manufacture of cleaning compounds	12	42	1	3
7601.20.99	Other	13 438	31 347	15 484	31 280
7602.00	Aluminum waste and scrap	56 207	86 991	67 404	90 419
76.03	Aluminum powders and flakes	2 152	8 405	1 773	7 002
76.04	Aluminum bars, rods and profiles				
7604.10	Of aluminum, not alloyed				
	United States	5 858	25 629	5 098	20 980
	Belgium	360	1 579	546	2 849
	Other countries	112	643	130	821
	Total	6 330	27 851	5 774	24 650

TABLE 1 (cont'd)

Item No.	1995		1996P	
	(tonnes)	(\$000)	(tonnes)	(\$000)
IMPORTS (cont'd)				
7604.21 to 7604.29	Of aluminum alloys			
	17 396	96 054	21 089	115 524
	1	12	157	1 416
	657	3 183	870	5 636
	18 054	99 249	22 116	122 576
76.05	6 766	28 392	3 463	16 505
76.06	375 173r	1 364 183r	342 532	1 151 445
76.07	27 694r	133 604r	31 432	141 199
76.08	7 848	42 073	6 878	35 766
76.09	..	18 204r	..	22 032
	(number 000)		(number 000)	
76.10	..	56 688	..	56 743
76.11	-	-	...	521
76.12	680 302	98 627	708 959	90 448
76.13	125r	8 890r	400	12 300
	(tonnes)		(tonnes)	
76.14	1 027	3 319	280	839
76.15	..	67 817	..	71 946
76.16	..	153 291r	..	158 593
EXPORTS				
2606.00	Aluminum ores and concentrates			
	153	27	6 172	1 226
	374	89	214	112
	527	116	6 386	1 338
2620.40	18 859r	9 294r	10 762	6 972
2818.20	Aluminum oxide (excluding artificial corundum)			
	61 601r	46 248r	72 588	55 645
	5	7	46	210
	-	-	31	78
	40	54	35	50
	48	104	18	40
	766	1 246	241	90
	62 460r	47 659r	72 959	56 113
7601.10	Unwrought aluminum, not alloyed			
	669 870r	1 769 905r	632 164	1 383 456
	122 451	246 598	170 221	332 817
	25 560	65 776	30 167	66 964
	60 091	120 382	33 938	66 087
	1 473	2 723	19 748	36 326
	10 649	20 101	14 560	28 599
	-	-	8 268	14 828
	21 047	45 648	11 489	24 994
	911 141r	2 271 133r	920 555	1 954 071

TABLE 1 (cont'd)

Item No.	1995		1996p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
EXPORTS (cont'd)					
7601.20	Unwrought aluminum alloys				
	United States	605 871r	1 696 248r	694 111	1 638 752
	Japan	124 214	310 615	123 915	280 163
	South Korea	33 414	96 574	32 579	76 084
	Israel	10 616	29 820	15 077	37 967
	Netherlands	6 735	19 411	7 527	17 322
	Italy	4 257	6 625	5 900	13 258
	Lebanon	4 473	13 705	5 027	13 070
	United Kingdom	2 817	8 637	3 959	10 091
	Ireland	2 462	13 516	1 035	6 328
	Other countries	11 151	34 227	7 648	19 149
	Total	806 010r	2 229 378r	896 778	2 112 184
7602.00	Aluminum waste and scrap				
	United States	214 636r	425 208r	220 145	363 387
	Japan	6 904r	17 528r	5 690	13 451
	Hong Kong	5 113	9 827	4 327	6 539
	United Kingdom	2 012	4 079	2 825	5 078
	Other countries	8 498	13 362	8 270	13 099
	Total	237 163r	470 004r	241 257	401 554
76.03	Aluminum powders and flakes	554	1 639	1 103	2 294
76.04	Aluminum bars, rods and profiles	61 963r	250 325r	39 438	167 971
76.05	Aluminum wire	44 790r	132 594r	80 917	209 644
76.06	Aluminum plates, sheets and strip, of a thickness exceeding 0.2 mm	247 385r	807 068r	253 177	734 492
76.07	Aluminum foil not exceeding 0.2 mm	21 598r	105 769r	27 500	127 387
76.08	Aluminum tubes and pipes	3 189r	16 967r	4 604	21 896
76.09	Aluminum tube or pipe fittings	..	10 035r	..	12 499
76.10	Aluminum structures (excluding prefabricated buildings of heading No. 94.06) and parts of structures, aluminum plates, rods, profiles, tubes and the like, prepared for use in structures	..	78 712r	..	108 878
		(number 000)		(number 000)	
7611.00	Aluminum reservoirs, tanks, vats and similar containers	1	852	6	1 105
76.12	Aluminum casks, drums, cans, boxes and similar containers	557 132r	83 053r	1 255 095	131 429
7613.00	Aluminum containers for compressed or liquefied gas	1 325	2 940	1 049	2 561
		(tonnes)		(tonnes)	
76.14	Stranded wire, cables, plaited bands and the like, of aluminum, not electrically insulated	5 105	13 726	2 713	8 380
76.15	Table, kitchen or other household articles and parts thereof, of aluminum	..	29 474	..	35 568
76.16	Other articles of aluminum	..	104 606r	..	102 600

Sources: Natural Resources Canada; Statistics Canada.

– Nil; .. Not available or not applicable; . . . Amount too small to be expressed; p Preliminary; r Revised.

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

TABLE 2. CANADA, ALUMINUM SMELTER CAPACITY

Company	As of December 31, 1996
	(tonnes/year)
Alcan Aluminium Limited	
Quebec	
Grande-Baie	180 000
Arvida, Jonquière	232 000
Isle-Maligne, Alma	73 000
Shawinigan	84 000
Beauharnois	48 000
Laterrière	204 000
British Columbia	
Kitimat	272 000
Total Alcan capacity	1 093 000
Canadian Reynolds Metals Company, Limited	
Quebec	
Baie-Comeau	400 000
Aluminerie de Bécancour Inc.	
Quebec	
Bécancour	360 000
Aluminerie Alouette Inc.	
Quebec	
Sept-Îles	218 000
Aluminerie Luralco Inc.	
Quebec	
Deschambault	215 000
Total Canadian capacity	2 285 000

Source: Natural Resources Canada.

TABLE 3. CANADA, CONSUMPTION¹ OF ALUMINUM METAL⁴ AT FIRST PROCESSING STAGE, 1993-95

	1993 ^a	1994 ^a	1995
	(tonnes)		
CASTINGS			
Permanent mould	89 222	103 707 ^r	108 524
Sand	2 363	2 533	2 663
Die and other	78 625	106 459 ^r	111 169
Total	170 210	212 699 ^r	222 356
WROUGHT PRODUCTS			
Sheet, plate, coil and foil	160 493	169 847	164 221
Extrusions, including tubing	110 903	117 396 ^r	110 084
Other wrought products (including rods, forgings and slugs)	121 456	125 489 ^r	138 836
Total	392 852	412 732 ^r	413 141
OTHER USES			
Destructive uses (deoxidizer), non-aluminum base alloys, powder and paste and other uses	34 895	41 953	37 984
Total consumed	597 957	667 384 ^r	673 481
Aluminum metal used for the production of secondary aluminum ²	131 174	145 661	146 987

	Metal Entering Plant			On Hand December 31		
	1993	1994	1995	1993	1994	1995
Primary aluminum ingot and alloys	480 186	525 733	526 205	15 716	18 255 ^r	16 986
Secondary aluminum	97 404	117 685	113 607	6 182	5 930	4 351
Scrap originating outside plant	170 484	198 396	199 892	7 231	11 178	7 458
Total	748 074	841 814	839 704	29 129	35 364 ^r	28 796
Aluminum shipments ³				15 500	23 324	25 804

Source: Natural Resources Canada.

^r Revised.

^a Increase in number of companies being surveyed; therefore, closing inventory of previous year does not equal opening inventory of current year.

¹ Available data as reported by consumers. ² Aluminum metal used in the production of secondary aluminum is not included in consumption totals. ³ Aluminum metal shipped without change. Does not refer to shipments of goods of own manufacture. ⁴ Aluminum metal refers to primary aluminum ingot and alloys, purchased secondary aluminum ingot, and outside aluminum scrap.

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

TABLE 4. AVERAGE ALUMINUM PRICES

Year	Month	LME	<i>Metals Week</i>
		Cash ¹	U.S. Markets ¹
		(US\$/t)	(US¢/lb)
ANNUAL AVERAGES²			
1986		1 150.8	55.9
1987		1 560.9	72.3
1988		2 597.8	110.1
1989		1 951.5	87.8
1990		1 751.8	75.0
1991		1 302.7	59.5
1992		1 254.6	57.5
1993		1 139.4	53.3
1994		1 477.2	71.2
1995		1 806.1	85.9
1996		1 504.5	71.4
MONTHLY AVERAGES			
1995	January	2 060.98	99.7
	February	1 916.63	93.7
	March	1 805.52	88.1
	April	1 849.42	89.8
	May	1 763.21	85.1
	June	1 780.43	84.5
	July	1 860.48	87.3
	August	1 888.68	87.2
	September	1 761.29	81.8
	October	1 674.75	77.9
	November	1 654.48	77.2
	December	1 657.11	78.3
1996	January	1 589.80	75.1
	February	1 592.00	74.6
	March	1 612.90	75.8
	April	1 587.60	75.0
	May	1 589.69	74.8
	June	1 482.88	69.9
	July	1 459.11	69.1
	August	1 463.74	69.4
	September	1 407.70	66.9
	October	1 336.70	64.4
	November	1 449.90	69.0
	December	1 500.63	72.3

Sources: Natural Resources Canada; *Metals Week*.

¹ Highest grade sold. ² Primary ingots, minimum 99.7% purity; prior to October 1988, minimum 99.5% purity.

**TABLE 5. AVERAGE ALUMINUM ALLOY
(SECONDARY) PRICES**

Year	Month	LME Alloy ¹ Cash
		(US\$/t)
ANNUAL AVERAGES		
1993		1 005.2
1994		1 452.9
1995		1 656.0
1996		1 302.8
MONTHLY AVERAGES		
1995	January	1 964.33
	February	1 879.53
	March	1 812.67
	April	1 761.28
	May	1 654.52
	June	1 625.64
	July	1 665.67
	August	1 692.55
	September	1 563.79
	October	1 434.86
	November	1 393.14
	December	1 424.39
1996	January	1 394.57
	February	1 356.79
	March	1 363.98
	April	1 345.50
	May	1 326.90
	June	1 253.63
	July	1 244.40
	August	1 258.33
	September	1 222.50
	October	1 210.63
	November	1 294.43
	December	1 346.59

Source: *Metals Week*.

¹ Alloy ingots meeting LME specifications.

TABLE 6. WORLD MINE PRODUCTION OF BAUXITE, 1992-95

	1992	1993	1994	1995 ^p
(000 tonnes)				
Australia	39 746.0	41 320.0	41 646.0	42 655.0
Brazil	9 365.6	9 669.0	8 673.3	8 761.3
China	6 661.0	6 468.2	6 621.3	6 700.0
France	104.0	151.0	128.0	131.0
Ghana	338.2	423.7	426.1	513.0
Greece	2 042.1	2 205.5	2 196.4	1 916.0
Guinea	15 997.0	17 040.0	11 124.0	12 393.5
Guyana	2 264.8	2 124.6	2 093.0	2 000.0
Hungary	1 721.1	1 561.3	835.7	1 014.6
India	4 898.3	5 276.8	4 809.1	5 162.6
Indonesia	803.5	1 320.4	1 342.2	904.5
Iran ^e	92.0	100.0	100.0	100.0
Italy	97.5	90.0	23.4	11.2
Jamaica	11 359.5	11 306.6	11 563.5	10 857.5
Kazakstan	3 036.0	2 911.0	2 584.0	3 300.0
Malaysia	330.6	68.8	161.9	184.4
Mozambique	8.8	6.0	9.6	11.2
Pakistan	3.5	4.8	4.6	17.3
Romania	176.1	186.6	184.1	174.3
Russia	4 578.0	4 364.0	3 633.0	3 500.0
Sierra Leone	1 262.2	1 122.0	699.3	—
Surinam	3 159.5	3 156.1	3 803.1	3 578.7
Turkey	613.0	594.6	373.4	350.0
United States	45.0	40.0	35.0	30.0
Venezuela	1 116.9	2 530.3	4 419.2	5 183.8
Ex-Yugoslavia	907.0	252.0	1.3	48.0
Total world	110 727.2	114 293.4	107 490.7	109 497.9

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.

— Nil; ^e Estimated; ^p Preliminary.

TABLE 7. WORLD PRODUCTION OF ALUMINA (HYDRATE), 1992-95

	1992	1993	1994	1995 ^p
(000 tonnes)				
Australia	11 783.0	12 598.0	12 792.0	13 147.0
Azerbaijan	220.9	106.0	70.0	27.0
Brazil	1 833.0	1 853.2	1 867.5	2 147.0
Canada ¹	1 104.0	1 182.0	1 170.0	1 064.0
China	1 582.9	1 894.5	1 846.9	2 080.0
Czechoslovakia	142.7	n.a.	n.a.	n.a.
France	508.0	476.0	438.2	525.0
Germany ¹	1 119.9	1 110.0	950.7	994.0
Greece	632.0	648.5	607.5	629.7
Guinea	603.2	642.3	648.4	630.4
Hungary	555.9	447.3	243.4	352.8
India	1 338.3	1 489.5	1 455.8	1 650.0
Ireland	1 007.0	1 103.3	1 140.0	1 100.0
Italy	762.1	840.1	852.1	857.0
Jamaica	2 917.2	2 989.4	3 221.2	3 030.2
Japan	714.1	704.1	674.6	743.2
Kazakstan	1 053.0	1 091.0	822.0	1 101.0
Romania ¹	279.7	293.2	301.6	323.4
Russia	2 705.1	2 568.0	2 168.4	2 250.0
Slovakia	n.a.	90.2	90.0	65.0
Spain	959.1	1 060.0	1 070.6	1 094.8
Surinam	1 591.0	1 506.6	1 498.1	1 579.7
Turkey	156.5	169.2	155.3	160.0
Ukraine	1 229.0	1 150.0	1 100.0	1 200.0
United Kingdom	120.0	120.0	110.0	110.0
United States ¹	5 185.0	5 290.0	4 860.0	4 530.0
Venezuela	1 282.8	1 562.9	1 551.5	1 700.0
Ex-Yugoslavia	110.0	70.0	60.6	35.3
Total world	41 495.4	43 055.3	41 766.4	43 035.5

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.

n.a. Not applicable; ^p Preliminary.

¹ Calcined.

TABLE 8. WORLD PRODUCTION OF ALUMINUM, 1993-96

	1993	1994	1995p	1996e
	(000 tonnes)			
Argentina	172.9	175.9	185.5	184.0
Australia	1 375.6	1 310.8	1 292.6	1 366.0
Azerbaijan	7.0	10.0	11.0	6.0
Bahrain	449.0	451.9	453.9	476.0
Brazil	1 172.0	1 184.6	1 188.1	1 199.0
Canada	2 308.9	2 254.7	2 172.0	2 283.0
Cameroon	86.5	81.1	79.3	82.0
China	1 220.4	1 446.1	1 657.6	1 776.0
Dubai	242.3	246.9	248.1	260.0
Egypt	180.7	181.5	180.3	177.0
France	426.2	384.1	364.5	349.0
Germany	551.9	505.0	575.2	576.0
Ghana	174.1	140.7	135.4	137.0
Greece	147.7	138.0	130.9	130.0
Hungary	27.9	30.7	34.9	32.0
Iceland	94.2	98.6	100.2	103.0
India	465.4	472.0	511.9	502.0
Indonesia	204.0	221.9	228.1	221.0
Iran	90.0	116.0	117.0	80.0
Italy	155.6	175.6	177.8	184.0
Japan	18.3	17.0	18.2	17.0
Mexico	—	—	10.4	65.0
Netherlands	231.8	219.4	215.6	226.0
New Zealand	269.5	268.0	269.0	285.0
Norway	888.0	858.2	846.7	859.0
Poland	46.9	49.5	52.0	52.0
Romania	112.4	119.6	141.5	145.0
Russia	2 800.8	2 670.5	2 790.0	2 870.0
Slovakia	39.7	40.0	80.0	111.0
Slovenia	74.7	74.3	70.2	66.0
South Africa	174.7	172.7	195.3	617.0
Spain	355.9	338.1	361.9	362.0
Surinam	30.1	26.7	28.1	28.0
Sweden	82.4	83.9	94.5	98.0
Switzerland	36.4	24.2	20.7	26.0
Tadjikistan	252.0	236.5	230.0	198.0
Turkey	58.5	59.7	61.5	62.0
Ukraine	104.0	98.0	98.0	91.0
United Kingdom	239.1	231.2	237.9	240.0
United States	3 694.8	3 298.5	3 375.1	3 577.0
Venezuela	567.6	585.4	629.8	635.0
Yugoslavia	36.0	10.6	26.0	36.0
Total world	19 655.9	19 108.1	19 696.7	20 789.0

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.

— Nil; e Estimated; p Preliminary.

TABLE 9. WORLD CONSUMPTION OF ALUMINUM, 1993-96

	1993	1994	1995 ^p	1996 ^e
	(000 tonnes)			
Albania ^e	1.0	1.0	1.0	1.0
Algeria	8.0	5.0	5.0	5.0
Argentina	104.5	109.0	82.8	100.0
Australia	339.6	352.8	351.8	355.0
Austria	140.0	145.0	150.0	155.0
Bahrain	114.5	132.9	135.0	137.0
Bangladeshe	10.0	10.0	10.0	10.0
Belgium/Luxembourg	275.5	328.7	340.0	340.0
Brazil	378.9	414.1	500.3	500.0
Bulgaria	11.9	6.5	6.0	6.0
Canada	486.6	535.1	581.6	590.0
Cameroon	19.0	16.9	21.0	21.0
Chile ^e	14.2	14.3	14.0	14.0
China ^e	1 318.1	1 484.1	1 860.0	1 900.0
Colombia	30.0	35.3	35.0	35.0
Cuba	1.0	1.0	1.0	1.0
Czech Republic	38.9	43.0	40.0	40.0
Denmark	23.0	26.0	28.0	28.0
Egypt	83.8	80.4	77.4	80.0
Finland	22.6	19.0	19.0	20.0
France	665.0	735.0	720.0	750.0
Germany	1 300.0	1 420.0	1 510.0	1 600.0
Ghana	14.7	15.8	15.0	15.0
Greece	104.6	143.0	158.0	155.0
Hong Kong	45.1	41.6	50.0	50.0
Hungary	140.1	143.1	119.9	135.0
India	415.3	474.0	475.0	480.0
Indonesia ^e	138.3	179.1	147.7	150.0
Iran ^e	96.0	116.0	120.0	120.0
Iraq ^e	1.0	1.0	1.0	1.0
Ireland	7.0	8.0	4.0	7.0
Israel	27.1	41.3	40.0	43.0
Italy	554.0	660.0	665.6	650.0
Japan	2 138.3	2 344.8	2 335.6	2 450.0
Lebanon	10.0	7.0	7.0	10.0
Malaysia	81.7	66.3	70.0	70.0
Mexico	97.9	78.8	40.0	50.0
Netherlands	130.0	145.0	150.0	150.0
New Zealand	27.8	40.0	38.6	40.0
Nigeria	7.0	7.0	7.0	7.0
North Korea ^e	20.0	20.0	20.0	20.0
Norway	202.0	212.0	166.0	200.0
Pakistan	10.0	10.0	10.0	10.0
Peru ^e	3.0	3.0	3.0	3.0
Philippines	22.7	22.9	23.0	25.0
Poland	67.7	67.0	69.0	70.0
Portugal	51.7	64.2	75.0	75.0
Romania	39.4	20.1	49.5	50.0
Russia	657.0	550.0	543.0	600.0
Saudi Arabia	25.0	30.0	30.0	30.0
Singapore	22.4	30.3	39.2	40.0
Slovakia	23.7	25.0	25.0	25.0
Slovenia	48.3	54.2	56.8	50.0
South Africa	86.1	98.4	113.1	120.0
South Korea	524.8	603.9	675.3	700.0
Spain	310.0	352.0	350.0	375.0

TABLE 9 (cont'd)

	1993	1994	1995p	1996e
(000 tonnes)				
Sweden	93.0	131.0	130.0	130.0
Switzerland	131.1	155.1	143.0	150.0
Taiwan	299.1	255.2	362.5	380.0
Thailand	180.3	183.4	240.0	240.0
Turkey	160.1	115.2	105.0	115.0
United Arab Emirates	14.0	19.3	25.0	30.0
United Kingdom	475.0	500.0	540.0	550.0
United States	4 877.1	5 407.1	5 300.0	5 350.0
Venezuela	155.2	123.9	130.0	140.0
Vietnam ^e	10.0	5.5	13.9	10.0
Yugoslavia	38.0	10.6	26.0	26.0
Other	597.3	202.2	66.3	150.0
Total world	18 102.5	19 698.4	20 262.9	20 935.0

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.

e Estimated; p Preliminary.

TABLE 10. WESTERN WORLD PRODUCTION OF SECONDARY ALUMINUM,¹ 1993-96

	1993	1994	1995p	1996e
(000 tonnes)				
Argentina	14.4	14.4	14.4	14.0
Australia	34.8	55.0	55.0	55.0
Austria	43.3	52.5	46.8	47.0
Brazil	76.8	91.0	116.7	117.0
Canada	90.0	95.0	97.0	100.0
Croatia	26.0	26.0	30.9	33.0
Denmark	14.0	14.0	14.0	14.0
Finland	29.9	31.0	31.0	31.0
France	222.4	253.4	222.0	225.0
Germany	408.1	438.1	418.8	415.0
Iran	15.1	26.0	26.0	26.0
Italy	346.1	375.5	412.3	428.0
Japan	1 005.6	1 173.5	1 180.5	1 192.0
Mexico	69.9	125.3	128.6	129.0
Netherlands	139.1	150.0	150.2	150.0
New Zealand	7.3	8.2	8.2	9.0
Norway	55.8	49.2	71.9	60.0
Portugal	2.0	3.0	3.0	3.0
Spain	99.7	103.5	107.0	107.0
Sweden	19.0	20.0	19.0	20.0
Switzerland	4.2	6.2	10.7	11.0
Taiwan	64.0	64.0	67.0	67.0
United Kingdom	279.0	248.9	282.0	285.0
United States	2 994.9	2 958.8	3 188.0	3 200.0
Venezuela	34.8	31.9	27.5	28.0
Other	28.0	28.0	28.0	28.0
Total world	6 124.2	6 442.4	6 756.5	6 794.0

Sources: Natural Resources Canada; World Bureau of Metal Statistics.

e Estimated; p Preliminary.

¹ Excluding the direct use of aluminum in the form of scrap.