

# BAUXITE AND ALUMINA

By Patricia A. Plunkert

Total world output of bauxite and alumina increased slightly, about 2% for each, during 1995, owing in part to a modest increase in the worldwide production of primary aluminum metal. Mine production of bauxite was reported from 27 countries, and alumina reportedly was produced in 29 countries around the world.

U.S. mine production continued to account for less than 1% of world mine production. This domestic output was used exclusively for nonmetal applications.

U.S. consumption of bauxite decreased about 3% in 1995. In quantity, the largest decrease occurred in the bauxite consumed to produce smelter-grade alumina.

U.S. production and shipments of smelter-grade alumina, derived almost exclusively from imported metallurgical-grade bauxite, decreased by 8% and 6% respectively in 1995. The increase in U.S. imports of alumina filled the supply gap created by the increase in domestic demand for smelter-grade alumina by the domestic primary aluminum metal industry.

Identified world bauxite resources at yearend 1995 were estimated to be 55 to 75 billion metric tons, located in South America (33%), Africa (27%), Asia (17%), Oceania (13%), and elsewhere (10%). The reserve base was estimated at 28 billion tons and reserves at 23 billion tons.

## Legislation and Government Programs

In October 1995, the Defense Logistics Agency (DLA) released its new Annual Materials Plan (AMP) for the National Defense Stockpile (NDS) for fiscal year 1996. The new AMP, which went into effect on October 1, 1995, provided for the sale of 915,000 dry tons (900,000 long dry tons) of metallurgical-grade bauxite, of which 610,000 dry tons (600,000 long dry tons) were Jamaica type and 305,000 dry tons (300,000 long dry tons) were Suriname type. Additionally, as part of this program, the DLA was authorized to dispose of 81,000 calcined tons (80,000 long calcined tons) of refractory-grade bauxite in fiscal year 1996. These were the maximum amounts recommended for disposal during the fiscal year, and the actual level of sales were dependent upon prevailing market conditions.

During calendar year 1995, the DLA announced the sale of 610,000 tons (600,000 long tons) of Jamaica-type, metallurgical-grade bauxite and 61,500 tons (60,500 long tons) of refractory-grade bauxite from the NDS. At yearend, the NDS uncommitted inventory for metallurgical-grade bauxite was 11.1 million tons of Jamaica-type and 4.98 million tons of Suriname-type. The NDS calcined refractory-grade bauxite inventory was listed as 155,000 tons.

## Production

**Bauxite.**—U.S. bauxite production decreased in 1995 and continued to amount to less than 1% of total world production. The only active bauxite mines remaining in the United States were the surface operations in Alabama and Georgia that produced bauxitic materials, a natural mixture of bauxitic clay and bauxite with a very low iron content, used primarily for a variety of non-metallurgical applications. Throughout the year, C-E Minerals continued to operate its mines in Alabama and Georgia, shipping raw ore to its Andersonville, GA, facility for the production of refractory products. Harbison-Walker Refractories Division of Indresco Inc. shipped bauxite from its mines in Alabama to its local calcining plant and to Carbo Ceramic Co.'s proppant plant in Eufaula, AL.

Harbison-Walker announced that it had signed a joint-venture agreement with Plasma Processing Corp. (PPC), a subsidiary of First Mississippi Corp., to manufacture and sell lightweight grain materials for the industrial refractory markets. The joint venture will use PPC-licensed technology at Harbison-Walker's Eufaula, AL, plant. The high-temperature proprietary process produces alumina-based materials for use in refractories and other applications. The raw material, supplied by PPC, is a co-product from the company's aluminum dross processing business unit. Harbison-Walker, which will operate the plant, also signed an exclusive sales agreement with Alcoa Industrial Chemicals (AIC), a division of Aluminum Co. of America (Alcoa). Under the agreement, AIC will purchase the joint venture's lightweight refractory products and retain exclusive worldwide rights for all marketing other than Harbison Walker's internal requirements.<sup>1</sup>

**Alumina.**—Alumina production in the United States decreased about 7% in 1995 to approximately 4.5 million tons.

According to Alcoa's 1995 annual report, Alcoa Aluminum & Chemicals (AAC) purchased the 600,000-ton-per-year alumina refinery located in St. Croix, VI, from Virgin Islands Aluminum Corp., a subsidiary of Glencore International AG. The refinery, which reportedly would remain temporarily idled until market conditions support its reopening, would be operated by a new AAC subsidiary, St. Croix Alumina. AAC is owned 60% by Alcoa and 40% by Western Mining Corp. of Australia.

Alcoa also announced that it had acquired Discovery Industries, a privately owned producer of alumina-based chemicals in Port Allen, LA. Discovery produced specialty activated alumina products used to remove contaminants from the process streams of oil refineries, petrochemical plants, and natural gas processing plants. Alcoa reported that Discovery was building facilities for the production of specialty alumina powders for use in auto exhaust systems and fine abrasives.<sup>2</sup>

(See tables 2 and 3.)

## Consumption

The domestic consumption of metallurgical-grade bauxite for the production of smelter-grade alumina continued to decrease in 1995. Although consumption of bauxite by the abrasive industry also decreased compared with that of 1994, consumption by the chemical and refractory industries improved by 5% and 13% respectively. Approximately 93% of the bauxite consumed in the United States in 1995 was refined to alumina, and an estimated 2.23 tons of dried bauxite was required to produce 1 ton of calcined alumina. Domestic production and consumption data for bauxite and alumina were obtained by the U.S. Geological Survey from three separate, voluntary surveys of U.S. operations. Typical of these surveys is the "Bauxite Consumption" survey, sent to 75 operations, 66 of which responded, representing 91% of the total bauxite consumed shown in table 4.

The twenty-two operating primary aluminum smelters reported a consumption of 7.28 million tons of calcined alumina in 1995, a 7% increase from the consumption level reported in 1994. An estimated 89% of the alumina shipped by U.S. alumina plants went to domestic primary smelters for aluminum metal production. Consumption in various forms by the abrasives, chemicals, refractories, and specialties industries accounted for the remainder of the U.S. alumina usage.

## Prices

Contract terms for the purchase of metallurgical-grade bauxite and smelter-grade alumina in world markets are not normally made public, and, consequently, contract prices for these commodities are not published by trade journals. Recently, spot or market price estimates for metallurgical-grade alumina have begun to appear in some industry publications, but the majority of published price quotes are limited to certain specialty forms of bauxite and alumina for nonmetallurgical applications.

In 1995, the USGS estimated the average value of domestic crude bauxite shipments, f.o.b. mine or plant, to be \$19 per ton. Base prices quoted by *Industrial Minerals* magazine for imported calcined refractory grade bauxite were as follows: Chinese, minimum 87% alumina ( $\text{Al}_2\text{O}_3$ ), f.o.b. Chinese ports, \$85 to \$100 per ton; Guyanese, f.o.b. barge, U.S. Gulf Coast, \$175 per ton; and Guyanese, c.i.f. Europe, \$165 to \$185 per ton. Base prices were subject to adjustment for various grain-size specifications, size of order, and fuel cost factors.

The supply of alumina began to tighten as demand increased, especially demand from China and Russia. The market or spot prices for alumina increased substantially during most of the year before turning downward in the last quarter. According to *Metal Bulletin*, metallurgical-grade alumina spot prices on international markets began the year at \$127 to \$130 per ton. The price range reached a high for the year of \$320 to \$340 per ton in August. The price remained at this level through the end

of September before beginning a gradual decline, and closed the year at \$220 to \$250 per ton. The average value of domestic calcined alumina shipments was estimated to be \$240 per ton. Trade data released by the U.S. Bureau of the Census indicated the average value of imported calcined alumina was \$212 per ton, f.a.s. port of shipment, and \$225 per ton, c.i.f. U.S. ports. (See table 8.)

## Foreign Trade

Exports of dried bauxite from the United States totaled 85,900 tons in 1995, a significant decrease from the 1994 total of 114,000 tons. Canada received 96% of these 1995 exports. U.S. exports of calcined refractory-grade bauxite totaled 17,900 tons in 1995; Japan received 74% (13,200 tons) of these shipments. Exports of all other grades of calcined bauxite (chiefly abrasive grade) amounted to 4,180 tons for the year, with Mexico receiving 1,620 tons (39%) and Canada receiving 1,380 tons (33%).

Exports of alumina were at the same level as those of 1994. Canada received most of the alumina, more than 70%; however, Russia replaced Brazil as the next largest recipient. Specialty aluminum compounds exported included 5,630 tons of aluminum sulfate, 14,500 tons of aluminum chloride, 10,600 tons of aluminum oxide abrasives, and 22,400 tons of various fluoride-based compounds of aluminum, including synthetic cryolite and aluminum fluoride.

Imports for consumption of crude and dried bauxite decreased slightly from the level of 1994 receipts; and the four principal suppliers, Guinea, Jamaica, Brazil, and Guyana, in order of shipments, provided 98% of the total. As in previous years, China and Guyana remained the dominant suppliers of calcined bauxite to the United States.

Imports for consumption of alumina increased significantly in 1995 compared with that for 1994, reflecting the loss of domestic production from the temporarily closed refinery in St. Croix, VI. Australia continued to be the primary source of U.S. alumina imports, accounting for approximately 73% of the total receipts for 1995. Specialty aluminum compounds imported included 39,900 tons of aluminum sulfate; 3,320 tons of aluminum chloride; 213,000 tons of aluminum oxide abrasives; and 22,200 tons of various fluoride-based aluminum compounds. (See tables 9, 10, 11, and 12.)

## World Review

World production of bauxite and alumina increased slightly in 1995 in response to a slight increase in metal production and an anticipated increase in world demand for aluminum. Twenty-seven countries reported mine production in 1995, and total world production amounted to about 109 million tons, 2% higher than that mined in 1994. Australia, Guinea, Jamaica, and Brazil, in order of volume, continued to be the largest producers of bauxite and accounted for 70% of total world production.

World output of alumina also increased approximately 2% in 1995 compared with that of the previous year. The four

principal producing countries, in order of volume, were Australia, the United States, Jamaica, and Russia. These countries accounted for over half of the world's production. (See tables 13 and 14.)

**Australia.**—In 1995, production levels rose in this, the world's largest bauxite and alumina producing country. Bauxite output and alumina production both increased by approximately 2%.

According to the company's 1995 annual report, Comalco Ltd. announced that, under a Protocol signed between the Russian and Australian Governments in late 1995, Comalco, along with others, would investigate the commercial feasibility of constructing alumina unloading facilities on the Russian Pacific coast.

Comalco also announced that a full feasibility study for the construction of a new alumina refinery, based on bauxite from its Weipa Mine, would be undertaken in 1996. A spokesperson for the company stated that ideally the company would like to build the proposed plant near the mine; however, if there were too many impediments, the company would have no other option than to build off shore.<sup>3</sup>

**Brazil.**—Cia. Vale do Rio Doce (CVRD) announced the start of production in mid-July at the Alunorte alumina refinery. Output at the refinery was expected to reach 258,000 tons by the end of the year, approximately 1 million tons in 1996, and full capacity of 1.1 million tons by 1997. The company reported that the bulk of the production would be shipped to the Albras and Valesul primary aluminum smelters in Brazil with the remainder to be exported. With feed material for the refinery coming from the Trombetas bauxite mine, CVRD has completed the production chain from bauxite mine to primary aluminum metal.<sup>4</sup>

**China.**—Technical difficulties during prolonged trial runs at the newly expanded Shanxi aluminum smelter complex had reportedly prevented the alumina refinery from reaching full production capacity. Company sources reported that the plant was not expected to reach its full production capacity of 1.2 million tons per year until 1998.<sup>5</sup>

**Guinea.**—According to Alcan Aluminium Ltd.'s 1995 annual report, the company acquired an additional 6% interest in Halco Inc., bringing its total interest to 33%. Halco owns 51% of Compagnie des Bauxites de Guinee (CBG), one of the world's largest bauxite producers. The remaining 49% of CBG is owned by the Government of Guinea. From its share of CBG ore, Alcan supplied the bauxite requirements of the Aughinish refinery in Ireland and also shipped ore to its refinery in Quebec and to third-party customers.

**Hungary.**—Hungalu Magyar Aluminiumpari Rt reported that it had signed a deal to provide Russia with about 100,000 tons of alumina in 1996. This deal represented a major turnaround from the small spot purchases made by Russia in recent years. The alumina covered by the contract would be produced at Hungalu's Ajka refinery, southwest of Budapest.<sup>6</sup>

**Iran.**—Iran reportedly announced plans to build a 20,000-ton-per-year alumina refinery as a pilot project at Azarshahr in

northern Iran. Construction of the refinery was expected to take up to 2 years. Technology for the plant reportedly was supplied by Vsesoyuznyy Nauchno-issledovatel'skiy i Proyektnyy Institut Alyuminievoy, Magnievoy i Elektrodnoy Promyshlennosti (VAMI), a Russian technical institute, and was based on the processing of nepheline-syenite ore from the nearby Koleybar and Sarab Mines.<sup>7</sup>

**Ireland.**—According to Alcan's annual report, the company acquired the Royal Dutch/Shell Group's 35% interest in the Aughinish alumina refinery located in Limerick, Ireland. Alcan now has full ownership of the 1.2-million-ton-per-year facility. The plant, which opened in 1983, supplied alumina to Alcan's smelters in the United Kingdom as well as to various third-party customers.

**Kazakhstan.**—Kazakhstan reportedly announced a \$135 million project to develop the Eastern Ayat bauxite field in the Kustanai region of the country. According to government sources, partners in the project included White Swan, Ivedon International Ltd., the Pavlodar alumina refinery, and local mining companies. Bauxite from the mine was expected to be used as feed material for the 1.1-million-ton-per-year Pavlodar refinery.<sup>8</sup>

**Suriname.**—Suriname Aluminium Co. and NV Billiton Maatschappij Suriname announced the awarding of a contract to Mackay & Schnellmann, the metals and minerals division of International Mining Consultants, to carry out the second phase of a feasibility study of the joint-venture Bakhuis bauxite project in Suriname. Work was to include auger drilling and bauxite-washing test programs, followed by a study of the production options available.<sup>9</sup>

**Venezuela.**—Corporacion Venezolana de Guayana (CVG) announced that it had begun exporting bauxite for the first time. A trial shipment of 38,000 tons of bauxite produced by CVG subsidiary, Bauxilum, was sent to U.S.-based Alcoa. Bauxilum has a reported annual mining capacity of 6 million tons, the bulk of which is consumed by the company's own alumina refinery (formerly Interalumina).<sup>10</sup>

## Outlook

Presently identified world bauxite reserves are sufficient to meet cumulative world demand well into the next century. Considering the high probability of discovering additional bauxite deposits, plus the added possibility of employing lower grade bauxite occurrences and various alternative sources of alumina, world resources of aluminum remain adequate to satisfy demand for the foreseeable future.

The continued and extended economic restructuring of Eastern Europe and the independent republics of the former Soviet Union provide significantly increased market opportunities for the established bauxite- and alumina-producing countries of the world. The quality and quantity of bauxite resources within the former Eastern bloc nations are incapable of sustaining an economically viable market-based aluminum industry. To become truly competitive in the "new global economy," significant amounts of imported bauxite and

alumina feedstocks will be required to supply their primary aluminum production facilities.

During the first half of 1996, the metallurgical-grade bauxite and alumina markets continued to be oversupplied, a condition which began during the latter half of 1995. Some production cutbacks have been announced, but the slowdown in aluminum metal demand will probably delay the return of a supply/demand balance. In the long term, worldwide demand for aluminum was expected to grow steadily, thereby increasing the demand for bauxite and alumina feedstocks.

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<sup>1</sup>Harbison-Walker. News Release. Harbison-Walker Announces Joint Venture With Plasma Processing Corp. Sept. 14, 1995, 2 pp.

<sup>2</sup>American Metal Market. Alcoa Acquires Chemicals Unit. V. 103, No. 133, July 13, 1995, p. 4.

<sup>3</sup>Metal Bulletin. Comalco Proceeds With Expansion Plans. No. 7992, June 29, 1995, p. 5.

<sup>4</sup>Kinch, D. Alunorte Prepares To Export Alumina. Met. Bull., No. 8025, Oct. 30, 1995, p. 9.

<sup>5</sup>Platt's Metals Week. Chinese Producers Boosting Alumina, Metal Output. V. 66, No. 23, June 5, 1995, p. 5.

<sup>6</sup>Mining Journal. Hungarian Alumina Lifeline. V. 324, No. 8330, June 9, 1995, p. 422.

<sup>7</sup>Metal Bulletin. New Iranian Alumina Refinery Planned. No. 7991, June 26, 1995, p. 7.

<sup>8</sup>Mining Journal. Kazakhstan Bauxite Project. V. 325, No. 8334, July 7, 1995, p. 4-5.

<sup>9</sup>———. Bakhuis Study Continues. V. 325, No. 8337, July 28, 1995, p. 60.

<sup>10</sup>Metal Bulletin. Venezuela Commences Bauxite Shipments. No. 8005, Aug. 17, 1995, p. 4.

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CRU. Alumina Monitor (bimonthly).

Industrial Minerals (London), monthly.

Metal Bulletin.

Mining Journal.

Platt's Metals Week.

TABLE 1  
SALIENT BAUXITE STATISTICS 1/

(Thousand metric tons and thousand dollars)

|  | 1991    | 1992    | 1993       | 1994      | 1995       |
|--|---------|---------|------------|-----------|------------|
| <b>United States:</b>                  |         |         |            |           |            |
| Production: Crude ore (dry equivalent) | W       | W       | W          | W         | W          |
| Value                                  | W       | W       | W          | W         | W          |
| Exports (as shipped)                   | 66 r/   | 63      | 90         | 129       | 108        |
| Imports for consumption 2/             | 11,900  | 10,900  | 11,600     | 10,700    | 10,100     |
| Consumption (dry equivalent)           | 12,200  | 11,900  | 12,200 r/  | 11,200 r/ | 10,900     |
| World: Production                      | 111,000 | 105,000 | 109,000 r/ | 107,000   | 109,000 e/ |

e/ Estimated. r/ Revised. W Withheld to avoid disclosing company proprietary data.

1/ Data are rounded to three significant digits.

2/ Excludes calcined bauxite. Includes bauxite imported to the U.S. Virgin Islands.

TABLE 2  
PRODUCTION AND SHIPMENTS OF ALUMINA IN THE UNITED STATES 1/

(Thousand metric tons)

| Year                  | Calcined alumina | Other alumina 2/ | Total                     |                     |
|-----------------------|------------------|------------------|---------------------------|---------------------|
|                       |                  |                  | As produced or shipped 3/ | Calcined equivalent |
| <b>Production: e/</b> |                  |                  |                           |                     |
| 1994                  | 4,360            | 730              | 5,090                     | 4,860               |
| 1995                  | 4,030            | 730              | 4,760                     | 4,530               |
| <b>Shipments: e/</b>  |                  |                  |                           |                     |
| 1994 r/               | 4,400            | 740              | 5,140                     | 4,910               |
| 1995                  | 4,120            | 740              | 4,860                     | 4,630               |

e/ Estimated. r/ Revised.

1/ Data are rounded to three significant digits.

2/ Trihydrate, activated, tabular, and other aluminas. Excludes calcium and sodium aluminates.

3/ Includes only the end product if one type of alumina was produced and used to make another type of alumina.

TABLE 3  
CAPACITIES OF DOMESTIC ALUMINA PLANTS, 1/ 2/ DECEMBER 31

(Thousand metric tons per year)

| Company and plant                              | 1994  | 1995  |
|--|-------|-------|
| <b>Aluminum Co. of America:</b>                |       |       |
| Point Comfort, TX                              | 1,740 | 1,740 |
| St. Croix, VI 3/                               | 635   | 600   |
| Total  | 2,380 | 2,340 |
| Kaiser Aluminum & Chemical Corp.: Gramercy, LA | 1,000 | 1,000 |
| Ormet Corp.: Burnside, LA                      | 600   | 600   |
| Reynolds Metals Co.: Corpus Christi, TX        | 1,600 | 1,600 |
| Total  | 5,570 | 5,540 |

1/ Capacity may vary depending on the bauxite used.

2/ Data are rounded to three significant digits; may not add to totals shown.

3/ Purchased from Virgin Islands Alumina Co. in 1995.

TABLE 4  
U.S. CONSUMPTION OF BAUXITE, BY INDUSTRY 1/

(Thousand metric tons, dry equivalent)

| Industry    | 1994      | 1995   |
|-------------|-----------|--------|
| Alumina     | 10,400 r/ | 10,100 |
| Abrasive 2/ | 197       | 133    |
| Chemical    | 192       | 201    |
| Refractory  | 350 r/    | 394    |
| Other       | 52        | 55     |
| Total       | 11,200 r/ | 10,900 |

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes consumption by Canadian abrasive industry.

TABLE 5  
PRODUCTION AND SHIPMENTS OF SELECTED ALUMINUM  
SALTS IN THE UNITED STATES IN 1994 1/

| Item   | Number of<br>producing<br>plants | Production<br>(thousand<br>metric tons) | Total shipments,<br>including interplant transfers |                      |
|--|----------------------------------|---|--|----------------------|
|  |                                  |   | Quantity<br>(thousand<br>metric tons)              | Value<br>(thousands) |
| <b>Aluminum sulfate:</b>                                       |                                  |   |  |                      |
| Commercial and municipal (17% Al <sub>2</sub> O <sub>3</sub> ) | 66                               | 1,000                                   | 951  | \$102,000            |
| Iron-free (17% Al <sub>2</sub> O <sub>3</sub> )                | 19                               | 160                                     | 156  | 18,100               |
| <b>Aluminum chloride:</b>                                      |                                  |   |  |                      |
| Liquid and crystal   | 6                                | 18                                      | W  | W                    |
| Anhydrous (100% AlCl <sub>3</sub> )                            | 3                                | 24                                      | 24   | 14,800               |
| Aluminum fluoride, technical                                   | 3                                | W                                       | W  | W                    |
| Aluminum hydroxide, trihydrate [100% Al(OH) <sub>3</sub> ]     | 11                               | 955                                     | 961  | 207,000              |
| Aluminates   | 16                               | 134                                     | 133  | 29,300               |
| Other aluminum compounds 2/                                    | XX                               | XX                                      | XX   | 179,000              |

W Withheld to avoid disclosing company proprietary data. XX Not applicable.

1/ Data are rounded to three significant digits.

2/ Includes light aluminum hydroxide, cryolite, etc.

Source: Data are based on Bureau of the Census 1994 Current Industrial Reports, Series MA-28A, "Inorganic Chemicals."

TABLE 6  
STOCKS OF BAUXITE IN THE UNITED STATES, 1/ 2/ DECEMBER 31

(Thousand metric tons, dry equivalent)

| Sector                               | 1994   | 1995   |
|--------------------------------------|--------|--------|
| Producers, processors, and consumers | 1,560  | 1,730  |
| Government                           | 17,200 | 16,300 |
| Total                                | 18,800 | 18,100 |

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Domestic and foreign bauxite; crude, dried, calcined, activated, all grades.

TABLE 7  
STOCKS OF ALUMINA IN THE UNITED STATES, 1/ 2/ DECEMBER 31

(Thousand metric tons, calcined equivalent)

| Sector                  | 1994 r/ | 1995  |
|-------------------------|---------|-------|
| Producers               | 470     | 325   |
| Primary aluminum plants | 1,050   | 1,100 |
| Total                   | 1,520   | 1,420 |

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Excludes consumers stocks other than those at primary aluminum plants.

TABLE 8  
AVERAGE VALUE OF U.S. IMPORTS OF CRUDE AND DRIED BAUXITE 1/

(Per metric ton)

| Country          | 1994                      |                                  | 1995                      |                                  |
|------------------|---------------------------|----------------------------------|---------------------------|----------------------------------|
|                  | Port of shipment (f.a.s.) | Delivered to U.S. ports (c.i.f.) | Port of shipment (f.a.s.) | Delivered to U.S. ports (c.i.f.) |
| Australia        | \$10.00                   | \$20.25                          | \$10.60                   | \$20.05                          |
| Brazil           | 27.68                     | 35.62                            | 23.31                     | 31.93                            |
| Guinea           | 23.53                     | 30.83                            | 22.45                     | 28.89                            |
| Guyana           | 27.29                     | 38.35                            | 25.00                     | 38.93                            |
| Jamaica          | 27.72 r/                  | 33.28 r/                         | 25.02                     | 30.50                            |
| Weighted average | 25.64 r/                  | 33.11 r/                         | 23.51                     | 30.64                            |

r/ Revised.

1/ Computed from quantity and value data reported to U.S. Customs Service and compiled by the Bureau of the Census, U.S. Department of Commerce. Not adjusted for moisture content of bauxite or differences in methods used by importers to determine value of individual shipments.

TABLE 9  
U.S. EXPORTS OF ALUMINA, 1/ 2/ BY COUNTRY

(Thousand metric tons, calcined equivalent, and thousand dollars)

| Country     | 1994     |         | 1995     |         |
|-------------|----------|---------|----------|---------|
|             | Quantity | Value   | Quantity | Value   |
| Brazil      | 234      | 47,500  | 28       | 9,500   |
| Canada      | 726      | 139,000 | 744      | 185,000 |
| Finland     | (3/)     | 447     | (3/)     | 634     |
| Mexico      | 33       | 18,500  | 39       | 20,900  |
| Netherlands | 14       | 9,150   | 13       | 14,400  |
| Norway      | --       | --      | (3/)     | 124     |
| Russia      | --       | --      | 138      | 24,200  |
| Sweden      | (3/)     | 133     | (3/)     | 141     |
| Other       | 35       | 56,900  | 81       | 98,600  |
| Total       | 1,040    | 271,000 | 1,040    | 353,000 |

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes exports of aluminum hydroxide (calcined equivalent) as follows: 1994--44,200 tons and 1995--41,700 tons.

3/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 10  
U.S. IMPORTS FOR CONSUMPTION OF BAUXITE, CRUDE AND DRIED,  
1/ 2/ BY COUNTRY

(Thousand metric tons)

| Country    | 1994   | 1995   |
|------------|--------|--------|
| Australia  | 54     | 134    |
| Brazil     | 1,630  | 1,720  |
| China      | 61     | --     |
| Guinea     | 3,740  | 3,890  |
| Guyana     | 1,150  | 793    |
| Indonesia  | 390    | 23     |
| Jamaica 3/ | 3,650  | 3,550  |
| Other      | 67     | 7      |
| Total      | 10,700 | 10,100 |

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes bauxite imported to the U.S. Virgin Islands from foreign countries.

3/ Dry equivalent of shipments to the United States.

NOTE.--Total U.S. imports of crude and dried bauxite (including the U.S. Virgin Islands) as reported by the Bureau of the Census were as follows:  
1994--10,400,000 tons and 1995--10,000,000 tons.

Sources: Bureau of the Census and the Jamaica Bauxite Institute.

TABLE 11  
U.S. IMPORTS FOR CONSUMPTION OF CALCINED BAUXITE, BY COUNTRY 1/

(Thousand metric tons and thousand dollars)

| Country   | 1994             |          |             |          | 1995             |          |             |          |
|-----------|------------------|----------|-------------|----------|------------------|----------|-------------|----------|
|           | Refractory grade |          | Other grade |          | Refractory grade |          | Other grade |          |
|           | Quantity         | Value 2/ | Quantity    | Value 2/ | Quantity         | Value 2/ | Quantity    | Value 2/ |
| Australia | --               | --       | 7           | 553      | --               | --       | 15          | 1,140    |
| Brazil    | 2                | 181      | 24          | 1,890    | 3                | 284      | 38          | 3,210    |
| China     | 153              | 6,540    | 137         | 6,820    | 131              | 5,940    | 154         | 8,770    |
| Guyana    | 25               | 3,110    | --          | --       | 71               | 9,460    | --          | --       |
| Other     | --               | --       | --          | --       | 17               | 1,370    | 54          | 1,830    |
| Total     | 181              | 9,830    | 168         | 9,260    | 223              | 17,000   | 259         | 14,900   |

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Value at foreign port of shipment as reported to U.S. Customs Service.

Source: Bureau of the Census.

TABLE 12  
U.S. IMPORTS FOR CONSUMPTION OF ALUMINA, BY COUNTRY 1/

(Thousand metric tons, calcined equivalent, and thousand dollars)

| Country   | 1994     |          | 1995     |          |
|-----------|----------|----------|----------|----------|
|           | Quantity | Value 2/ | Quantity | Value 2/ |
| Australia | 2,080    | 328,000  | 2,910    | 552,000  |
| Brazil    | 11       | 6,020    | 24       | 8,970    |
| Canada    | 84       | 50,600   | 80       | 50,500   |
| France    | 11       | 14,600   | 9        | 12,400   |
| Germany   | 34       | 54,600   | 35       | 66,000   |
| India     | 102      | 17,600   | 147      | 29,800   |
| Israel    | --       | --       | (3/)     | 4        |
| Italy     | (3/)     | 407      | (3/)     | 676      |
| Jamaica   | 320      | 50,000   | 270      | 61,000   |
| Japan     | 8        | 16,600   | 10       | 20,200   |
| Suriname  | 187      | 26,000   | 305      | 49,200   |
| Venezuela | 126      | 27,100   | 18       | 8,110    |
| Other     | 160      | 31,100   | 189      | 49,100   |
| Total     | 3,120    | 623,000  | 4,000    | 908,000  |

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Value at foreign port of shipment as reported to U.S. Customs Service.

3/ Less than 1/2 unit.

Source: Bureau of the Census.



TABLE 13  
BAUXITE: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

| Country                   | 1991      | 1992     | 1993       | 1994      | 1995 e/   |
|---------------------------|-----------|----------|------------|-----------|-----------|
| Albania e/                | 20        | 4        | 2          | 2         | 1         |
| Australia                 | 40,510    | 39,746   | 41,320     | 41,733    | 42,655 3/ |
| Bosnia and Herzegovina e/ | XX        | 200 3/   | 100        | 75        | 75        |
| Brazil                    | 10,365    | 9,366    | 9,669 r/   | 8,673 r/  | 8,761 3/  |
| China e/                  | 2,600     | 2,700    | 3,500      | 3,700     | 5,000     |
| Croatia                   | XX        | 7        | 2          | 1 r/ e/   | 2         |
| Dominican Republic 4/     | 7         | --       | --         | --        | --        |
| France                    | 9         | --       | --         | --        | --        |
| Ghana                     | 353 e/    | 338      | 424        | 426       | 490       |
| Greece                    | 2,133     | 2,078 r/ | 2,205 r/   | 2,196 r/  | 1,916 3/  |
| Guinea e/ 4/              | 15,466 3/ | 13,800   | 14,100     | 14,400    | 14,400    |
| Guyana 4/                 | 2,204     | 2,376    | 2,130 e/   | 2,100 e/  | 2,100     |
| Hungary                   | 2,037     | 1,721    | 1,561      | 830 r/    | 1,100     |
| India                     | 4,735     | 4,898    | 5,277 r/   | 4,809 r/  | 4,800     |
| Indonesia                 | 1,406     | 804      | 1,320      | 1,342 r/  | 899 3/    |
| Iran e/                   | 100       | 100      | 100        | 100       | 100       |
| Italy e/                  | 9         | 98 3/    | 90         | 90        | 90        |
| Jamaica 4/ 5/             | 11,552    | 11,302   | 11,391     | 11,564 r/ | 10,857 3/ |
| Kazakstan                 | XX        | 3,036    | 3,000 e/   | 2,425     | 3,300 3/  |
| Malaysia                  | 376       | 331      | 269 r/     | 162       | 184 3/    |
| Mozambique                | 8         | 8        | 6 e/       | 10        | 11        |
| Pakistan                  | 4         | 3        | 5          | 5         | 8         |
| Romania                   | 200       | 175      | 186        | 184       | 174 3/    |
| Russia                    | XX        | 4,578    | 4,260      | 3,000 e/  | 3,100     |
| Serbia and Montenegro     | XX        | 792      | 102        | --        | 48 3/     |
| Sierra Leone              | 1,288     | 1,250 e/ | 1,165      | 735       | 280       |
| Spain                     | 1 e/      | --       | --         | --        | --        |
| Suriname                  | 3,198     | 3,250    | 3,412 r/   | 3,772 r/  | 3,300 3/  |
| Turkey 6/                 | 489       | 613      | 538        | 445 r/    | 331       |
| U.S.S.R. 7/               | 7,870     | XX       | XX         | XX        | XX        |
| United States             | W         | W        | W          | W         | W         |
| Venezuela                 | 1,992     | 1,052    | 2,910 e/   | 4,419 r/  | 5,184 3/  |
| Yugoslavia 8/             | 1,912     | XX       | XX         | XX        | XX        |
| Total                     | 111,000   | 105,000  | 109,000 r/ | 107,000   | 109,000   |

e/ Estimated. r/ Revised. W Withheld to avoid disclosing company proprietary data; not included in "Total." XX Not applicable.

1/ World totals and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data through July 26, 1996.

3/ Reported figure.

4/ Dry bauxite equivalent of crude ore.

5/ Bauxite processed for conversion to alumina in Jamaica plus kiln-dried ore prepared for export.

6/ Public-sector production only.

7/ Dissolved in Dec. 1991. In addition to the bauxite reported in the body of the table, Russia produces nepheline syenite concentrates and Azerbaijan produces alunite ore as sources of aluminum. Estimated nepheline syenite concentrate, produced in Russia was as follows, in thousand metric tons: 1991--1,500; 1992--1,500; 1993--1,390 (reported); 1994--1,300; and 1995--1,400. Estimated alunite ore produced in Azerbaijan was as follows, in thousand metric tons: 1991--500; 1992--300; 1993--200; 1994--150; and 1995--100. Nepheline syenite concentrate grades 25% to 30% alumina, and alunite ore grades 16% to 18% alumina; these commodities may be converted to their bauxite equivalent by using factors of 1 ton of nepheline syenite concentrate equals 0.55 ton of bauxite and 1 ton of alunite equals 0.34 ton of bauxite.

8/ Dissolved in Apr. 1992.

TABLE 14  
ALUMINA: WORLD PRODUCTION, 1/ BY COUNTRY 2/ 3/

(Thousand metric tons)

| Country                   | 1991      | 1992   | 1993      | 1994        | 1995 e/  |
|---------------------------|-----------|--------|-----------|-------------|----------|
| Australia                 | 11,703    | 11,783 | 12,598    | 12,892      | 13,147   |
| Azerbaijan e/             | XX        | 300    | 200       | 100 r/      | 27 4/    |
| Bosnia and Herzegovina e/ | XX        | 100    | 50        | 50          | 50       |
| Brazil                    | 1,743     | 1,833  | 1,853 r/  | 1,868       | 1,870    |
| Canada                    | 1,131     | 1,104  | 1,180     | 1,170       | 1,064 4/ |
| China e/                  | 1,520     | 1,580  | 1,820     | 1,850 r/    | 2,200    |
| Czechoslovakia e/ 5/ 6/   | 187       | 143    | XX        | XX          | XX       |
| France                    | 538       | 508    | 476       | 438         | 450      |
| Germany                   | 863       | 857    | 840       | 824 r/      | 825      |
| Greece                    | 625       | 612    | 615 r/    | 584 r/      | 597 4/   |
| Guinea                    | 610       | 561    | 656 r/    | 660 r/      | 660      |
| Hungary                   | 635       | 548    | 421 r/    | 177 r/      | 230      |
| India e/                  | 1,700     | 1,700  | 1,800     | 2,000       | 2,000    |
| Ireland                   | 981       | 973    | 1,100     | 1,000 e/    | 1,000    |
| Italy 7/                  | 805       | 762    | 840 e/    | 825 e/      | 825      |
| Jamaica                   | 3,015     | 2,917  | 2,989     | 3,221       | 3,030 4/ |
| Japan 8/                  | 438       | 316    | 327       | 322 r/      | 320      |
| Kazakstan e/              | XX        | 1,100  | 1,000     | 900 r/      | 1,200    |
| Romania                   | 310 r/    | 280    | 293       | 302         | 323 4/   |
| Russia e/                 | XX        | 3,100  | 2,500 r/  | 2,254 r/ 4/ | 2,600    |
| Serbia and Montenegro e/  | XX        | 197    | 12        | -- r/       | 20       |
| Slovakia e/ 6/            | XX        | XX     | 140       | 75 r/       | 100      |
| Slovenia e/               | XX        | 45     | 40        | 40          | 40       |
| Spain e/ 7/               | 1,003     | 959 4/ | 1,060     | 1,000       | 1,000    |
| Suriname                  | 1,510     | 1,576  | 1,500 e/  | 1,500 e/    | 1,500    |
| Turkey                    | 159       | 156    | 169 r/    | 155 r/      | 180      |
| Ukraine e/                | XX        | 1,100  | 1,010     | 1,070       | 1,100    |
| U.S.S.R. 9/               | 5,277     | XX     | XX        | XX          | XX       |
| United Kingdom e/         | 110       | 120    | 105       | 105         | 100      |
| United States             | 5,230     | 5,190  | 5,290     | 4,860       | 4,530 4/ |
| Venezuela                 | 1,295     | 1,308  | 1,500     | 1,300 r/    | 1,641 4/ |
| Yugoslavia e/ 10/         | 900       | XX     | XX        | XX          | XX       |
| Total                     | 42,300 r/ | 41,700 | 42,400 r/ | 41,500 r/   | 42,600   |

e/ Estimated. r/ Revised. XX Not applicable.

1/ Figures represent calcined alumina or the total of calcined alumina plus the calcined equivalent of hydrate when available; exceptions, if known, are noted.

2/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

3/ Table includes data available through July 26, 1996.

4/ Reported figure.

5/ Dissolved Dec. 31, 1992.

6/ All production in Czechoslovakia from 1991-92 came from Slovakia.

7/ Hydrate.

8/ Data presented are for alumina used principally for specialty applications. Gross weight of aluminum hydrate for all uses was as follows, in thousand metric tons: 1991--864; 1992--714; 1993--704; and 1994-95--not available.

9/ Dissolved in Dec. 1991.

10/ Dissolved in Apr. 1992.