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BAUXITE AND ALUMINA

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Bauxite and Alumina

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Bauxite is a naturally occurring, heterogeneous material comprised primarily of one or more aluminum hydroxide minerals plus various mixtures of silica (SiO_2), iron oxide (Fe_2O_3), titania (TiO_2), aluminosilicates (clay, etc.), and other impurities in trace amounts. The principal aluminum hydroxide minerals found in varying proportions within bauxite are gibbsite [$Al(OH)_3$] and the polymorphs, boehmite and diaspore [both AlO(OH)].

Bauxite is typically classified according to its intended commercial application, such as abrasive, cement, chemical, metallurgical, and refractory. Of all bauxite mined, approximately 85% is converted to alumina (Al_2O_3) for the production of aluminum metal, and an additional 10% is converted to various forms of specialty alumina for nonmetal uses. The remaining 5% is used directly for nonmetallurgical bauxite applications. The bulk of world bauxite production is used, therefore, as feed for the manufacture of alumina via a wet chemical caustic leach process known as the Bayer process. Most of the alumina produced from this refining process is smelted using the Hall-Héroult process to produce aluminum metal by electrolytic reduction in a molten bath of natural or synthetic cryolite (Na_3AlF_6).

Specifications for the nonmetallurgical grades of bauxite are more stringent than those for bauxite used to produce alumina and are based on the processing requirements and special properties required of their final commercial products. The natural chemical impurities that exist within these specialty-grade ores are not chemically removed by refining because the ores are used as direct feed for the production of their ultimate end products. Although global figures on nonmetallurgical bauxite production and consumption are not commonly available, the principal industrial end uses are considered to be in refractories and abrasives, followed by cement applications. In addition, the aluminum chemicals and steel industries also consume significant quantities of bauxite.

Twenty-two countries reported bauxite mine production in 2005, and total world production increased by about 6% compared with that of 2004 (table 11). Australia, Brazil, China, Guinea, and Jamaica accounted for about three-fourths of the total bauxite mined in 2005.

At the current rate of consumption, total reported world reserves of bauxite are sufficient to meet cumulative world primary aluminum metal demand well beyond the 21st century. Although bauxite reserves are unevenly distributed throughout the world, with approximately 90% in a dozen countries, the sheer magnitude of these reserves (25 billion metric tons) is sufficient to ensure a readily accessible supply for the future (Plunkert, 2006).

U.S. production of alumina (calcined equivalent), derived almost exclusively from imported metallurgical-grade bauxite, decreased by 3% compared with that of 2004 (table 2). An estimated 91% of the alumina shipped by U.S. refineries went to domestic primary smelters for aluminum metal production. Consumption by the abrasives, chemicals, refractories, and specialties industries accounted for the remainder of U.S. alumina shipments.

World output of alumina increased by 5% in 2005 compared with that of 2004. The principal producing countries, in descending order of alumina output, were Australia, China, Brazil, the United States, and Jamaica. These countries accounted for 66% of the world's production; Australia alone accounted for 28% of total world production (table 12).

Legislation and Government Programs

In November, the Defense Logistics Agency (DLA) released its revised Annual Materials Plan (AMP) for the National Defense Stockpile for fiscal year 2006 (October 1, 2005, through September 30, 2006). The 2006 AMP provided for the sale of up to 43,700 calcined metric tons (43,000 calcined long tons) of refractory-grade bauxite in fiscal year 2006. This was the maximum amount recommended for disposal during the fiscal year, and the actual level of sales would be limited to available inventory. The AMP also included the authority to sell 2.03 million metric tons (Mt) (2 million long tons) of Jamaica-type metallurgical-grade bauxite and 406,000 metric tons (t) (400,000 long tons) of Suriname-type metallurgical-grade bauxite. This represented inventory that had been sold previously, but not yet shipped (Defense Logistics Agency, 2005).

At yearend 2005, the uncommitted inventories for metallurgical-grade bauxite and calcined refractory-grade bauxite were depleted (Defense Logistics Agency, 2006).

Production

Bauxite.—For many years, domestic mines have supplied less than 1% of the U.S. requirement for bauxite. Essentially all the domestic bauxite production was used in nonmetallurgical products, such as abrasives, chemicals, proppants, and refractories. Thus, the United States imported almost all the bauxite, especially the metallurgical grade, that it required.

Alumina.—The two hurricanes (Katrina and Rita) that hit the Gulf Coast of the United States forced the domestic alumina refineries to curtail production for several days. Although none of the plants experienced significant damage, the temporary shutdowns were responsible for the 3% decrease in U.S. production compared with that of 2004.

Consumption

Bauxite.—Domestic production and consumption data for bauxite and alumina were obtained by the U.S. Geological Survey from three voluntary surveys of U.S. operations. One of these surveys, "Bauxite Consumption," was sent to 31 operations, 24 of which responded, representing 89% of the bauxite consumed for uses other than cement listed in table 4. Total domestic consumption of bauxite decreased by about 3% compared with that of 2004. In 2005, 92% of the bauxite consumed in the United States was refined to alumina (an estimated 2.3 t of dried bauxite was required to produce 1 t of alumina); the remaining 8% was consumed in nonmetallurgical applications (table 4).

Alumina.—An estimated 91% of the alumina shipped by U.S. alumina plants went to primary aluminum smelters for metal production. In 2005, 15 domestic primary aluminum smelters consumed 4.66 Mt of alumina. Consumption of various forms of alumina by the abrasives, chemicals, refractories, and specialties industries accounted for the remainder of U.S. alumina use.

Prices

Most metallurgical-grade bauxite and alumina were purchased under long-term contracts. Contract terms for these commodities normally were not made public. Spot prices for metallurgical-grade alumina and specialty forms of bauxite and alumina for nonmetallurgical applications, however, were published in trade journals.

Industrial Minerals (2005) quoted end-of-year prices for several types of imported refractory-grade bauxite from China and Guyana. The price quotes for Chinese refractory-grade bauxite, 88% Al_2O_3 free on board (f.o.b.) Chinese ports, were as follows: Shanxi, round kiln, lump, $160 to $165 per metric ton; Shanxi, rotary kiln, lump, $150 to $165 per ton; and Guizhou, rotary kiln, lump, $140 to $145 per ton. The price range for Guyanese refractory-grade bauxite was $205 to $210 per ton, cost, insurance, and freight (c.i.f.) Rotterdam, Netherlands. The 2005 annual average values of U.S. imports of metallurgical-grade bauxite are listed in table 7.

The market or spot prices for alumina fluctuated in 2005 amid continuing tight global supply and strong demand from China. According to Metal Bulletin, metallurgical-grade alumina spot prices on international markets began 2005 at $390 to $420 per ton. By mid-March, the price reached $440 to $460 per ton before beginning a slow decline to end at $400 to $420 per ton in mid-June. In mid-August, the price began to increase dramatically, and by yearend, the price had reached $580 to $590 per ton. Trade data released by the U.S. Census Bureau indicated that the 2005 annual average value of U.S. imports of calcined alumina was $305 per ton, free alongside ship (f.a.s.) port of shipment, and $316 per ton, c.i.f. U.S. ports.

Trade

In addition to the materials listed in tables 8-10, various specialty aluminum compounds were also traded. The compounds exported in 2005 included 13,900 t of aluminum oxide abrasives; 13,100 t of aluminum chloride; 12,600 t of aluminum sulfate; and 8,410 t of fluoride-base compounds of aluminum, including synthetic cryolite and aluminum fluoride. The compounds imported in 2005 included 244,000 t of aluminum oxide abrasives; 9,860 t of aluminum sulfate; 4,250 t of fluoride-base aluminum compounds; and 712 t of aluminum chloride.

World Industry Structure

In 2005, world production of bauxite increased by 6% compared with that of 2004 (table 11). Mine production was reported in 22 countries, and total world production amounted to 169 Mt. The leading producers of bauxite, in decreasing order of tonnage mined, were Australia, Brazil, China, Guinea, and Jamaica, which accounted for about three-fourths of total world production.

World output of alumina increased by 5% in 2005 compared with that of 2004 (table 12). The five principal producing countries, in descending order of quantity of alumina produced, were Australia, China, Brazil, the United States, and Jamaica. These countries accounted for about two-thirds of the world's production; Australia alone accounted for 28%.

World Review

Australia.—In March, the 1.4-million-metric-ton-per-year (Mt/yr) Comalco Alumina Refinery (CAR) was officially opened. Alumina from the refinery would be used by Comalco Ltd.'s smelters in Australia and New Zealand and also sold to a range of export customers, including Norsk Hydro ASA under a 26-year supply agreement for 500,000 metric tons per year (t/yr) of alumina (Comalco Ltd., 2005a).

Comalco also announced the construction of a new ship loader project, scheduled for completion in late 2006, at its Weipa Mine in Queensland. The new loader, rated at 6,500 metric tons per hour, would allow the operation to load two ships simultaneously. The Weipa Mine supplied 100% of the bauxite required for the CAR and the Queensland Alumina Refinery in Gladstone and the Eurallumina Refinery in Sardinia, Italy (Comalco Ltd., 2005b).

Alcan Inc. announced that it had signed a 20-year agreement with the PNG Gas Project for the purchase of natural gas for Alcan's Gove alumina refinery in the Northern Territory, which would replace imported oil as the primary energy source for the refinery. The first gas delivery was expected in 2009 (Alcan Inc., 2005c).

Alcan opened a new alumina research and development facility in Brisbane to develop new technologies and to enhance existing alumina production processes to improve productivity, environmental performance, and employee safety. Construction of the facility was jointly funded by the governments of Queensland and Australia (Alcan Inc., 2005b).

Bosnia and Herzegovina.—The Government of Bosnia and Herzegovina signed a 25-year contract with Starsped Gacko for the exploitation of bauxite mines in four Herzegovina

municipalities. Starsped planned to produce 60,000 t/yr of ore and to invest in exploration of other deposits (Seeurope, 2005§[1]).

Brazil.—Participants in the Alumar consortium [Alcan (10%) (2005d), Alcoa (54%) (2005c), and BHP Billiton (36%) (2005)], announced plans to invest in the expansion of the alumina refinery in Sao Luis, State of Maranhao. The project, which would increase capacity at the refinery to about 3.5 Mt/yr from 1.4 Mt/yr, was scheduled to begin in November and to be completed in 2008.

Companhia Vale do Rio Doce (CVRD) (2005) and Norsk Hydro ASA (2005) approved investments in the Stages 6 and 7 expansions of the Alunorte alumina refinery in the State of Para. Stages 4 and 5, scheduled to be completed in 2006, would increase capacity to 4.4 Mt/yr from 2.5 Mt/yr. Stages 6 and 7, scheduled to be completed in 2008, would each add 935,000 t/yr of capacity and would increase Alunorte's capacity to about 6.3 Mt/yr. CVRD owned 57% of Alunorte, Norsk Hydro owned 34%, and the remaining 9% was held by private companies in Brazil and Japan.

CVRD continued the development of the Paragominas bauxite mine and began the construction of a 244-kilometer pipeline to transport 14.4 Mt/yr of ore from the mine to the Alunorte refinery. Phase I of the mine development, with a production capacity of 5.4 Mt/yr of ore, was scheduled for completion in 2007. CVRD also approved the investment for the development of Phase 2 of the Paragominas Mine. The Phase 2 expansion, which would increase bauxite production capacity to 9.9 Mt/yr, was expected to be completed by 2008 (Companhia Vale do Rio Doce, 2005).

Alcoa's board of directors approved the development of the Juruti Mine in the State of Para. The mine initially was expected to produce 2.6 Mt/yr of ore as feed for the Alumar refinery. Future expansions of the mine were expected to require low incremental investments. The deposit was estimated to contain 695 Mt of ore. A fill installation permit was issued by the Para State government in August (Alcoa Inc., 2005c).

China.—In September, Aluminum Corp. of China (Chalco) began commercial production at the 800,000-t/yr expansion of its Shanxi refinery that increased the plant's capacity to 2.2 Mt/yr, making it the largest alumina refinery in China. The refinery processes Chinese bauxite using a "Bayer-Sinter" technology and produces a sandy alumina. Chalco also commissioned the 700,000-t/yr expansion at its Zhengzhou (formerly Henan) alumina plant in central China, which increased capacity to 2.1 Mt/yr of alumina (CRU Alumina Monitor, 2005a).

Chalco announced plans to begin construction of the Phase 3 expansion at its 850,000-t/yr Pingguo refinery in Guangxi Province. The expansion, which would increase capacity to about 1.8 Mt/yr, was scheduled to be completed in 2008 (CRU Alumina Monitor, 2005a).

Guangxu Guixi Huayin Aluminium Corp. [Chalco (33%), China Minmetals Corp. (33%), and Guanxi Investment Group Corp. (34%)] received approval from China's National Development and Reform Commission to begin construction of an 800,000-t/yr expansion of Guangxu's alumina refinery near Baise city in southern Guangxi Province. Upon completion, which could take 2 to 3 years, capacity at the refinery would increase to 1.6 Mt/yr (Metal Bulletin, 2005).

Yimei Group, a gas producer in Henan Province, announced the startup of commercial production at its 100,000-t/yr alumina refinery. Startup of the plant's Phase 2 expansion to 200,000 t/yr of alumina was delayed (Platts Metals Week, 2005).

Ghana.—Alcoa and the Government of Ghana signed a memorandum of understanding (MOU) to develop an integrated aluminum industry in Ghana. Alcoa and the Government would conduct feasibility studies on the projects to be completed in 2006. The studies included development of the Kibi and Nyinahin bauxite mines and construction of a 1.5-Mt/yr alumina refinery and related infrastructure. The refinery was expected to use natural gas supplied from the West Africa Gas Pipeline Project. Also included in the agreement was the initial restart of three of the five potlines at the 200,000-t/yr Volta Aluminium Co. (Valco) aluminum smelter in Tema (Alcoa Inc., 2005b).

Greece.—Alcan, which held a 60.2% interest in Aluminium de Grèce (AdG), sold a 53% controlling interest to Mytilineos Holdings S.A. According to the sales agreement, the balance of Alcan's interest (7.2%) may be sold to Mytilineos 1 year after the closing of this transaction. Included in the sale were a 750,000-t/yr alumina refinery and a 160,000-t/yr aluminum smelter (Alcan Inc., 2005a).

Guinea.—The Government of Guinea ratified Global Alumina Corp.'s basic agreement for the development and construction of a 2.8-Mt/yr alumina refinery in Boke. The agreement granted Global Alumina rights to construct, operate, and maintain an alumina refinery in Guinea, rights to a mining concession for the exploitation of bauxite, rights to use existing road, rail, and port infrastructure, as well as investment protections and fiscal incentives (Global Alumina Corp., 2005c). Dubai Aluminium Co. Ltd. (Dubal) and China Aluminium Group (CAG) each entered into a long-term purchase agreement for 25% of Global Alumina's annual production. In addition, Dubal and CAG would be given the opportunity to make substantial equity investments in Global Alumina (Global Alumina Corp., 2005a, b).

Halco (Mining) Inc. and the Government of Guinea reached an agreement on bauxite mining rights. Halco owned 51% of Compagnie des Bauxites de Guinée (CBG), which mined bauxite in the Boke region of Guinea and had exclusive rights to bauxite reserves and resources in northwestern Guinea through 2038. The Government, CBG, and Global Alumina entered a three-party agreement granting mining rights to part of the Initial Territory held by CBG to Global Alumina. In return, CBG, Halco, and the Government were to meet to recommend the granting of additional mining titles for 2 billion metric tons of bauxite reserves to CBG to compensate CBG for the bauxite reserves granted to Global Alumina and to provide additional tonnage to CBG for long-term needs in areas outside of CBG's Initial Territory. The additional tonnage would provide bauxite resources for export and future in-country refining needs (Alcoa Inc., 2005f).

Alcan, Alcoa, and the Government of Guinea signed a basic agreement that set forth the framework for development of a

[1]References that include a section mark (§) are found in the Internet References Cited section.

1.5-Mt/yr alumina refinery with provisions for future expansion. Under the terms of the agreement, Alcan and Alcoa would hold at least an 80% interest in the refinery with an option for the Government to acquire an equity stake. CBG would supply the refinery with bauxite, and the project would have access to the existing infrastructure (Alcoa Inc., 2005a).

India.—Dubal finalized a $3.6 billion agreement with Larsen & Toubro Ltd. for the construction of an integrated aluminum complex in Orissa. Dubal would hold a 74% stake in the project, and Larsen & Toubro would hold the remainder. Phase I included a 1.4-Mt/yr alumina refinery, a bauxite mine with associated infrastructure, and a powerplant. Construction was expected to begin in 2007 with completion scheduled for 2009. Phase 2 of the project included a doubling of the refinery capacity and construction of a primary aluminum smelter. No date was given for the start of Phase 2 (Mason, 2005).

Vedanta Resources plc, majority owner of Sterlite Industries Ltd., began construction of a 1.4-Mt/yr alumina refinery in Orissa. The project was expected to be completed in 2007 (Kassakovich, 2005).

Hindalco Industries Limited, a member of Aditya Birla Group, signed a MOU with the government of Orissa to construct an integrated aluminum complex. The project included a 1-Mt/yr alumina refinery, a 260,000-t/yr aluminum smelter, a captive powerplant, and bauxite mines with a capacity of 3 Mt/yr (Aditya Birla Group, 2005§).

Jamaica.—Alcoa's board of directors approved the 1.5-Mt/yr expansion of the Jamalco alumina refinery, thereby increasing the plant's capacity to 2.8 Mt/yr. The first phase of this expansion (150,000 t/yr) was expected to be completed by yearend 2006. Phase 2 (the remaining 1.35 Mt/yr) was scheduled to be completed by yearend 2007, pending final agreements on the supply of natural gas to the refinery (Alcoa Inc., 2005d).

Kazakhstan.—Aluminum of Kazakhstan announced plans to begin development of the Vostochno-Ayatskoye bauxite deposit. The company reported reserves of 28.8 Mt of bauxite (Interfax Mining & Metals Report, 2005).

Russia.—RUSAL and SUAL Group signed an agreement that made them equal partners in the Komi Aluminium Project. The project involved the development, construction, and operation of a bauxite-alumina complex in the Komi Republic. Under the terms of the agreement, financing of a new 1.4-Mt/yr alumina refinery near the city of Sosnogorsk would be shared on a parity basis by means of debt and shareholders' capital. The refinery, scheduled to be completed by yearend 2008, would process bauxite ore extracted from the Middle Timan bauxite deposit. Production from the mine was expected to increase to 6 Mt of ore by 2008 from 1.5 Mt in 2005 (SUAL Group, 2005b).

SUAL resumed production at the Novo-Kalyinskaya Mine. Construction at the mine was suspended in the late 1980s, and the mine was temporarily closed. The mine was expected to extract 170,000 t of bauxite by yearend 2005 with production slowly increasing to about 800,000 t/yr (SUAL Group, 2005a).

In December 2004, RUSAL won a tender for the development of the Denislavsky, Ixinsky, and Plesetsky areas of the North Onega bauxite deposit. Under the provisions of the license agreement for the Ixinsky area, technical parameters for development of the area were to be prepared no later than September 2007, and construction of the infrastructure was to begin by December 2007. Mine production was expected to begin by January 2010 and to increase to 1.5 Mt/yr within 2 years. In accordance with the agreement, RUSAL must complete a feasibility study for a 1.5-Mt/yr alumina refinery (with possible future expansion to 2.8 Mt/yr) by February 2007 (RUSAL, 2005).

Serbia and Montenegro.—Salamon Enterprises (a subsidiary of RUSAL) purchased a 65.4% interest in the Kombinat Aluminijuma Podgorica (KAP) aluminum complex and a 32% interest in the Ridnik Boksita Niksic bauxite mine in Montenegro. The KAP complex included a 125,000-t/yr aluminum smelter and a 280,000-t/yr alumina refinery (CRU Alumina Monitor, 2005b).

Sierra Leone.—The Government of Sierra Leone and Titanium Resources Group Ltd. (TRG) announced the restart of mining at TRG's wholly owned bauxite operations Sierra Minerals Holdings I, Ltd. (SML). Bauxite production at the rate of 1.2 Mt/yr was expected to begin in the first quarter of 2006. TRG signed long-term sales agreements with Alcoa and Glencore AG for the full estimated annual production. In January, SML was granted a 10-year mining lease with the option to renew for another 10 years. Bauxite reserves were estimated to be 12.4 Mt, which should support mining operations for about 10 years; however, it was anticipated that future exploration work in the area would expand these reserves (Titanium Resources Group Ltd., 2005).

Suriname.—In February, Suriname Aluminum Company, L.L.C. (Suralco) completed the 250,000-t/yr expansion of its refinery in Paranam 6 months ahead of schedule. The expansion increased the plant's capacity to about 2.2 Mt/yr (Alcoa Inc., 2005e).

Outlook

Several new bauxite deposits around the world are being explored and developed. Additional alumina refinery capacity is coming onstream. As a result, bauxite and alumina production was expected to be adequate to meet the long-term needs of the aluminum industry. Alumina shortages, which led to a rapid increase in price in 2005, have begun to ease and prices have moderated. Growth in demand for aluminum metal was expected to continue to increase during the next few years but at a slightly slower pace than that of the past year or two. Hence, bauxite and alumina production was expected to be adequate to meet the increased demand.

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TABLE 1
SALIENT BAUXITE STATISTICS[1]

(Thousand metric tons)

	2001	2002	2003	2004	2005
United States:					
Production, crude ore, dry equivalent:					
Quantity	NA	NA	NA	NA	NA
Value	NA	NA	NA	NA	NA
Exports, as shipped:					
Crude and dried	67	27	55	42	34
Calcined	14	15	22	21	18
Imports for consumption, as shipped:					
Crude and dried	8,300	7,340	8,390	10,000	9,850
Calcined	242	237	307	341	337
Consumption, dry equivalent	9,770	9,980	11,300	13,600 r	13,200
World, production	137,000	144,000	153,000 r	160,000 r	169,000 e

eEstimated. rRevised. NA Not available.

[1]Data are rounded to no more than three significant digits.

TABLE 2
ESTIMATED PRODUCTION AND SHIPMENTS OF ALUMINA IN THE UNITED STATES[1]

(Thousand metric tons)

			Total	
Year	Calcined alumina	Other alumina[2]	As produced or shipped[3]	Calcined equivalent
Production:				
2004	4,990	529	5,520	5,350
2005	4,750	708	5,460	5,220
Shipments:				
2004	5,000	716	5,720	5,490
2005	4,760	658	5,420	5,190

[1]Data are rounded to no more than 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, DECEMBER 31[1, 2]

(Thousand metric tons per year)

Company and plant	2004	2005
Alcoa Inc., Point Comfort, TX	2,300	2,300
BPU Reynolds, Inc., Corpus Christi, TX	1,600	1,600
Gramercy Alumina LLC, Gramercy, LA[3]	1,250	1,250
Ormet Corp., Burnside, LA	600	600
Total	5,750	5,750

[1]Capacity may vary depending on the bauxite used.

[2]Data are rounded to no more than three significant digits; may not add to totals shown.

[3]Jointly owned by Century Aluminum Co. and Noranda Aluminum Inc.

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

(Thousand metric tons, dry equivalent)

Industry	2004	2005
Abrasive	53	26
Alumina	12,500	12,200
Cement[2]	486 [r]	542
Chemical	W	W
Refractory	260	187
Other[3]	258	271
Total	13,600 [r]	13,200

[r]Revised. W Withheld to avoid disclosing company proprietary data, included with "Other."
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Data from the D15-Cement annual survey form, U.S. Geological Survey Form 9-4041-A.
[3]Includes municipal water works, oil, and steel and ferroalloys.

TABLE 5
STOCKS OF BAUXITE IN THE UNITED STATES, DECEMBER 31[1, 2]

(Thousand metric tons, dry equivalent)

Sector	2004	2005
Producers, processors, consumers	3,120	2,730
Government	--	--
Total	3,120	2,730

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Domestic and foreign bauxite; crude, dried, calcined, activated, all grades.

TABLE 6
STOCKS OF ALUMINA IN THE UNITED STATES, DECEMBER 31[1, 2]

(Thousand metric tons, calcined equivalent)

Sector	2004 [r]	2005
Producers	81	64
Primary aluminum plants	876	765
Total	957	830

[r]Revised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Excludes consumer stocks other than those at primary aluminum plants.

TABLE 7
AVERAGE VALUE OF U.S. IMPORTS OF CRUDE AND DRIED BAUXITE[1]

(Dollars per metric ton)

Country	2004		2005	
	Port of shipment f.a.s.[2]	Delivered to U.S. ports c.i.f.[3]	Port of shipment f.a.s.[2]	Delivered to U.S. ports c.i.f.[3]
Australia	11.19	29.97	15.59	30.32
Brazil	22.71	36.82	25.63	39.15
Guinea	21.85	28.08	24.36	30.31
Guyana	28.41	35.26	34.63	40.47
Jamaica	18.36	22.34	19.69	23.02
Weighted average	22.50	30.80	25.87	34.54

[1]Computed from quantity and value data reported to U.S. Customs Service and compiled by the U.S. Census Bureau, Department of Commerce. Not adjusted for moisture content of bauxite or differences in methods used by importers to determine value of individual shipments.
[2]Free alongside ship valuation.
[3]Cost, insurance, and freight valuation.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF BAUXITE, CRUDE AND DRIED, BY COUNTRY[1]

(Thousand metric tons)

Country	2004	2005
Imports:		
Australia	127	232
Brazil	2,550	3,210
Guinea	2,320	2,460
Guyana	1,110	1,280
Jamaica[2]	3,340	1,760
Other	550	916
Total	10,000	9,850
Exports:		
Canada	21	27
China	(3)	--
Mexico	12	1
Other	9	5
Total	42	34

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]In 2004, exports to the United States; data from the Jamaica Bauxite Institute.
[3]Less than ½ unit.

Note: Total U.S. imports of crude and dried bauxite as reported by the U.S. Census Bureau were as follows: 2004–8.5 million metric tons (Mt) and 2005–9.45 Mt.

Sources: U.S. Census Bureau and the Jamaica Bauxite Institute.

TABLE 9

U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF CALCINED BAUXITE, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

	2004				2005			
	Refractory grade		Other grade		Refractory grade		Other grade	
Country	Quantity	Value[2]	Quantity	Value[2]	Quantity	Value[2]	Quantity	Value[2]
Imports:								
Australia	12	1,050	80	8,010	--	--	88	10,200
Brazil	--	--	7	524	--	--	(3)	61
China	116	15,300	88	7,570	104	14,300	43	5,490
Guyana	36	4,440	--	--	38	4,790	9	564
Other	1	52	(3)	11	47	1,430	8	457
Total	165	20,800	175	16,100	188	20,500	149	16,800
Exports:								
Canada	5	648	5	306	8	809	4	242
Mexico	1	114	9	1,340	(3)	124	5	776
Other	1	199	(3)	340	(3)	117	1	258
Total	7	961	14	1,990	8	1,050	10	1,280

-- Zero.

[1]Data are rounded to no more than 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 ½ unit.

Source: U.S. Census Bureau.

TABLE 10

U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF ALUMINA, BY COUNTRY[1]

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

Country	2004		2005	
	Quantity	Value[2]	Quantity	Value[2]
Imports:				
Australia	816	180,000	932	231,000
Brazil	32	16,400	17	4,260
Canada	106	70,500	103	75,100
China	7	3,570	10	5,570
France	18	23,100	16	25,400
Germany	40	72,000	49	75,200
Jamaica	60	14,200	116	36,400
Japan	4	14,200	5	13,200
Suriname	543	115,000	560	139,000
Venezuela	(3)	250	27	6,360
Other	25	23,600 r	31	27,900
Total	1,650	533,000	1,860	639,000
Exports:				
Brazil	2	3,220	3	4,260
Canada	144	65,300	407	215,000
China	493	118,000	366	125,000
Finland	(3)	632	(3)	231
Mexico	54	25,800	69	39,700
Netherlands	14	10,900	20	18,800
Norway	303	62,000	104	25,600
Russia	(3)	868	(3)	1,440
Sweden	1	1,700	1	1,760
Other	217	151,000	234	199,000
Total	1,230	439,000	1,210	631,000

rRevised.

[1]Data are rounded to no more than 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 ½ unit.

Source: U.S. Census Bureau.

TABLE 11
BAUXITE: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

Country	2001	2002	2003	2004	2005[e]
Australia	53,799	54,135	55,602	56,593	59,959 [3]
Bosnia and Herzegovina[e]	75	113	573 [r]	480 [r]	480
Brazil	13,032 [r]	13,260 [r]	17,363 [r]	19,700 [r]	19,800 [p]
China[e]	9,800	12,000	13,000	15,000	18,000
Ghana	678	684	495	498	734 [p]
Greece	2,052	2,492	2,418	2,444	2,450
Guinea[e, 4]	15,100	15,300 [r]	15,000 [r]	15,000 [r]	15,000
Guyana[4]	1,950	1,690	1,701 [r]	1,466 [r]	1,500
Hungary	1,000	720	666	647	511
India	7,864	9,647	10,414	11,285	11,957 [3]
Indonesia	1,237	1,283	1,263	1,331	1,400
Iran	274 [r]	57 [r]	366 [r]	420 [r]	500 [3]
Jamaica[4, 5]	12,370	13,120	13,444	13,296	14,118 [3]
Kazakhstan	3,685	4,377	4,737	4,706	4,800
Malaysia	64	40	6	2 [r]	2
Mozambique	9	9	12	7	10 [3]
Pakistan[e]	9	8	8	8 [r]	9
Russia[e]	4,000	4,500	5,500	6,000	6,400
Serbia and Montenegro	610	612	540 [r]	486 [r]	610
Suriname	4,394	4,002	4,215	4,052	4,584 [3]
Turkey[6]	242	287	364	366	365
United States	NA	NA	NA	NA	NA
Venezuela	4,585	5,191	5,446	5,842 [r]	5,900
Total	137,000	144,000	153,000 [r]	160,000 [r]	169,000

[e]Estimated. [p]Preliminary. [r]Revised. NA Not available.

[1]World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through July 25, 2006.

[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.

TABLE 12
ALUMINA: WORLD PRODUCTION, BY COUNTRY[1, 2, 3]

(Thousand metric tons)

Country	2001	2002	2003	2004	2005
Australia	16,313	16,382	16,529	16,700 [4]	17,704
Azerbaijan	95	91	180	232 [r]	315
Bosnia and Herzegovina[e]	50 [4]	50	50	50	50
Brazil	3,445	3,962	5,111	5,315 [r]	5,320 [p]
Canada	1,036	1,125	1,109	1,170	1,214
China[e]	4,650	5,450	6,110	6,990 [r, 4]	8,610
France[e]	150	150	150	100	100
Germany[e]	715 [r]	720	830	835 [r, 4]	840
Greece	679	750	750	750 [e]	750 [e]
Guinea	644 [r]	724 [r]	738 [r]	779 [r]	780 [e]
Hungary[e]	300	294	300	300	300
India[e]	2,400	2,800	2,500	2,600	2,700
Iran	--	101 [r]	102 [r]	137 [r]	150 [e]
Ireland[e]	1,100	1,100	1,100	1,100	1,100
Italy[e]	500	500	500	500	500
Jamaica	3,542	3,631	3,844	4,023	4,086
Japan[5]	331	333	363 [r]	340 [e]	330 [e]
Kazakhstan	1,231	1,386	1,419	1,468	1,505
Romania	319	361	333	350 [e]	350 [e]
Russia	3,046	3,131	3,230	3,269	3,259
Serbia and Montenegro	201	237	225	245 [r]	235
Slovakia[e]	110	112	132	130	135
Slovenia[e]	34	30	30	30	30
Spain[e, 6]	1,100	1,100	1,100	1,100	1,100
Suriname[e]	1,900	1,900	2,004 [r, 4]	2,039 [r, 4]	1,950
Turkey	146	152	162	170 [e]	170 [e]
Ukraine	1,343	1,351	1,434	1,563	1,632
United Kingdom	84	74	--	-- [e]	-- [e]
United States	4,340	4,340	4,860	5,350	5,220
Venezuela	1,833	1,901	1,882 [r]	1,900 [e]	1,920 [p]
Total	51,600	54,200	57,100	59,500 [r]	62,400

[e]Estimated. [p]Preliminary. [r]Revised. -- Zero.

[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 no more than three significant digits; may not add to totals shown.

[3]Table includes data available through July 25, 2006.

[4]Reported figure.

[5]Data presented are for alumina used principally for specialty applications. Information on aluminum hydrate for all uses is not adequate to formulate estimates of production levels. Production of aluminum hydroxide, in metric tons: 2001—739,000 (revised); 2002—724,000 (revised); 2003—740,000; 2004—730,000 (estimated); and 2005—740,000 (estimated).

[6]Hydrate.