



# 2007 Minerals Yearbook

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## BAUXITE AND ALUMINA

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# BAUXITE AND ALUMINA

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In 2007, almost all of the 9.78 million metric tons (Mt) of bauxite used in the United States was imported. World production totaled 199 Mt; the leading producing countries were Australia, China, and Brazil. U.S. production of alumina was estimated to be 3.9 Mt of calcined equivalent. Of the 3.9 Mt of alumina (calcined equivalent) shipped in 2007, an estimated 84% was used for metal production. World production of alumina was estimated to be 76,100 Mt; China, Australia, and Brazil were the leading producing countries.

## Legislation and Government Programs

By yearend 2006, the uncommitted inventories of metallurgical-grade bauxite or calcined refractory-grade bauxite that were in the National Defense Stockpile had been depleted (Defense Logistics Agency, 2006).

## Production

**Bauxite.**—For many years, domestic mines have supplied less than 1% of the U.S. requirement for bauxite. 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.**—U.S. production of alumina (calcined equivalent), which was derived exclusively from imported metallurgical-grade bauxite, declined by 17% compared with that of 2006 (table 2). The decline in production was attributed to closures of refining capacity where production costs were higher than those of competitors, and declining alumina prices. The Burnside, LA, alumina refinery was closed by Ormet Corp. in late 2006 and remained closed throughout 2007. No decision on reopening the refinery has been announced (Ormet Corp., 2007, p. 1). Alcoa Inc. closed one of six digesters at its refinery in Point Comfort, TX, in late 2006. No announcement was made about reopening the digester (Alcoa Inc., 2008a, p. 23).

## 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. The “Bauxite Consumption” survey was sent to 31 operations, 24 of which responded, representing approximately 89% of the bauxite consumed for uses other than cement listed in table 4.

Total domestic consumption of bauxite declined by 21% compared with that of 2006 as a result of closures at two alumina refineries at yearend 2006. In 2007, 96% of the bauxite consumed in the United States was refined to alumina [an

estimated 2.43 metric tons (t) of dried bauxite was required to produce 1 t of alumina]; the remaining 4% was consumed in nonmetallurgical applications (table 4).

**Alumina.**—An estimated 90% of the alumina shipped by U.S. alumina refineries and imported from other sources went to primary aluminum smelters for metal production. In 2007, 14 domestic primary aluminum smelters consumed 5.12 Mt of alumina, an increase of 19% compared with the amount of alumina consumed in 2006, as domestic primary aluminum smelters restarted idle capacity. Consumption of various forms of alumina by the abrasives, chemicals, refractories, and other specialty 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 (2007) quoted yearend prices for several types of imported refractory-grade bauxite from China and Guyana. The prices for refractory-grade bauxite in China, 88%  $Al_2O_3$  free on board (f.o.b.), were as follows: Shanxi, round kiln, lump, \$210 to \$220 per metric ton; Shanxi, rotary kiln, lump, \$210 to \$220 per ton; and Guizhou, rotary kiln, lump, \$190 to \$220 per ton. The price range for Guyanese refractory-grade bauxite was \$210 to \$220 per ton f.o.b. The 2007 annual average values of U.S. imports of metallurgical-grade bauxite are listed in table 6.

According to Metal Bulletin, metallurgical-grade alumina spot prices on international markets started the year in the range of \$200 to \$210 per ton but increased dramatically to \$350 to \$370 per ton by the end of January owing to decreased refinery output and firm demand by aluminum smelters worldwide. The price remained in the \$350- to \$370-per-ton range until July when prices declined slightly to a range of \$330 to \$360 per ton. Prices remained unchanged until the beginning of December, when they rose again to the \$350- to \$370-per-ton range. Trade data released by the U.S. Census Bureau indicated that the 2007 annual average value of U.S. imports of calcined alumina was \$395 per ton, cost, insurance, and freight (c.i.f.) U.S. ports. In April, a group of 13 alumina producers in China agreed to a floor price of \$507 per ton for alumina sold to smelters in China (Mok, 2007).

The sharp rise in alumina prices in January corresponded to strikes in Guinea that reduced production for January and February before full production was restored in March (Lerner,

2007b). Other problems throughout the year kept supplies tight, and prices remained relatively steady throughout the year. Transportation accidents in Guinea were blamed for disruptions to deliveries of alumina and bauxite during the third quarter of the year (Lerner, 2007c). Damage caused by Hurricane Dean in August disrupted production in Jamaica (Lerner, 2007a). Production problems also took place in the fall at Glencore International's (Baar, Switzerland) Sherwin Alumina Co. refinery in Gregory, TX (Lerner, 2007c).

## World Industry Structure

**Production.**—In 2007, world production of bauxite increased 5% compared with that of 2006 (table 12). Mine production of 199 Mt was reported in 26 countries. The leading producers of bauxite were, in decreasing order of tonnage mined, Australia, China, Brazil, India, and Guinea, and accounted for more than three-fourths of total world production.

World output of alumina increased by 7% in 2007 compared with that of 2006 (table 11). The five principal producing countries were, in descending order of quantity of alumina produced, China, Australia, Brazil, Jamaica, and the United States, and accounted for 70% of the world's production; China and Australia together accounted for 50%.

## Mergers, Acquisitions, and Restructuring

Russian Aluminum Inc., Siberian Aluminum Inc., and alumina assets owned by Glencore were merged into a single company known as United Company Rusal (UC Rusal). The deal completed in March had been announced in October 2006. The new company had 4 bauxite mines, 10 alumina refineries, 14 aluminum smelters, and 3 foil mills located in 17 nations. When the deal was completed, UC Rusal ranked as the leading producer of alumina and aluminum in the world (United Company Rusal, 2007b). In December 2007, UC Rusal announced plans to purchase a 25% share of MMC Norilsk Nickel, a major producer of nickel as well as cobalt, copper, and platinum-group metals, in an effort to diversify as it expands (United Company Rusal, 2007d).

Rio Tinto plc acquired Alcan Inc. in a deal completed in October. The combined company known as Rio Tinto Alcan Inc. will be headquartered in London, United Kingdom. However, the administrative office for all of the company's aluminum operations will be maintained in Montreal, Quebec, Canada, as required by the regulators and terms of low-cost power contracts with the Government (Rio Tinto Alcan Inc., 2007a).

Apollo Management LP acquired Noranda Aluminum Inc. (Franklin, TN) from Xstrata plc (Zug, Switzerland). Noranda assets included a 50% share of the St. Ann bauxite mine in Jamaica and a 50% share of the 1.25-million-metric-ton-per-year (Mt/yr) alumina refinery at Gramercy, LA. Other assets include a 250,000-metric-ton-per-year (t/yr) smelter at New Madrid, MO, and three rolling mills located in Arkansas, North Carolina, and Tennessee. Xstrata had obtained the aluminum assets as a result of the merger with Falconbridge Ltd. in 2006, which had acquired Noranda Inc. earlier in 2006 (Xstrata plc, 2007).

Aluminum Corp. of China Ltd. (Chinalco) completed its acquisition of Shandong Aluminum Industry Co. Ltd. in April (Aluminum Corp. of China Ltd., 2008b, p. 13). In May, Glencore acquired the Sherwin Alumina refinery in Texas from China Minmetals Corp. and Houshang LLC (Lerner, 2007c). Dubai International Capital purchased specialty alumina producer Almatris from Rhone Capital and Teacher's Private Capital. Almatris had manufacturing facilities in Bauxite, AR; Dalton, GA; Leetsdale, PA; Neville, PA; Falta, India; Iwakuni, Japan; Ludwigshafen, Germany; Qingdao, China; and Rotterdam, Netherlands (CRU Alumina Monitor, 2007h, p. 6; Almatris Inc., 2008).

Alcoa divested its 7% holdings in Chinalco in September. Alcoa said it will continue to maintain its presence in China through investments in production facilities (Alcoa Inc., 2007b).

## World Review

**Australia.**—BHP Billiton Ltd. completed an expansion of the Worsley refinery that increased capacity to 3.5 Mt/yr from 3.25 Mt/yr. Further expansion of capacity to 4.6 Mt/yr was being studied (BHP Billiton Ltd., 2007a, p. 25).

Completion of the expansion of Alcan's Gove alumina refinery was delayed from the first quarter of 2007 to the second quarter of 2007 owing to labor shortages, equipment delivery delays, and harsh weather. Total capacity would be expanded to 3.8 Mt/yr from 2 Mt/yr, and full production was scheduled for early in 2008 (Alcan Inc., 2007c).

The government of Western Australia granted environmental permits needed for expansion of Alcoa World Alumina and Chemical's Wagerup refinery to 4.7 Mt/yr from 2.4 Mt/yr (CRU Alumina Monitor, 2007b).

Rio Tinto announced a plan to expand capacity of the Yarwun alumina refinery to 3.4 Mt/yr from 1.4 Mt/yr. The project would be completed in 2011 (Rio Tinto plc, 2007).

Chinalco proposed to develop the Aurukun bauxite deposit in Queensland. The proposed mine would produce 6.5 Mt/yr of bauxite to be refined at a 2.1-Mt/yr alumina refinery to be built on the east coast of Queensland. Review of the proposal by regulators in Australia was underway. Once all required approvals are received, construction of the refinery was expected to take 3 years, with completion of the mine to coincide with the refinery's completion. The Aurukun bauxite reserves were reported to be 440 Mt grading 53.6% alumina with 7.4% reactive silica (State of Queensland Department of Infrastructure and Planning, 2007).

Several bauxite exploration projects were active in Australia during 2007. Metallica Minerals Ltd. [a subsidiary of Cape Alumina Pty. (East Brisbane, Queensland)] was conducting an exploration project to significantly increase the reserves on its tenements in Queensland from 54 Mt (Metallica Minerals Ltd., 2007). Bauxite Resources Ltd. (East Perth, Western Australia) was conducting three exploration projects in Western Australia (Bauxite Resources Ltd., 2007). Norsk Hydro ASA and United Minerals Corp. signed an agreement to explore for bauxite near Kimberley, Western Australia. The agreement also called for a possible refinery if sufficient reserves of bauxite are identified (Norsk Hydro ASA, 2007).

In 2007, Alcoa unveiled a new process to bind carbon dioxide with red mud, the residue from refining bauxite into alumina. The Kwinana alumina refinery in Western Australia was the first facility to use the technology, but Alcoa reportedly planned to implement it at all of its refineries and license the process to other companies. Use of the process at the 2.1-Mt/yr-Kwinana refinery would reduce carbon dioxide emissions by 70,000 t/yr according to Alcoa (Alcoa Inc., 2007a).

**Brazil.**— In April, Companhia Vale do Rio Doce Ltd. (Vale) began producing bauxite from the 5.4 Mt/yr Paragominas I Mine. Two expansions also were planned. The 4.5 Mt/yr Paragominas II Mine was under construction and scheduled to begin production in the second quarter 2008. If approved, the Paragominas III Mine would add 5 Mt/yr of bauxite production capacity beginning in March 2011. Bauxite from the Paragominas deposit was processed at Vale's Alunorte alumina refinery (Barradas, 2007; Companhia Vale do Rio Doce Ltd., 2007a, p. 3). Vale continued progress on the expansion project at the Alunorte refinery that would increase capacity to 6.2 Mt/yr from 4.4 Mt/yr. The project was expected to be completed in mid-2008 (Companhia Vale do Rio Doce Ltd., 2008, p. 18).

Alcoa and BHP Billiton were expanding the Alumar refinery to 3.5 Mt/yr from 1.4 Mt/yr. The project was originally scheduled for completion in 2008 but rising costs and supply shortages were expected to delay the opening until mid-2009 (BHP Billiton Ltd., 2007a, p. 102; Alcoa Inc. 2008a, p. 11).

Similarly, startup of Companhia Brasileira de Alumínio's (CBA) Mirai bauxite mine was delayed until March 2008 from the fourth quarter of 2007 owing to shortages of equipment and materials needed to operate the mine. Initial bauxite capacity was expected to be 1.25 Mt/yr, increasing to 5 Mt/yr as CBA expands its alumina refining and aluminum smelting capacity (Companhia Brasileira de Alumínio, 2007; Pregnaca, 2008).

Alcoa was working to open the Juruti bauxite mine in Para. Production was scheduled to start by yearend 2008 with an initial capacity of 2.6 Mt/yr (Alcoa Inc., 2008b).

A tailings dam failed during heavy rains at Minaracao Rio Pomba Cataguesas Inc's refractory bauxite mine in Minas Gerais, stopping production. The State's environment secretary announced that the mine would not be allowed to reopen (Miranda, 2007).

Vale and Norsk Hydro signed an agreement to jointly develop an alumina refinery in Barcarena. The four-phase project would have an initial capacity of 1.85 Mt/yr and a total capacity of 7.4 Mt/yr. If approved by government authorities, construction was scheduled to begin in mid-2008 (Companhia Vale do Rio Doce Ltd., 2007b).

**China.**—China announced a policy to close or stop construction in progress on alumina refineries and aluminum smelters that do not meet strict environmental and financing rules or that use obsolete technology (Xiaowei, 2007). However, many provincial governments reportedly were ignoring the national Government's efforts to control growth in the aluminum industry. New projects not meeting these standards were being allowed to move forward and those operating in violation of the national Government's rules were still producing as the provincial governments desired to increase employment and local economic growth (Pasek, 2007).

China's alumina refining capacity increased to 25.3 Mt/yr with the addition of 2.4 Mt/yr of capacity completed during 2007. Projects under construction and projected for completion in 2008 would add 2.7 Mt/yr of refining capacity. Further expansions in progress or scheduled for completion in 2009 would add 3.0 Mt/yr of refining capacity. Projects announced for completion after 2009 would add another 6.0 Mt/yr of refining capacity.

In December, Chinalco started production from the phase 3 expansion of the Guangxi Huayin refinery in Bose, increasing capacity to 1.6 Mt/yr from 800,000 t/yr. Other partners in the refinery include China Minmetals Nonferrous Metals Corp. and Guangxi Investment Group Ltd. (Aluminum Corp. of China Ltd., 2008a).

Chinalco was constructing a bauxite mine and an adjacent alumina refinery in Chongqing Province near Nanchuan. The refinery capacity reportedly would be 800,000 t/yr, and the mine would produce an estimated 2 Mt/yr of low- to medium-grade bauxite. A second 800,000-t/yr refinery was under construction in Zunyi. Completion of the projects was expected by midyear 2009 (CRU Alumina Monitor, 2007c; Aluminum Corp. of China Ltd. 2008b, p. 64). Chinalco also announced its intention to construct a third 800,000-t/yr alumina refinery in Xing, Shanxi Province, although no timetable was given (CRU Alumina Monitor, 2007e). An expansion project begun at Chinalco's Zhonghou refinery in Henan Province would raise refining capacity to 3 Mt/yr from 2 Mt/yr by yearend 2009 (CRU Alumina Monitor, 2007h).

In September, a greenfield bauxite mine was completed in Guangxi Province by Huayin Aluminium Co. Ltd., a joint venture between Chinalco, China Minmetals, and Guangxi Investment Group Ltd. Bauxite production capacity was reported to be 4 Mt/yr. An accompanying 1.6-Mt/yr alumina refinery was under construction, and production was scheduled to begin in December 2008 (CRU Alumina Monitor, 2007f; 2007h). The Qingzhen city government was in talks with Chinalco and other potential investors to develop an aluminum complex to include a bauxite mine, an 800,000-t/yr alumina refinery, and a 200,000-t/yr aluminum smelter. The refinery and smelter could start up by 2010 and 2011, respectively (CRU Aluminum Monitor, 2007).

East Hope Group Ltd. completed the expansion of its refinery, doubling its capacity to 800,000 t/yr (CRU Alumina Monitor, 2007d). Shanxi Yangquan Coal Corp. completed construction of a 400,000-t/yr alumina refinery and started trial production at yearend 2007 (CRU Alumina Monitor, 2007f). Henan Zhongmei Aluminium Co. Ltd. started production at its 400,000-t/yr refinery. Further expansions were proposed to bring total capacity to 1.2 Mt/yr, although no schedule was given (CRU Alumina Monitor, 2007i). Yunnan Aluminium Co. and Bosai Minerals Group Co. Ltd. announced delays in expansion projects at their refineries as a result of rising supply costs (CRU Alumina Monitor, 2007a).

Shandong Xinfu Aluminium Electricity Group Co. started construction of a 1.6-Mt/yr alumina refinery in Jingxi County, Guangxi Province (CRU Alumina Monitor, 2007c). Chongqing Bosai Minerals Group Co. Ltd. started construction on the third phase of the Nanchuan Xianfeng alumina refinery

in Chongqing Province in the third quarter of 2007. The expansion is expected to increase capacity to 500,000 t/yr from 200,000 t/yr by late 2008. The refinery used bauxite from Nanchuan as raw material (CRU Alumina Monitor, 2007f). Diangjiang Wanji Aluminium Co. Ltd. announced financing had been arranged to expand capacity at its refinery to 1.2 Mt/yr from 400,000 t/yr. A project schedule was not announced (CRU Alumina Monitor, 2007h). Luneng Jin Bei Aluminium Co. Ltd. expected to complete an expansion of its Shandong refinery to 1 Mt/yr from 600,000 t/yr in early 2008. Further expansion to 2 Mt/yr was in progress and projected for completion by yearend 2008 (CRU Alumina Monitor, 2007i). Chiping Xinfa Co. received government approval to expand its refinery in Liaocheng, Shandong Province to 3 Mt/yr from 1.8 Mt/yr. No construction schedule was available (CRU Alumina Monitor, 2007a).

**Congo (Brazzaville).**—Century Aluminum Co. signed a memorandum of understanding (MOU) with Congo (Brazzaville) to build a smelter and alumina refinery at Pointe Noire to be supplied with domestic bauxite. Plant size and construction would be dependent on a planned assessment of bauxite deposits in the area. No timetable was announced (Century Aluminum Co., 2007).

**France.**—Rio Tinto Alcan started production of specialty alumina at its refinery in Gardanne. The production will replace production from the Jonquiere, Quebec, Canada, refinery that closed in 2006 (Rio Tinto Alcan Inc., 2007b).

**Guinea.**—Nationwide strikes protesting the leadership of the Government stopped mining, refining, and shipping activities for several weeks in January and February resulting in decreased production. After negotiations between the Government and strike organizers, production and exporting resumed from mines and refineries (CRU Alumina Monitor, 2007j).

UC Rusal was conducting a feasibility study to increase capacity of the Friguia refinery to 1 Mt/yr from 640,000 t/yr. UC Rusal was also conducting exploration work on the Dian Dian bauxite deposit and a feasibility study for an associated refinery with production anticipated by 2012 (United Company Rusal, 2007h, i).

BHP Billiton, Dubai Aluminium Co. Ltd. (Dubal), Global Alumina International Ltd. (GAI), and Mubadala Development Company PJSC (Mubadala) planned to jointly develop the Sangaredi mine and refinery project in Guinea. The refinery would have a capacity of 3 Mt/yr and would use bauxite from an adjacent deposit to be mined at a rate of 9 Mt/yr. Completion of the refinery and mine was expected in late 2009 or 2010 (BHP Billiton Ltd., 2007b; Dubai Aluminium Co. Ltd., 2007a).

Alcoa and Alcan announced a feasibility study would be conducted for a refinery with a capacity of 1.5 Mt/yr and the potential for expansion to 4.5 Mt/yr. The study would be completed in 2009 with production possible in 2012. The site selected for the proposed refinery is in Kabata, north of Kamsar (Alcoa Inc., 2007d).

Alliance Mining Commodities Ltd. was conducting exploration work near Koumbia in northwest Guinea (Alliance Mining Commodities Ltd., 2007). Navasota Resources Ltd. was conducting exploration work on the Nomo and Madina Diang Plateaus in the Boke Bauxite Belt of northwest Guinea.

No projected mining schedule has been announced although three alumina refineries near the deposit were proposed for construction during the next 5 years, which presumably would be the destination for the bauxite (Navasota Resources Ltd., 2007).

**Guyana.**—Bosai Minerals Group Co. Ltd. announced plans to build an 800,000-t/yr refinery, a 400,000-t/yr smelter, and an associated 1,000-megawatt (MW) hydroelectric powerplant. Bosai was also making improvements to its existing mine that would increase capacity to 2 Mt/yr (American Metal Market, 2007).

UC Rusal was developing a large-scale project on the Kurubuku 22 deposit. Proven bauxite reserves were reported to be 45 Mt. Exploration work was also being conducted by UC Rusal on the Ituni, Moblissa-Bamia, and Tiger Jump deposits, whose combined proven reserves were reported to exceed 100 Mt (United Company Rusal, 2007a).

**India.**—Vedanta Resources plc started alumina production at the Lanjigarh refinery in August. The refinery capacity is 1.4 Mt/yr, and production was expected to reach full capacity by early 2008 (Vedanta Resources plc, 2008, p. 10-11). Vedanta was plagued by legal obstacles in its efforts to open the Lanjigarh Mine. A ruling by India's Supreme Court in November spelled out stringent conditions under which the project may proceed. No projection for completion was available (Mahapatra, 2007).

National Aluminum Co. of India Ltd. (Nalco) was expanding capacity of the Panchpatmali bauxite mine to 6.3 Mt/yr from 4.8 Mt/yr. Completion of the expansion was projected for December 2008. Bauxite reserves were reported to be 310 Mt, grading 45% alumina and 2% reactive silica, with more than 90% of available alumina as gibbsite. Bauxite from the mine would be sent to the Nalco refinery at Damanjodi, which was being expanded to 2.1 Mt/yr from 1.6 Mt/yr by yearend 2008 (National Aluminum Co. of India Ltd., 2006).

Hindalco Industries Ltd. was progressing on the Aditya aluminum complex, which would include an alumina refinery with a capacity of 1 to 1.5 Mt/yr, a smelter with a capacity of 325,000 t/yr, and a 750-MW powerplant. Environmental permits and long-term supply contracts for coal and water had been obtained. Commissioning of the smelter and refinery was planned for the first half of 2011. Hindalco also expected to complete expansion of the Muri refinery in early 2008. The expansion would increase capacity to 450,000 t/yr from 100,000 t/yr. In addition, Hindalco was working to secure bauxite leases to supply additional feed for the Belgaum refinery in order to expand its capacity to 650,000 t/yr from 350,000 t/yr (Hindalco Industries Ltd., 2007, p. 3).

Dubal and Larsen & Toubro Ltd. were in negotiations with the local government to build a bauxite mine, an accompanying 3-Mt/yr refinery, and a 250,000-t/yr aluminum smelter in Orissa (Dubai Aluminium Co. Ltd., 2007b).

In the third quarter of 2007, Hindalco became the sole owner of the Utkal bauxite project when it purchased Alcan's share of the operation (Alcan Inc., 2007b). Bauxite from the deposit would be used to feed a 1.5-Mt/yr alumina refinery projected for completion by March 2010. Mining was scheduled to start by March 2009 (Hindalco Industries Ltd., 2007, p. 3).

**Indonesia.**—The Government announced orders to close several small bauxite mines in environmentally sensitive locations on Bintan Island. The affected mines produced approximately 720,000 t/yr of bauxite for sale to refineries in China. This amount was equal to approximately 4% of Chinese bauxite consumption in 2006 (CRU Alumina Monitor, 2007k).

State-owned PT Aneka Tambang (Antam) postponed completion of its refinery at Tayan, West Kalimantan, until 2011 owing to rising costs of equipment. The refinery would have a capacity of 300,000 t/yr of chemical-grade alumina (Platts Metals Week, 2007).

UC Rusal signed an agreement with Antam to conduct a feasibility study for a proposed 3.6-Mt/yr bauxite mine and 1.2-Mt/yr alumina refinery in West Kalimantan. The feasibility study was expected to be completed in 2008, and pending its review, construction of the mine and refinery was anticipated to start in 2009 with completion in 2011 (United Company Rusal, 2007c).

**Iran.**—Foreign Engineering and Construction Co. of China and Jahad Tahghighat Group were awarded a contract to build an alumina refinery with 200,000 t/yr of capacity. A construction schedule was not announced (CRU Alumina Monitor, 2007g).

**Jamaica.**—Alumina production was stopped at the Jamalco refinery [a joint venture between Alcoa World Alumina and Chemicals (AWAC) and the Government of Jamaica] as Hurricane Dean approached in August. Production resumed at about one-half the normal capacity of 1.27 Mt/yr until repairs to port facilities were completed late in 2007. UC Rusal closed the Alpart, Ewarton, and Kirvine refineries for several days as the storm approached, but resumed normal operations within a week, as no damage to the refineries or ports took place (Alcoa Inc., 2007c; United Company Rusal, 2007e).

**Laos.**—A joint venture between China Nonferrous Metals International Mining Co. and Ord River Resources Inc. was conducting an exploration project on the Bolaven Plateau in southern Laos. Work was being conducted to quantify bauxite reserves (Mining Engineering, 2007).

**Romania.**—The Tulcea refinery was closed permanently in January. The refinery had a capacity of 550,000 t/yr and had supplied the Slatina aluminum smelter, which started purchasing alumina from India (CRU Alumina Monitor, 2007j).

**Russia.**—At midyear, UC Rusal began construction of a 1.4-Mt/yr alumina refinery in the Komi Republic of Russia. Capacity at the Middle-Timan bauxite mine would be increased to 6.4 Mt/yr from 2.6 Mt/yr in order to supply the new refinery. The proven reserves of the Eurasia Middle-Timan deposit were reported to be 260 Mt of bauxite. Completion of the project was expected by yearend 2009 (United Company Rusal, 2007g).

**Saudi Arabia.**—Alcan and Saudi Arabian Mining Co. signed an agreement to jointly develop an aluminum complex that included a bauxite mine, alumina refinery, and aluminum smelter. The mine would be in the South Zone of the Az Zabirah bauxite deposit in the north central part of the Kingdom. Estimated initial capacity would be 3 Mt/yr of bauxite, 1.6 Mt/yr of alumina, and 720,000 t/yr of aluminum. Total bauxite reserve base in the South Zone was estimated to be 250 Mt. The bauxite grade was reported to be 55.9% alumina with 10.1% reactive silica. A completion date was not released (Saudi Arabian Mining Co., 2006; Alcan Inc., 2007a).

Western Way for Industrial Development Co. contracted with China National Machinery Industry Corp. and China Nonferrous Metal Industry Foreign Engineering and Construction Co. to construct an aluminum complex in Jizan. The proposed complex would produce 1.6 Mt/yr of alumina and 700,000 t/yr of aluminum using bauxite imported from Greece. The projected completion date of the complex was not available (Ghafour, 2007).

**Suriname.**—The Lelydorp 3 mine closed in February after 10 years of production (BHP Billiton Ltd., 2007a, p. 25).

**Venezuela.**—UC Rusal signed an agreement with State-owned Corporacion Venezolana de Guayana to study opportunities in the aluminum industry in Venezuela. The joint venture would include all aspects of the upstream segment of the aluminum industry from bauxite mining through smelting of aluminum. No projection of completion of the study was given, nor was the scope of the projects involved revealed (United Company Rusal, 2007f).

**Vietnam.**—Vietnam National Coal-Mineral Industries Group (Vinacomin) announced in November that it was moving forward with plans to develop a bauxite mine with an accompanying alumina refinery in Lam Dong Province. It was projected that the mine would produce 4 Mt/yr of bauxite, and the refinery would produce 600,000 t/yr of alumina. Completion of the project was scheduled for 2010 (Vietnam National Coal-Mineral Industries Group Ltd., 2007).

Vinacomin had previously announced two other major projects. In November 2006, Vinacomin signed a joint-venture agreement with Chinalco to mine bauxite and construct a refinery in the central highland province of Dak Nong. An estimated 4 Mt/yr of bauxite would be mined. No date of project completion was announced (Investment & Trade Promotion Center, 2006).

In 2006, Vinacomin and AWAC signed an MOU to study the potential for a bauxite and alumina project, also in Dak Nong. The project would mine bauxite from the Gia Nghia deposit to produce an estimated 2 to 3 Mt/yr of reportedly high-quality bauxite (Alcoa Inc., 2006).

## Outlook

Continued expansion of alumina refining capacity was expected to be available in the next few years to meet the growing demand for aluminum in emerging markets such as China. Newly completed capacity helped to moderate prices in the latter half of 2007. Development of bauxite mines and exploration for new deposits was also expected to continue. Most bauxite mine projects included adjacent alumina refineries as Governments sought to maximize the economic gains from deposits. Similar requirements are likely with future mine projects, possibly limiting bauxite available for use in refineries in Canada, the United States, and Western Europe. Alumina supplies were expected to remain tight as growing demand keeps pace with increased refining capacity, leading to possible shortages and price spikes owing to supply disruptions as a result of accidents, harsh weather, labor disruptions, political unrest, or supply shortages as happened in 2007.

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TABLE 1  
SALIENT BAUXITE STATISTICS<sup>1</sup>

(Thousand metric tons)

|  | 2003    | 2004                 | 2005                 | 2006                 | 2007                 |
|--|---------|----------------------|----------------------|----------------------|----------------------|
| 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                        | 55      | 42                   | 34                   | 20                   | 15                   |
| Calcined                               | 22      | 21                   | 18                   | 14                   | 8                    |
| Imports for consumption, as shipped:   |         |                      |                      |                      |                      |
| Crude and dried                        | 8,390   | 10,000               | 11,800               | 11,600               | 9,840                |
| Calcined                               | 307     | 341                  | 818                  | 752                  | 808                  |
| Consumption, dry equivalent            | 11,300  | 13,600               | 12,400               | 12,300               | 9,780                |
| World, production                      | 153,000 | 164,000 <sup>r</sup> | 179,000 <sup>r</sup> | 190,000 <sup>r</sup> | 199,000 <sup>e</sup> |

<sup>e</sup>Estimated. <sup>r</sup>Revised. NA Not available.

<sup>1</sup>Data are rounded to no more than three significant digits.



TABLE 2  
ESTIMATED PRODUCTION AND SHIPMENTS OF ALUMINA  
IN THE UNITED STATES<sup>1</sup>

(Thousand metric tons)

| Year               | Calcined alumina | Other alumina <sup>2</sup> | Total                               |                     |
|--------------------|------------------|----------------------------|-------------------------------------|---------------------|
|                    |                  |                            | As produced or shipped <sup>3</sup> | Calcined equivalent |
| <b>Production:</b> |                  |                            |                                     |                     |
| 2006               | 4,610            | 618                        | 5,230                               | 4,700               |
| 2007               | 3,770            | 717                        | 4,490                               | 3,890               |
| <b>Shipments:</b>  |                  |                            |                                     |                     |
| 2006               | 4,580            | 564                        | 5,150                               | 4,670               |
| 2007               | 3,770            | 667                        | 4,440                               | 3,890               |

<sup>1</sup>Data are rounded to no more than three significant digits.

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

<sup>3</sup>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<sup>1,2</sup>

(Thousand metric tons per year)

| Company and plant                                    | 2006  | 2007  |
|--|-------|-------|
| Alcoa Inc., Point Comfort, TX                        | 2,300 | 2,300 |
| Gramercy Alumina LLC, Gramercy, LA <sup>3</sup>      | 1,250 | 1,250 |
| Ormet Corp., Burnside, LA                            | 600   | 600   |
| Sherwin Alumina Co., Corpus Christi, TX <sup>4</sup> | 1,600 | 1,600 |
| Total  | 5,750 | 5,750 |

<sup>1</sup>Capacity may vary depending on the bauxite used.

<sup>2</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>Jointly owned by Century Aluminum Co. (50%) and Apollo Management LP (50%).

<sup>4</sup>Owned by Glencore International AG.

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

(Thousand metric tons, dry equivalent)

| Industry   | 2006   | 2007  |
|------------|--------|-------|
| Abrasive   | W      | W     |
| Alumina    | 11,800 | 9,430 |
| Chemical   | W      | W     |
| Refractory | W      | W     |
| Total      | 12,300 | 9,780 |

W Withheld to avoid disclosing company proprietary data, included in "Total."

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 5  
STOCKS OF ALUMINA IN THE UNITED STATES,  
DECEMBER 31<sup>1,2</sup>

(Thousand metric tons, calcined equivalent)

| Sector                  | 2006             | 2007 |
|-------------------------|------------------|------|
| Producers               | 87               | W    |
| Primary aluminum plants | 855              | W    |
| Total                   | 942 <sup>†</sup> | 437  |

<sup>†</sup>Revised. W Withheld to avoid disclosing company proprietary data, included in "Total."

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

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

TABLE 6  
AVERAGE VALUE OF U.S. IMPORTS OF CRUDE AND DRIED BAUXITE<sup>1</sup>

(Dollars per metric ton)

| Country          | 2006                |                         | 2007                |                         |
|------------------|---------------------|-------------------------|---------------------|-------------------------|
|                  | Port of shipment    | Delivered to U.S. ports | Port of shipment    | Delivered to U.S. ports |
|                  | f.a.s. <sup>2</sup> | c.i.f. <sup>3</sup>     | f.a.s. <sup>2</sup> | c.i.f. <sup>3</sup>     |
| Australia        | 13.95               | 19.99                   | 23.81               | 36.31                   |
| Brazil           | 30.35               | 42.83                   | 38.81               | 51.58                   |
| Guinea           | 27.15               | 35.14                   | 32.97               | 48.43                   |
| Guyana           | 47.29               | 56.36                   | 40.01               | 54.44                   |
| Jamaica          | 21.77               | 25.95                   | 20.40               | 23.81                   |
| Weighted average | 28.10               | 36.05                   | 31.20               | 42.91                   |

<sup>1</sup>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.

<sup>2</sup>Free alongside ship valuation.

<sup>3</sup>Cost, insurance, and freight valuation.

TABLE 7  
U.S. IMPORTS FOR CONSUMPTION  
AND EXPORTS OF BAUXITE, CRUDE  
AND DRIED, BY COUNTRY<sup>1</sup>

(Thousand metric tons)

| Country              | 2006               | 2007  |
|----------------------|--------------------|-------|
| <b>Imports:</b>      |                    |       |
| Brazil               | 1,640              | 1,410 |
| Guinea               | 2,610              | 1,960 |
| Guyana               | 918                | 903   |
| Jamaica <sup>2</sup> | 4,540              | 4,450 |
| Sierra Leone         | 824                | 832   |
| Other                | 1,110 <sup>r</sup> | 290   |
| Total                | 11,600             | 9,840 |
| <b>Exports:</b>      |                    |       |
| Belgium              | 2                  | 1     |
| Canada               | 16                 | 11    |
| Germany              | (3)                | 1     |
| Other                | 2 <sup>r</sup>     | 2     |
| Total                | 20                 | 15    |

<sup>r</sup>Revised.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Data from the Jamaica Bauxite Institute.

<sup>3</sup>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: 2006—8.48 Metric tons (revised) and 2007— 8.68 Mt

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

TABLE 8  
U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF CALCINED BAUXITE, BY COUNTRY<sup>1</sup>

(Thousand metric tons and thousand dollars)

| Country         | 2006             |                    |             |                    | 2007             |                    |             |                    |
|-----------------|------------------|--------------------|-------------|--------------------|------------------|--------------------|-------------|--------------------|
|                 | Refractory grade |                    | Other grade |                    | Refractory grade |                    | Other grade |                    |
|                 | Quantity         | Value <sup>2</sup> | Quantity    | Value <sup>2</sup> | Quantity         | Value <sup>2</sup> | Quantity    | Value <sup>2</sup> |
| <b>Imports:</b> |                  |                    |             |                    |                  |                    |             |                    |
| Australia       | --               | --                 | 191         | 14,100             | --               | --                 | 174         | 13,000             |
| Brazil          | 30               | 12,400             | 118         | 26,100             | 93               | 39,700             | 14          | 569                |
| China           | 121              | 15,900             | 43          | 5,390              | 118              | 17,600             | 47          | 7,220              |
| Greece          | 60               | 1,960              | 52          | 2,350              | 35               | 1,420              | 54          | 2,720              |
| Guyana          | 24               | 3,840              | 72          | 3,500              | 36               | 6,320              | 212         | 9,680              |
| Other           | --               | --                 | 42          | 820                | --               | --                 | 23          | 1,090              |
| Total           | 235              | 34,100             | 518         | 52,300             | 282              | 65,000             | 525         | 34,200             |
| <b>Exports:</b> |                  |                    |             |                    |                  |                    |             |                    |
| Canada          | 4                | 507                | (3)         | 33                 | 3                | 379                | 1           | 68                 |
| Mexico          | 1                | 263                | 4           | 801                | 1                | 272                | 3           | 691                |
| Other           | 2                | 433                | 1           | 356                | (3)              | 53                 | (3)         | 81                 |
| Total           | 7                | 1,200              | 6           | 1,190              | 4                | 705                | 4           | 839                |

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

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

<sup>3</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9  
U.S. IMPORTS FOR CONSUMPTION AND EXPORTS  
OF ALUMINA, BY COUNTRY<sup>1</sup>

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

| Country         | 2006           |                    | 2007         |                    |
|-----------------|----------------|--------------------|--------------|--------------------|
|                 | Quantity       | Value <sup>2</sup> | Quantity     | Value <sup>2</sup> |
| <b>Imports:</b> |                |                    |              |                    |
| Australia       | 895            | 287,000            | 833          | 265,000            |
| Brazil          | 94             | 28,100             | 390          | 142,000            |
| Canada          | 103            | 86,100             | 67           | 54,300             |
| Germany         | 87             | 101,000            | 92           | 106,000            |
| Jamaica         | 151            | 60,300             | 620          | 250,000            |
| Suriname        | 424            | 136,000            | 281          | 94,500             |
| Venezuela       | 5              | 2,420              | 77           | 25,200             |
| Other           | 98             | 89,600             | 77           | 103,000            |
| <b>Total</b>    | <b>1,860</b>   | <b>791,000</b>     | <b>2,440</b> | <b>1,040,000</b>   |
| <b>Exports:</b> |                |                    |              |                    |
| Canada          | 577            | 253,000            | 445          | 203,000            |
| China           | 513            | 222,000            | 14           | 15,400             |
| Iceland         | 137            | 45,200             | 308          | 108,000            |
| Japan           | 11             | 39,900             | 15           | 86,000             |
| Mexico          | 58             | 42,100             | 60           | 38,800             |
| Norway          | 145            | 51,400             | 225          | 74,100             |
| Russia          | <sup>(3)</sup> | 664                | 27           | 11,000             |
| Other           | 96             | 157,000            | 67           | 173,000            |
| <b>Total</b>    | <b>1,540</b>   | <b>811,000</b>     | <b>1,160</b> | <b>709,000</b>     |

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

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

<sup>3</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 10  
BAUXITE: WORLD PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Thousand metric tons)

| Country                | 2003               | 2004                 | 2005                 | 2006                 | 2007 <sup>e</sup>   |
|------------------------|--------------------|----------------------|----------------------|----------------------|---------------------|
| Australia              | 55,602             | 56,593               | 59,959               | 61,780 <sup>r</sup>  | 62,428 <sup>3</sup> |
| Bosnia and Herzegovina | 573                | 917 <sup>r</sup>     | 1,032 <sup>r</sup>   | 817 <sup>r</sup>     | 800                 |
| Brazil                 | 17,363             | 20,950 <sup>r</sup>  | 22,034 <sup>r</sup>  | 22,055 <sup>r</sup>  | 22,100 <sup>p</sup> |
| China <sup>e</sup>     | 13,000             | 17,000 <sup>r</sup>  | 22,000 <sup>r</sup>  | 27,000 <sup>r</sup>  | 30,000              |
| Dominican Republic     | 6                  | 79                   | 535                  | 500 <sup>e</sup>     | 500                 |
| Ghana                  | 495                | 498                  | 607 <sup>r</sup>     | 842 <sup>r</sup>     | 840                 |
| Greece                 | 2,418              | 2,444                | 2,495 <sup>r</sup>   | 2,163 <sup>r</sup>   | 2,220               |
| Guinea <sup>e,4</sup>  | 15,000             | 15,254               | 16,817 <sup>r</sup>  | 16,956 <sup>r</sup>  | 18,000              |
| Guyana <sup>4</sup>    | 1,846              | 1,506                | 1,648 <sup>r</sup>   | 1,558 <sup>r</sup>   | 1,600               |
| Hungary                | 666                | 647                  | 511 <sup>e</sup>     | 538 <sup>r</sup>     | 546 <sup>3</sup>    |
| India                  | 10,414             | 11,285               | 12,385               | 13,940 <sup>r</sup>  | 19,221 <sup>3</sup> |
| Indonesia <sup>3</sup> | 1,263              | 1,331                | 1,442                | 1,502                | 1,251 <sup>3</sup>  |
| Iran                   | 366                | 420                  | 438 <sup>r</sup>     | 500 <sup>e</sup>     | 500                 |
| Jamaica <sup>4,5</sup> | 13,444             | 13,296               | 14,116 <sup>r</sup>  | 14,865 <sup>r</sup>  | 14,568 <sup>3</sup> |
| Kazakhstan             | 4,737              | 4,706                | 4,800 <sup>e</sup>   | 4,800 <sup>e</sup>   | 4,800               |
| Malaysia               | 6                  | 2                    | 5                    | 92 <sup>r</sup>      | 80                  |
| Montenegro             | 540 <sup>r,6</sup> | 610 <sup>r,6</sup>   | 672 <sup>r,6</sup>   | 659 <sup>r</sup>     | 650                 |
| Mozambique             | 12                 | 7                    | 10                   | 11 <sup>r</sup>      | 11                  |
| Pakistan               | 4                  | 5                    | 7                    | 7                    | 8                   |
| Russia <sup>e</sup>    | 5,500              | 6,000                | 6,400                | 6,600                | 6,400               |
| Sierra Leone           | --                 | --                   | --                   | 1,072                | 1,168 <sup>3</sup>  |
| Suriname               | 4,215              | 4,052                | 4,757                | 4,924 <sup>r</sup>   | 4,900               |
| Tanzania               | --                 | --                   | 2                    | 5                    | 5 <sup>3</sup>      |
| Turkey <sup>7</sup>    | 364                | 366                  | 475                  | 771 <sup>r</sup>     | 780                 |
| United States          | NA                 | NA                   | NA                   | NA                   | NA                  |
| Venezuela              | 5,446              | 5,842                | 5,900                | 5,928 <sup>r</sup>   | 5,900               |
| Vietnam <sup>e</sup>   | 20                 | 20                   | 26 <sup>3</sup>      | 30                   | 30                  |
| Total                  | 153,000            | 164,000 <sup>r</sup> | 179,000 <sup>r</sup> | 190,000 <sup>r</sup> | 199,000             |

<sup>e</sup>Estimated. <sup>p</sup>Preliminary. <sup>r</sup>Revised. NA Not available. -- Zero.

<sup>1</sup>World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Table includes data available through August 3, 2008.

<sup>3</sup>Reported figure.

<sup>4</sup>Dry bauxite equivalent of crude ore.

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

<sup>6</sup>Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

<sup>7</sup>Public-sector production only.

TABLE 11  
ALUMINA: WORLD PRODUCTION, BY COUNTRY<sup>1, 2, 3</sup>

(Thousand metric tons)

| Country                | 2003                | 2004                | 2005                | 2006                | 2007               |
|------------------------|---------------------|---------------------|---------------------|---------------------|--------------------|
| Australia              | 16,529              | 16,700              | 17,704              | 18,312              | 18,844             |
| Azerbaijan             | 180                 | 232                 | 315                 | 363                 | 185                |
| Bosnia and Herzegovina | 35 <sup>r</sup>     | 360 <sup>r</sup>    | 450 <sup>r</sup>    | 350 <sup>r, e</sup> | 350 <sup>e</sup>   |
| Brazil                 | 5,111               | 5,300               | 5,300               | 6,793 <sup>r</sup>  | 6,890 <sup>p</sup> |
| Canada                 | 1,109               | 1,170               | 1,214               | 1,220               | 1,220 <sup>e</sup> |
| China <sup>e</sup>     | 6,110               | 6,990 <sup>4</sup>  | 8,610               | 13,700              | 19,500             |
| France <sup>e</sup>    | 300 <sup>r</sup>    | 300 <sup>r</sup>    | 200 <sup>r</sup>    | 200 <sup>r</sup>    | 200                |
| Germany <sup>e</sup>   | 830                 | 835 <sup>4</sup>    | 830 <sup>r</sup>    | 850 <sup>r</sup>    | 850                |
| Greece                 | 750 <sup>4</sup>    | 750                 | 750                 | 750                 | 750                |
| Guinea                 | 738                 | 887                 | 740                 | 573 <sup>r</sup>    | 610 <sup>e</sup>   |
| Hungary <sup>e</sup>   | 300                 | 300                 | 270 <sup>r</sup>    | 270 <sup>r</sup>    | 270                |
| India <sup>e</sup>     | 2,500               | 2,600               | 2,700               | 2,800               | 2,900              |
| Iran                   | 102                 | 137                 | 200 <sup>r, e</sup> | 250 <sup>r, e</sup> | 250 <sup>e</sup>   |
| Ireland <sup>e</sup>   | 1,100               | 1,100               | 1,100               | 1,100               | 1,100              |
| Italy                  | 1,064 <sup>r</sup>  | 1,114 <sup>r</sup>  | 1,093 <sup>r</sup>  | 1,159 <sup>r</sup>  | 1,327              |
| Jamaica                | 3,844               | 4,023               | 4,086               | 4,099               | 3,941              |
| Japan <sup>e, 5</sup>  | 363 <sup>4</sup>    | 340                 | 330                 | 340                 | 330 <sup>e</sup>   |
| Kazakhstan             | 1,420 <sup>r</sup>  | 1,468               | 1,505               | 1,515               | 1,556              |
| Montenegro             | 240 <sup>r, 6</sup> | 245 <sup>6</sup>    | 235 <sup>6</sup>    | 237 <sup>r</sup>    | 240 <sup>e</sup>   |
| Romania                | 333                 | 560                 | 689                 | 622 <sup>r</sup>    | 23 <sup>7</sup>    |
| Russia                 | 3,230               | 3,269               | 3,259               | 3,265               | 3,300 <sup>e</sup> |
| Slovakia <sup>e</sup>  | 132                 | 130                 | 135                 | 161 <sup>r, 4</sup> | 160 <sup>4</sup>   |
| Slovenia <sup>e</sup>  | 30                  | 30                  | 30                  | 30                  | 30                 |
| Spain <sup>e, 8</sup>  | 1,380               | 1,400               | 1,400               | 1,400               | 1,400              |
| Suriname               | 2,004               | 2,039               | 1,944               | 2,153 <sup>r</sup>  | 2,200 <sup>e</sup> |
| Turkey                 | 162                 | 170 <sup>e</sup>    | 113                 | 150                 | 160 <sup>e</sup>   |
| Ukraine                | 1,434               | 1,563               | 1,632               | 1,672               | 1,700 <sup>e</sup> |
| United Kingdom         | 8 <sup>r</sup>      | 8 <sup>r</sup>      | 8 <sup>r</sup>      | 8 <sup>r, 4</sup>   | 27 <sup>4</sup>    |
| United States          | 4,860               | 5,350               | 5,220               | 4,700               | 3,900 <sup>e</sup> |
| Venezuela              | 1,882               | 1,900 <sup>e</sup>  | 1,920               | 1,892 <sup>r</sup>  | 1,900 <sup>e</sup> |
| Total                  | 58,100 <sup>r</sup> | 61,300 <sup>r</sup> | 64,000 <sup>r</sup> | 70,900 <sup>r</sup> | 76,100             |

<sup>e</sup>Estimated. <sup>p</sup>Preliminary. <sup>r</sup>Revised.

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

<sup>2</sup>World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>Table includes data available through July 25, 2008.

<sup>4</sup>Reported figure.

<sup>5</sup>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: 2003—740,000; 2004—730,000; 2005—740,000; 2006—750,000; and 2007—720,000.

<sup>6</sup>Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

<sup>7</sup>Plant closed January of 2007.

<sup>8</sup>Hydrate.