Chapter 26

The Big 6 and global expansion

The global aluminum industry rapidly expanded in capacity, production and marketing during the 1960s, from bauxite and alumina to smelting and fabricating, and in both domestic and global markets. While new companies entered the industry at all levels, the rapid growth benefited six top companies that consolidated control over raw materials and finished products. Prices fluctuated some as the market adjusted to all this growth and change, but overall growth was predominant. Even the dumping of Korean War-era stockpiles in the 1960s had little impact on the overall trend. Forecasts for the next decade were robust even when signs of overcapacity or overproduction were cited.

Spurring that growth were technological advances at all levels of the aluminum industry. In a 1962 report on the postwar American aluminum industry, Merton Peck divided new inventions into four main categories – new alloys, new processes for manufacturing products from aluminum, new methods for fabricating aluminum ingot, and new methods for reducing the cost of producing primary aluminum. Peck based his categories on a roster of potential inventors, which was influenced by the transition through anti-trust action from monopoly to a Big 3 and then a Big 5 oligopoly. The increased consumption of aluminum since World War II was in part dependent upon advances in manufacturing techniques because aluminum was less workable than steel or copper, Peck said. He noted that Alcoa, Reynolds and Kaiser were among the 100 largest U.S. manufacturing companies in the Fortune list, and all three had extensive research organizations. He also noted that the number of end-product manufacturers in the U.S. numbered more than 24,000. Aircraft manufacturers were a special category among the end-users, and manufacturing techniques for aluminum posed important technical problems for them. Peck noted that aircraft manufacturers had large engineering staffs and could charge a share of their research costs to defense contracts. About 100 secondary aluminum producers that converted scrap to ingot aluminum accounted for about 20% of the U.S. output of ingot aluminum. [1]

Siding and cans

In mid-1962, the U.S. Department of Commerce reported that primary aluminum production in the U.S. reached about 2.45 million tons in 1961. Building construction accounted for 25.5% of aluminum consumption; transportation was 22%; consumer durables 11.5%; electrical 11.3%; machinery-equipment 7.6%; containers and packaging

7.1%; miscellaneous 8.8%; and exports 6.6%. [2] Aluminum siding was a post-World War II building product that was promoted as a consumer product. On Oct. 15, 1953, a traveling display coach owned by Reynolds Metals Co. stopped in Columbia Falls to demonstrate the uses of aluminum window frames and screens, insulation, nails, industrial and farm building siding, roofing and irrigation sprinkling equipment. Future uses included colored aluminum shingles and paintable aluminum siding. While the utility of aluminum roofing to handle heavy snow loads was appreciated, "disliked is the glare of the metal and its tin can look," the Hungry Horse News noted. Furthermore, the Flathead Valley was predominantly a lumber-producing area, and aluminum as a building material was seen as a competitor. [3]

The U.S. aluminum siding industry began in 1948, but most of its growth took place after 1958. Both Alcoa and Kaiser entered the industry as manufacturers. By July 1963, sales were expected to reach $300 million. The industry's rapid growth included retailing problems when unscrupulous companies made false claims and drew the attention of the government. In 1962, the Federal Trade Commission adopted a new code drawn up by the Aluminum Siding Association to combat false claims by siding companies. Intense competition between siding companies forced prices down and made profits hard to achieve. Some larger manufacturers went out of business. By 1963, prices had stabilized and the industry was improving. [4]

Another booming market was in cans. In February 1961, a new type of aluminum can for frozen fruit juices was unveiled. Developed by the R.C. Can Co. of St Louis, the new can utilized laminated aluminum foil in place of aluminum sheet or tin-plated steel and conserved two pounds of aluminum for every 48-can case. According to Anaconda Aluminum Co. researchers in Louisville, Ky., a truckload of fruit juice using the new can saved 4% to 5% in freight costs and 10% in rail costs. R.C. Can employed high-speed foil-tube winding and processing equipment to create a laminate with aluminum on the inside and outside and fiberboard in between. AAC researchers began working on the project in 1957 and were studying ways to use laminated foil cans for oil and grease, emulsion paints and coatings, nuts, popcorn and coffee. [5]

In 1962, Alcoa developed an easy-open aluminum can using pull-tab rings and convinced the Pittsburgh Brewing Co. to use it for their Iron City beer. By the end of 1963, the aluminum top had been adopted by most U.S. brewers, and pop-top ring technology was found on 40% of U.S. beer cans. By 1968, aluminum ends were found in more than 80% of the canned beer market in the U.S. That eventually grew to 100%. [6] Alcoa initially moved into the development of aluminum ends for tin-plate beer cans. The Alcoa product was adopted by most brewers by 1963 and used on about 40% of all U.S. beer cans. Alcoa also developed an all-aluminum beer can, but instead of producing the cans,

the company produced the aluminum sheet used by can manufacturers. The move into beer can manufacturing led to more involvement by Alcoa in all packaging. By the 1980s, Alcoa's revenue from packaging and containers was more than the combined revenue streams from transportation, electrical and construction markets. [7] Reynolds introduced the first all-aluminum pop can in 1963 for a diet cola product called Slenderella. Soon after, other drink manufacturers were using all-aluminum cans. [8] In 1965, Reynolds led the U.S. aluminum industry in aggressively promoting a new 12-ounce all-aluminum beverage can. At the time, only 2.6% of the 15 billion cans used in the U.S. were all-aluminum. By 1977, half of the 51.2 billion cans in the beverage market were aluminum. [9]

The international oligopoly

By 1967, six aluminum companies dominated the aluminum industry of the free world – Alcan, Alcoa, Reynolds, Kaiser, Pechiney and Alusuisse. The Big 6 owned most of the known bauxite deposits, produced most of the world's alumina, smelted most of the primary aluminum, and fabricated most the aluminum shapes and products. Together they directly owned about 63.9% of the free world's smelting capacity in 1963, had a share in ownership of an additional 12.7%, and had plans to expand capacity throughout the world. Possessing financial strength and operating on a global scale, they were vertically integrated and maintained extensive well-staffed facilities for research, sales and customer service, according to Sterling Brubaker's 1967 account. The Big 6 also benefited over time from government policies that favored their growth. Policies in North America included favorable terms for acquisition of war-time aluminum plants, financial assistance, tax privileges, guaranteed markets and publicly financed electrical power. Tariff protection in the past had benefited the Big 3 in the U.S., but that benefit was declining. A number of smaller aluminum producers that were less vertically-integrated and with a narrower geographical reach competed in the same global market. The smaller firms lacked the organizational, technical and financial resources of the Big 6 and sometimes allied with the six majors. [10]

While monopoly and cartels were common in the international aluminum industry prior to World War II, metal shortages caused by rapid economic growth and increasing consumption halted those practices in the post-war years, according to Brubaker. By the late 1950s, when metal inventories reached a surplus, the market had changed so much that cartels were impossible to create – there were too many aluminum companies, the market was too complex, primary aluminum was competing with secondary aluminum and other materials, and opinion in most industrialized nations opposed cartels. The result was a market of large international companies competing strongly against each other. Competition for export markets led the major aluminum producers to acquire

independent fabricators in foreign markets or build new fabricating facilities in foreign markets where the facility could receive government protection. The result was that smaller independent aluminum producers, lacking the organization and the funds to produce and fabricate aluminum, had a difficult time penetrating foreign markets. [11]

By 1967, Alcoa continued to be the largest U.S. aluminum company, but with the exception of bauxite mining, it was considered a relative newcomer to major international operations, according to Brubaker. Alcoa enjoyed a strong domestic base, was historically in the forefront of pioneering new uses, and was a technical leader in production and service to customers. Alcoa had significant bauxite holdings in Suriname (the former Dutch Guiana), the U.S., Jamaica and Australia. The company's principal alumina refineries were located in the U.S. along the Gulf Coast and in Arkansas, and it had recently built alumina refineries in Australia and Suriname for local smelters. Most of the company's smelting capacity was in the U.S., but Alcoa was also partners in existing or proposed smelters in Norway, Australia, Mexico and Suriname. The older Alcoa smelters in the U.S. were powered by Alcoa-owned hydroelectric facilities, but post-World War II expansion had focused on thermal energy. Reynolds continued as the No. 2 U.S. aluminum producer by 1967 with a highly diversified international operation that typically participated in foreign operations rather than owning them outright, according to Brubaker. Reynolds owned bauxite in Jamaica, Guyana (the former British Guiana), Haiti and Arkansas. Reynolds' principal alumina refineries were in Arkansas and Texas, and it had a stake in alumina refineries in the United Kingdom and Guinea, West Africa. Reynolds also successfully promoted new and unusual applications for aluminum, especially in packaging, automotive and rail. [12]

Kaiser Aluminum and Chemical Corp. was the third largest U.S. aluminum producer and the most active of the three on an international scale by 1967, according to Brubaker. The company owned important bauxite holdings in Jamaica and at the new Weipa deposit in Australia, where it was a partner for a new alumina refinery. The company also operated major alumina refineries in the U.S. along the Gulf Coast and smaller refineries in Tasmania and India. Kaiser's U.S. smelters included three large plants along the Gulf Coast, in the Pacific Northwest and in the Ohio Valley that were powered by natural gas, hydro and coal. Kaiser also had interests in smelters in Tasmania, India, Spain and a major project to be built in Ghana. By 1967, Alcan was the largest aluminum exporter in the world, with the U.S. and the United Kingdom being its main markets. A fully integrated company with bauxite holdings in Guyana, Jamaica, France and Sarawak in Malaysia, Alcan was a partner in an alumina project in Queensland, Australia, and it sold alumina to Norway in exchange for metal. The company's Canadian-based smelters were powered by Alcan's own hydroelectric facilities. The company also had interests in smelters in Brazil, India, Italy, Norway and Japan. [13]

Pechiney was the fifth largest aluminum producer in the free world by 1967, with a predominant position in the French market. The company mined bauxite in southern France, Australia and Greece, and had an interest in a new bauxite operation in Guinea. Pechiney owned alumina refineries in southern France and Guinea. Its smelters were located in Europe in the southern Alps and Pyrenees and in Cameroon, West Africa. Much smaller than Alcan, Alcoa, Reynolds and Kaiser, Pechiney was among the technical leaders of the world aluminum industry, according to Brubaker. By 1967, Alusuisse was the sixth largest aluminum producer in the world and comparable in size to Pechiney. It was the only company among the Big 6 that did not have a strong domestic base of operations and instead operated worldwide. Alusuisse mined for bauxite in France, Italy, Greece and Sierra Leone, with a minor share in the Fria complex in Guinea. The company's alumina was refined in Germany, France, Italy and Guinea, and Alusuisse headed a consortium to build a new alumina refinery near the Gove bauxite deposits in Australia. In most cases, Alusuisse owned its smelters in Germany, Switzerland, Italy, Austria, Norway and the U.S. [14]

Bauxite mining and cartels

Global bauxite reserves had grown geometrically since World War II. This rate of growth was linked to the discovery of new uses for aluminum in the electrical, transportation and construction sectors of the economy. In 1965, the U.S. Bureau of Mines estimated bauxite reserves in Guinea at 150 million tons, but by 1979 Guinea's reserves had increased to 9 billion tons. Estimated bauxite reserves in Brazil in 1965 were nonexistent, but by 1980 they had increased to an estimated 3 billion tons. Bauxite reserves in Australia were estimated in 1965 to be 2 billion tons, but by 1980 they had increased to 5 billion tons. Global bauxite reserves were expected to last from 225 to 300 years at 1980 consumption rates, so there was little economic incentive to prove additional reserves. Guinea and Australia accounted for about half the world's total bauxite reserves in 1980, and global bauxite production exceeded 100 million tons, a 50% increase over 1970 and a 240% increase over 1960. Australia passed over Jamaica as the leading producer of bauxite in 1971, and Guinea became the world's second largest bauxite producer by 1976. The cost to ship bauxite to alumina refineries in 1980 ranged from $15 to $40 per ton, reflecting distance as well as ore quality – the amount of bauxite needed to produce one ton of aluminum metal could range from four to six tons depending on the quality. Australian bauxite production was highly cost-efficient, but shipping to the U.S. accounted for about 75% of the total cost. By 1980, the trend was to locate alumina refineries near bauxite mines. [15] With better bauxite sources increasingly developed overseas, Alcoa closed down the town of Bauxite, Ark., in July 1969. Alcoa had run the company town since 1901. [16]

The importance of bauxite deposits in Jamaica was first realized in 1942. The deposits were contained within saucer-shaped limestone formations, the remains of volcanic rock that weathered away into the limestone formations. There was very little overburden, so strip mining was economical. [17] By 1961, bauxite from Jamaica and other Caribbean sites exceeded domestic supplies for U.S. aluminum production by a factor of seven. About 1.22 million tons of bauxite was mined in the U.S. in 1961, nearly 40% less than in 1960. Arkansas accounted for about 95% of U.S. bauxite production. U.S. bauxite imports in 1961 were estimated at 8.7 million tons of which 50% came from Jamaica, 25% from Suriname and the rest from the Dominican Republic, Haiti and British Guiana. [18] Jamaica accounted for about 22% of the world's bauxite production in 1962 with about 5 million tons per year. Early bauxite mining companies in Jamaica included Alcan, Kaiser and Reynolds. Alcan alone had invested about $100 million in facilities in Jamaica. Kaiser was the largest bauxite mining company in Jamaica in 1962 when Alcoa invested $15 million in bauxite deposits there. [19] Bauxite production in Jamaica climbed to a maximum output of 15 million tons in 1974, at which point 10,000 people were employed in the bauxite-alumina industry. Production and employment fluctuated after that, dropping to 8,000 workers by 1984. [20]

Kaiser began exploring for bauxite deposits in Jamaica in 1947, and six years later its first shipment of ore left the island for the company's alumina refinery in Baton Rouge. By 1958, Kaiser was shipping 200,000 tons of bauxite per year from Jamaica. As Kaiser bought up land for mining, the company resettled farmers on more suitable agricultural land, houses, roads and community centers were built, and mined areas were rehabilitated and replanted with grasses, mahogany, cedar, mahoe and cassis simea trees. Sometimes small fruit orchards were established. [21] In 1967, Kaiser began Jamaican operations as Kaiser Jamaica Bauxite Co. By 2004, the new company could produce 4.5 million tons of bauxite per year. [22] Alcoa formed the subsidiary Alcoa Minerals of Jamaica to mine bauxite in Jamaica in 1959. [23] In 1960, Alcoa Minerals of Jamaica began mining bauxite in the Mocho Mountains and processing the ore at their Clarendon Alumina Works four miles away. The first shipment left Rocky Point in 1963. [24] On Sept. 11, 1968, Alcoa announced plans to build a new alumina refinery in Jamaica with a capacity of 880,000 tons per year. [25]

The Harvey Aluminum Co. began investigating bauxite deposits in Jamaica in 1961. The company held a prospecting license on 48.6 square miles with options to buy several thousand acres. The company was also studying bauxite deposits in British Guiana and sites in the Caribbean for construction of an alumina refinery. The company's aluminum smelter in The Dalles at the time was using alumina shipped from Japan. [26] In 1962, Harvey Aluminum and Hess Oil teamed up to build an alumina refinery and oil refinery on 1,400 acres of former sugar cane fields on St. Croix, Virgin Islands. The Virgin Islands

legislature approved the deal. [27] In an area later called St. Croix Renaissance Park. Harvey's construction crews blasted a channel and created a port, extending one mile out into the ocean, one of the most hurricane-proof ports in the Caribbean. [28] By 1967, Harvey continued to import alumina from Japan for its U.S.-based smelters while it built the Virgin Island refinery. [29]

In late October 1962, during the height of the Cuban Missile Crisis, attention was drawn to the fact that 90% of all bauxite imported into the U.S. came from the Caribbean. Some aluminum producers recalled problems during World War II when ships carrying bauxite were attacked by German submarines. To counter the threat, the U.S. government began to store 13.5 million tons of bauxite in defense stockpiles. It was estimated that half of the 29 million tons of bauxite produced in the world came from five nations in the Caribbean: Jamaica, Haiti, the Dominican Republic, Suriname and Guyana. Some of the ore carriers in the Caribbean were the largest ships in the world, and with the ongoing political crisis some ships were hugging the Yucatan peninsula on their way to the U.S. in an attempt to avoid Cuba, according to the New York Times. [30] The political turmoil surrounding the Cuban Missile Crisis continued to create problems for U.S. aluminum producers by July 1963. [31]

In August 1968, the Jamaican government raised the idea of creating an economic group representing bauxite-producing nations in South America and the Caribbean. By 1972, Jamaica, Suriname and Guyana had signed an agreement to share information on the bauxite industry and ultimately to maximize the benefits of its natural resources by controlling their development. While sales of bauxite and alumina accounted for half their exports, bauxite and alumina accounted for less than 2% and 15% respectively of the overall cost of primary aluminum production, so many of these countries sought ways to process bauxite into alumina and alumina into aluminum. In March 1974, representatives from Australia, Guinea, Guyana, Jamaica, Sierra Leone, Suriname and Yugoslavia met in Conarky, Guinea, to discuss forming a bauxite cartel. The International Bauxite Association was formally born on July 29, 1975. The Dominican Republic, Ghana, Haiti and Indonesia joined the association later. By 1980, the 11 member nations accounted for 85% of the bauxite traded in the international market and nearly 100% of U.S. imports. The organization did not control markets, however, as some members had large reserves, while others had very little, according to a 1982 account by Rhea Berk, Howard Lax, William Prast and Jack Scott. The association initially suggested floor prices for bauxite, and in 1981 the floor price was raised to $33 per ton from $29 in 1980. [32] In 1973, the Jamaican government imposed a levy on its bauxite-alumina industry indexed to the world price for aluminum ingots, increasing government earnings from $23 million in 1973 to $170 million in 1974. Major aluminum companies argued against the

levy and sought bauxite elsewhere, which caused a serious loss in demand for Jamaican bauxite and alumina. [33]

The major aluminum producers relied heavily on South American bauxite. Alcan's subsidiary mining company in Guyana, the Demerara Bauxite Co., exported nearly 1.4 million tons of processed bauxite. Bauxite was removed from 200-foot deep deposits using hydraulic methods, and the hard-packed ore was blasted and then crushed before being transported to the island country of Trinidad for transfer to sea-going ships. Reynolds' bauxite operations in Guyana were similar to Alcan's but much smaller. Reynolds exported nearly 500,000 tons of bauxite from Guyana in 1962 under a U.S. government stockpile contract. In July 1963, political unrest in Guyana led to a general strike, racial riots, violent anti-government demonstrations and sabotage. The entire economy was crippled and bauxite mining was shut down. The 11-week old strike grew out of labor legislation passed by the Leftist government of Prime Minister Cheddi B. Jagan that intended to give the government complete control over the labor movement, according to the New York Times. Because of labor problems, Alcan turned to independent bauxite mines in Suriname. Jamaica benefited from the situation because its bauxite deposits were located right at the surface and not hard-packed, and the labor situation on the island was much better. [34]

The trend in Guyana was toward nationalization, according to the New York Times. By 1963, Alcoa joined with the Guyanese government in a $150 million project called the Brokopondo Development that would connect the Afobakka hydroelectric dam to Paranam with a 50-mile road. An alumina refinery and a 60,000 ton-per-year aluminum smelter would be constructed nearby. [35] In May 1969, Guyana's parliament approved two agreements with Reynolds and Demerara Bauxite which would allow the companies to operate until 1990. [36] The Guyanese government nationalized Alcan's Demerara Bauxite plant in July 1971, and the subsidiary company was compensated with $53.5 million. In 1973, the Guyanese government offered a deal to Reynolds to avoid nationalization of the company's bauxite operations. The government took 51% ownership of Reynolds' facilities in the deal. In January 1974, Guyanese Prime Minister F. Burnham announced that his government had begun negotiations for ownership and control of bauxite mines and plants owned by Reynolds. The government paid a $2.4 million installment to Alcan for property it once held in Guyana. [37]

Alcoa looked into bauxite opportunities in Africa beginning in 1957 when Lawrence Litchfield, head of Alcoa's bauxite operations, contracted to enter a consortium of French, Swiss and Canadian companies to mine bauxite in Guinea. Litchfield's action was taken without the knowledge of Alcoa's operating manager, Roy Hunt, who was not in favor of Alcoa increasing its overseas investments. But the company's position was

changing. In 1958, Alcoa's Brokopondo venture in Suriname, which included a hydroelectric plant and a smelter, was Alcoa's first major offshore mine-to-metal venture. Alcoa went on to form Alcoa of Australia in 1961 to develop the huge bauxite reserves there. [38] On Sept. 18, 1968, Harvey Aluminum, operating under the name Halco Mining, joined with Alcoa, Alcan, Aluminium Canada and Compagnie des Bauxites de Guinee to finance a bauxite mine in the Boke region of Guinea. The government of the Republic of Guinea participated by taking out loans from the World Bank and the Agency for International Development to construct infrastructure. [39]

Alcoa's first venture into Brazil was in the 1960s when it bought a bauxite mining operation in Pocos de Caldas in Minas Gerais. The bauxite operation there had been in operation since 1930. In 1967, Alcoa organized Compania Mineira de Aluminio, also known as Alcominas, to operate the resources at Pocos de Caldas. By 1970, Alcoa had a primary aluminum operation in the area on a plateau about 115 miles from Sao Paulo. In 1980, Alcoa developed an ambitious alumina and aluminum complex on the Sao Luiz island in the Brazilian state of Maranhao called Alumar. [40] By 1969, global bauxite production had reached 50 million tons per year. The leading producers were Jamaica followed by Australia, Suriname, the Soviet Union, Guyana, France, Guinea, Yugoslavia, Greece, Hungary and the U.S. Global production of primary aluminum in 1969 was estimated at more than 10 million tons per year. North America accounted for 49%, Europe 37% and Asia 9%. The eight leading producing nations were the U.S., the Soviet Union, Canada, Japan, Norway, France, West Germany and Italy. With demand for aluminum increasing rapidly in nearly every country in the world, it was expected that major aluminum production would soon spread beyond those eight countries. [41]

The U.S. smelters

Eight companies produced primary aluminum in the U.S. by August 1969: Alcoa, Reynolds, Kaiser, Harvey Aluminum, Consolidated Aluminum, Intalco (owned jointly by Amax Aluminum Co., Howmet Corporation and Pechiney), Ormet (owned jointly by Olin Corporation and Revere Copper and Brass Inc.) and the Anaconda Aluminum Co. Monthly production reached 318,035 tons, which translated into an annual production rate of 3.7 million tons, an increase from 2.9 million tons for 1968. [42] U.S. aluminum companies had production facilities in 10 foreign countries with an annual capacity of 800,000 tons per year, equivalent to 22% of the total U.S. aluminum production. [43] Four firms entered the U.S. aluminum industry in the mid- to late 1950s – Anaconda, Harvey, Olin and Revere; four entered the industry in the mid-1960s – Alusuisse, Phelps Dodge, Pechiney and Amax; and two entered the industry in the early 1970s – National Steel with Southwire and Noranda Mines. Most of these companies were independent aluminum fabricators that purchased primary aluminum from the bigger producers. At

the time that these companies decided to enter the primary aluminum industry, the market was typically experiencing high demand and supply-side rationing, according to John Stuckey's 1983 account. [44]

The history of Conalco in the U.S. is one of short-lived smelters and companies. In 1948, the Consolidated Aluminum Co. began operating as Aluminum Foils Inc., a wholly-owned subsidiary of Alusuisse Metals Inc. of Switzerland. The company ran an aluminum foil plant in Jackson, Tenn., and in 1962 built an aluminum smelter in New Johnsonville, Tenn. [45] Under the name Gulf Coast Aluminum Co., also a wholly owned subsidiary of Alusuisse, the company started production at a 35,000-ton-per year smelter at Lake Charles, La., in 1970. Phelps Dodge, a large global mining company founded in 1834, assisted in construction of the smelter and took some of the output. [46] In 1971, Conalco and Phelps Dodge's aluminum division merged to create a new company, 60% held by Alusuisse and 40% by Phelps Dodge. On Jan. 1, 1974, the new company acquired all of the Olin Corporation's aluminum business, including a 66% share of the Ormet Corporation, which operated a smelter in Hannibal, Ohio. In 1980, Phelps Dodge sold its 40% share in Conalco to Alusuisse for $110.5 million. [47] The Lake Charles smelter closed in 1981 and was sold to Reynolds for use as a carbon plant. The New Johnsonville smelter closed in 1986. [48]

In 1966, Revere Copper & Brass, which owned a 33% interest in Ormet Corp., decided to build an alumina refinery in Maggotty, Jamaica, and an aluminum smelter and rolling mill in Scottsboro, Ala. Compared to the large producers' plants, both Maggotty and Scottsboro were small, but Revere planned to increase capacity later – the energy contract the Scottsboro plant negotiated with the Tennessee Valley Authority, for example, allowed for the plant to triple in size. But both facilities were poorly designed, small and inefficient, and the Scottsboro plant depended in part on alumina from Maggotty. Between 1966 and 1976, Revere funneled about $240 million into the aluminum projects and saw profits sink. Profits in 1966 were $22 million on sales of about $350 million, but 10 years later profits were only $2.2 million on sales of about $500 million. [49] The Scottsboro plant on Goose Pond Island in the Tennessee River began operating in 1971 with an initial capacity 112,000 tons per year and future expansion plans for 336,000 tons per year. [50] The Scottsboro plant closed in 1982. [51]

The International Aluminum Co. (Intalco) smelter had a more successful story, although it also began with a consortium of various businesses. The Howmet Aluminum Corp. started in 1903 as Howe Sound, a mining company that moved into aluminum fabrication when it acquired Quaker State Metals in 1958 and later Navaco, a building products fabricator. During the 1960s, the company operated hot and cold rolling operations, casting facilities and manufacturing plants in Pennsylvania and Texas. In

1962, Pechiney acquired a 40% interest in Howe Sound, and in 1965 the company changed its name to Howmet. Howmet also had interests in bauxite mining, alumina refining and aluminum smelting in Australia. American Metal Climax (Amax Inc.) entered the U.S. aluminum industry in 1962 through a series of acquisitions involving U.S. aluminum fabricators. [52] Amax, a long-time U.S. copper producer, acquired two sizeable independent fabricators, Kawneer Co. and Apex Smelting Co. Both Kaiser and Alcan had tried to acquire Apex Smelting but were halted by the U.S. Justice Department. In 1963, Amax acquired Hunter Engineering Co., a major producer of wrought products, and in 1965 Amax acquired Johnston Foil Co. [53] In 1966, Amax discovered a major bauxite deposit in Australia and formed a new subsidiary called Amax Pacific. [54]

Amax Realty and Howe Sound Realty, as lessors, entered into a lease with the Intalco Aluminum Corp. on Aug. 1, 1964, to build an aluminum smelter in Ferndale, Wash. Amax and Howe Sound issued notes to finance the deal that were due June 1, 1986 at 4.85%. [55] Using Pechiney's high-capacity and highly automated potlines, the new smelter on Puget Sound along the Strait of Georgia was rated at 260,000 tons per year. [56] The new $150-million Intalco aluminum plant was dedicated on Sept. 17, 1966, as a joint venture between Pechiney with 25%, Amax with 50% and Howmet with 25%. The smelter plant took two years to build and was designed to consume 360 megawatts of electrical power, double the residential needs of a city the size of Seattle. Most of the aluminum produced at the plant would be used in fabrication plants run by Amax and Howmet in New York. Pechiney and Amax supplied alumina for the plant from Australia. [57] In the early 1970s, as a recession impacted the aluminum industry, Amax sold 50% of its total aluminum equity to Mitsui & Co. Ltd. of Japan. In 1975, the company changed its name from Intalco to Alumax. [58]

The same companies joined forces in the mid-1960s to build a smelter on the Atlantic Coast. On July 17, 1968, Amax, Howmet and Pechiney announced plans to build a primary aluminum reduction plant in Frederick County, Md., about 20 miles from Washington, D.C. [59] The Eastalco smelter cost $100 million and was completed in 1969. Alumina for the plant primarily was shipped to Baltimore from France and transported about 55 miles by rail. With an initial size of about 85,000 tons per year and plans to expand to 155,000 tons per year, the smelter produced extrusion billet and ingot. [60] The Eastalco plant opened in 1970 on 350 acres of a 1,900-acre site, part of which was farmed by the company. [61] In 1976, a second potline was added to the Eastalco plant. [62]

Noranda Mines, a major independent fabricator in Canada, entered the U.S. aluminum fabrication industry in 1967 by acquiring the Pacific Coast Co., a manufacturer of aluminum building products. [63] In 1971, Noranda Aluminum Inc. completed construction of a 70,000 ton-per-year aluminum smelter in New Madrid, Mo., which was expanded in

1974 to 140,000 tons per year. The company later acquired a 38.5% interest in Frialco, a consortium of companies that owned 51% of a bauxite mine and alumina refinery complex in Guinea, West Africa. [64] The 4,000-acre facility on the Mississippi River included an $85 million smelter and a $99 million 600-megawatt power plant – the single largest industrial investment in Missouri's history. Designed and built by Kaiser, initial output was 70,000 tons per year with plans to expand to 210,000 tons per year using alumina shipped to the plant by barge. A rod and cable plant was built on the site in 1969. [65]

National Steel Corp. entered the U.S. aluminum fabrication industry in 1968 by acquiring a 20% stake in Southwire, the largest independent producer of aluminum and copper rod, electrical conductor and cable. That same year, National Steel acquired Republic Foil Inc. and Hastings Aluminum Products Inc. [66] Southwire Co. was founded as a wire manufacturer in 1950. In the late 1960s, the company introduced two new aluminum alloys called Triple E and Super T for building wire that were licensed worldwide. [67] National Steel and Southwire Co. joined together in 1968 to build an aluminum smelter in Hawesville, Ky. The $90 million plant was in operation by 1969. [68] In 1980, Southwire's Hawesville plant was rated at 180,000 tons per year and was considered the producer of the world's purest commercial aluminum. [69] By 1998, the plant was producing 238,000 tons per year of aluminum. [70]

The Alumax case

The last major smelter project in the Pacific Northwest was never completed after it ran into a number of hurdles, including environmental concerns, protests by competing aluminum producers and increasing demands on the Bonneville Power Administration's power supplies. The impact of the proposal was felt across the Pacific Northwest, as the BPA conducted a regionwide environmental impact statement on its power supply and transmission system. The smelter proposal originated in 1966 with plans by Northwest Aluminum to build a plant on Puget Sound in Port Angeles, Wash. The location changed in June 1967 to a site near the mouth of the Columbia River at Warrenton, Ore. [71] Bell Intercontinental Corp. initiated the plans under Northwest Aluminum for a 130,000 ton-per-year smelter using alumina from Australia. [72] By Feb. 19, 1968, Northwest Aluminum and three Japanese companies announced plans to spend $100 million building the new aluminum reduction plant at Warrenton. [73]

As controversy grew over possible impacts to BPA power supplies, more was learned about the smelter's promoters. In a Nov. 9, 1973, letter published in the Hungry Horse News in Columbia Falls, Mont., Oregon Gov. Tom McCall pointed out that plans for the Warrenton plant went back to 1966 before he became governor. At that time, he said, the BPA signed a contract agreeing to deliver power to the Northwest Aluminum Co.,

but the contract was subsequently assumed by Amax. At that time, both Northwest Aluminum and Amax were encouraged by government officials to pursue the idea in order to increase jobs in the area, and the BPA anticipated a steady growth in energy sources. Despite all this, McCall said, he withdrew support for the Amax smelter in light of energy shortages in 1973. He said he was also concerned about environmental impacts on the area by the smelter. "The Amax plant – if it is built – must be the environmentally cleanest aluminum producer in the world," he said. "If it is not, it will not operate in Oregon." [74]

In September 1973, Amax publicly announced it would start building the new aluminum smelter at Warrenton in spring 1974. Amax had just completed selling 50% of its aluminum business to Mitsui Inc. The new plant would use 240 megawatts of power supplied by the BPA at a time when many of the aluminum smelters in the Pacific Northwest were running on reduced power due to water shortages. The situation also irked the general public, which was being asked to conserve power, and was worsened by the suspicion that much of the aluminum production would be shipped overseas. According to media reports, the BPA had signed a contract with Amax back in 1966 when the BPA had not anticipated electrical shortages of the magnitude witnessed in 1973, and now the BPA was forced to honor its contract. [75]

On Oct. 17, 1973, Rep. Dick Shoup of Montana wrote to the BPA criticizing them for providing electrical power to the proposed Amax-Mitsui aluminum smelter when electrical power was short for existing industries. Shoup was also upset that aluminum production from the proposed plant might be shipped overseas. Shoup argued that the BPA should "abrogate" any pre-existing contracts with Amax or else be "grossly remiss in the exercise of your public trust." He also warned that it was time for Congress to reevaluate the BPA's role in meeting the nation's energy needs. At the same time, Sen. Lee Metcalf of Montana replied to a constituent's letter expressing concern over the Amax-Mitsui plant. In view of the energy shortages in the Pacific Northwest, Metcalf argued that the Anaconda Aluminum Co. plant in Columbia Falls should be operating at full capacity before construction began on a new aluminum smelter. Metcalf assured the constituent that he would pursue the matter. [76]

In late 1974, the Oregon Environmental Quality Commission stated that an aluminum smelter constructed on the Columbia River estuary might have to provide for zero fluoride emissions, but technology for such a plant was not currently available. After consulting with Oregon state officials, Alumax-Pacific concluded they would look for a site in eastern Oregon where a previously adopted emissions standard would prevail. In July 1975, Northwest Aluminum sold its interests in the project to Amax-Pacific Corp., which was renamed Alumax-Pacific. [77]

On April 17, 1975, a lawsuit was filed in U.S. District Court in Oregon on the very same day that the BPA signed a new contract providing power to Alumax's proposed smelter in Umatilla, Ore., on the Columbia River in eastern Oregon. The new contract replaced a 20-year contract that had been signed in 1966. In Port of Astoria v. Hodel, which became known as the "Alumax Case," Judge Otto Richard Skopil ruled on Aug. 26, 1975, that the power contract between the BPA and Alumax was valid but unenforceable pending the preparation and acceptance of a final environmental impact statement for the proposed plant and related facilities. Judge Skopil ruled that execution of the new contract constituted a major federal action that significantly affected the quality of the human environment, and he ordered that the environmental impact statement assess the primary or direct environmental impacts, the socio-economic impacts on the local community, and the effects of the power contract on transmission facilities serving the plant. The Ninth Circuit Court of Appeals affirmed the decision on March 5, 1979. [78]

Following the appellate court ruling, the BPA decided to expand the environmental impact statement by encompassing all of the BPA's actions regionwide. The resulting programmatic EIS was called "The role of BPA in the Pacific Northwest power supply system, including its participation in the Hydro-Thermal Power Program." The demise of Phase 2 of the BPA's hydro-thermal program had left the region with no regional program for planning, financing and developing future power resources. Faced with construction delays for thermal power plants and other resource development, the BPA was required to notify its preference customers that it would not be able to handle their total load growth needs after 1983 and to notify direct-service industry customers – mostly aluminum smelters – that their contracts would not be renewed after they expired. By March 1, 1979, the BPA was selling power to 15 industrial corporations with 21 plants that had a total contract demand of about 3,600 megawatts of industrial firm power. [79]

In the BPA's early days, selling power to the direct-service industries made sense because they used large blocks of power that provided needed revenue and kept the system predictable, the BPA stated in its 1981 final environmental impact statement. In 1965, when the BPA no longer had sufficient hydropower to meet direct-service industry demand, and when the region was just beginning to transition to a mixed hydro-thermal system, the BPA signed its first modified-firm power contracts in which the BPA had restriction rights and the direct-service industries assumed responsibility for providing a portion of the system's reserves. In 1968, the BPA entered into an Interruptible Replacement Energy Trust Agreement with the direct-service industries, where the BPA established a process for acquiring energy from non-federal sources for the direct-service industries at their expense during periods when federal power had to be curtailed because of low streamflow or peaking capacity limitations. [80]

In 1973, as Phase 2 of the Hydro-Thermal Power Program was being developed, the BPA adopted a new industrial power sales policy embracing the principles of industrial firm power, where the BPA received additional restriction rights in order to provide for increased reserves. In exchange, the direct-service industries were to receive long-term contracts in an era of decreasing power availability. The court ruling in the Alumax Case put a halt to the BPA signing any additional long-term industrial firm power contracts until a regionwide environmental impact statement was completed. The BPA published its final EIS for Alumax's proposed smelter in May 1981. By that time, BPA had signed a power contract providing Alumax with a new lower grade of industrial firm power. The 10-year contract offered 320 megawatts of industrial firm power and contained interruptibility clauses. But most importantly, the contract would terminate on July 20, 1986. The BPA would not offer power to Alumax or any other direct-service industry in the Pacific Northwest after 1986. The BPA stated in its 1981 final environmental impact statement that it was too early to speculate on where future power sources would come from. [81]

In the six years following Judge Skopil's ruling, Alumax retained its options on land near Umatilla and donated the Warrenton site to the YMCA of San Francisco. Plans called for a two-potline 187,300 ton-per-year smelter on a 4,100-acre site in Umatilla that would be 50% owned by Mitsui & Co., a Japanese company that owned 45% of Alumax-Pacific Corp. [82] The Umatilla plant was never built because the BPA power contract was too short. As a result, Alumax looked east. The Mount Holly plant on the Atlantic Coast was the last aluminum smelter built in the U.S. Delays in the Oregon smelter project led Alumax in 1977 to begin building a new plant about 24 miles north of Charleston, S.C. One quarter of the Mt. Holly plant output was tolled for Mitsui. By 1980, Alumax operated three smelters in the U.S. including the 265,000 ton-per-year Intalco plant, the 197,000 ton-per-year Mt. Holly plant and the 176,000 ton-per-year Eastalco plant. [83] By 1998, under Alcoa, Century Aluminum and Xstrata ownership, the Mt. Holly plant was producing 205,000 tons per year. [84]

Adjusting to the 1960s

Total annual production of primary aluminum in the U.S. in 1960 was 2 million tons. The amount declined by 5.5% in 1961 before beginning a steady climb to 2.7 million tons in 1965 and 3.9 million tons in 1970. Output increased by 94% from 1960 to 1970 with more in the forecast. Six of the nine primary aluminum producers in the U.S. announced plans to expand capacity or modernize plants from 1970 to 1972. Four new producers had plants under construction in the U.S. at the start of 1970, and a fifth new producer was considered likely by 1973. By 1972, Alcoa had eight smelters in the U.S., Anaconda had two, Comalco had one, Harvey had two, Intalco had one, Kaiser had four, Ormet

had one, Reynolds had seven, Eastalco had one, Gulf Coast Aluminum had one, National-Southwire had one, Noranda had one, and Revere had one for a total of 31 smelters with a capacity of 4.9 million tons. [85]

The U.S. aluminum industry in 1960 produced about 41% of the world's primary aluminum. [86] Aluminum prices remained relatively stable in the low- to mid-20 cent a pound range through the 1960s as production capacity continued to increase and keep up with increasing demand. [87] But there were market fluctuations. Production of primary aluminum fell from more than 2 million tons in 1960 to 1.9 million tons in 1961. [88] The U.S. aluminum industry faced problems from overcapacity, competition with rival materials and price weakness by 1961, the same problems facing many other U.S. industries, such as steel, oil, paper and copper. As a result, Alcoa moved to trim back some expansion projects as well as its research and development budget so it could concentrate on practical money-making efforts. The overcapacity problem had persisted throughout the 1950s, but government contracts to stockpile aluminum had absorbed the surplus in production. By 1961, government stockpiling contracts no longer existed. The industry's success in creating new markets for aluminum also made it prone to the ups and downs of the rest of the economy – a downturn in the automobile or construction industries was soon felt by aluminum producers, according to the New York Times. As a new industry with new members competing in an over-supplied market, the price structure for primary and fabricated aluminum was disrupted. The price weakness created lower price margins for the producers. Meanwhile, competitors to aluminum had come up with new products to threaten the inroads made by U.S. aluminum producers, particularly in the can market where steel companies were introducing new extra-thin tinplate cans. U.S. aluminum producers also were beginning to face firm competition from international markets and foreign producers. [89]

In January 1962, executives of the leading U.S. aluminum producers presented their forecasts for the coming year. Growth in the industry during 1961 was a modest 3% to 4%, but the executives expected 12% growth for 1962. Aluminum production was at about 80% of rated capacity. Two noted concerns were uncertainty about the federal policy on tariffs and upcoming labor negotiations in both the U.S. steel and aluminum industries. AAC President Archie Cochran believed that despite these concerns, operations were expected to be appreciably better for 1962. Both Kaiser and Reynolds reported declines in exports but an increase in domestic sales for 1961. Olin forecasted a 13% increase in production for 1962. [90] On March 26, 1961, Alcan President Nathanael V. Davis spoke about overcapacity in the global aluminum industry and the Canadian company's growth. Alcan's sales increased from $447.6 million in 1959 to $508.6 million in 1960. Davis noted that both price and volume was weak in 1960. [91]

On Nov. 15, 1961, the Aluminum Association announced a plan to establish an "orderly pattern" of sales and expansion in the global aluminum market through a voluntary system of government-negotiated trade. The plan, proposed to begin in 1963, was the first of its kind ever developed by a major industry, according to the New York Times. It would maintain a fixed share of the U.S. aluminum market for foreign aluminum producers in exchange for a reduction in tariffs in Europe and other areas. The goal was to stop U.S. producers from fighting each other for a larger share of the U.S. market and instead allow them to focus on increasing their share in the international aluminum market. This would be accomplished by helping other countries increase their use of aluminum. When the proposal was compared to a cartel, Aluminum Association President and Reynolds Chairman Irving Lipkowitz noted that the plan was in effect the opposite because the government was actively involved and because the plan sought to increase general consumption rather than set up market restrictions. The U.S. aluminum industry was suffering from overcapacity and smaller earnings, which affected new research and development. At the same time, European Common Market nations were eliminating tariffs between themselves while maintaining high tariffs for outsiders. [92]

In 1963, the Ford Foundation published "Resources in America's Future," a book of unprecedented scope that forecasted aluminum demand in the U.S. would increase 3.5 times from 1.6 million tons in 1960 to 8.7 million tons in 1980 and continue to increase to 14.7 million tons in 2000. [93] Production of aluminum by the eight U.S. aluminum companies set new records in 1963, increasing by 9.2% over 1962 and reaching 2.3 million tons. [94] By July 1963, aluminum output in the U.S. was at 96% of capacity and climbing. U.S. aluminum companies produced 192,868 tons in May, a new record. Production for 1963 was running 4.6% ahead of the record pace set in 1962. With demand believed to be climbing, some producers began to talk about increasing capacity again. About 267,500 tons of idled capacity had been reactivated since Jan. 1. Prices were up on many mill- and semi-fabricated products. [95]

Despite the growing volume of business, however, profits were not doing as well. Profits for Alcoa, Reynolds and Kaiser together fell to $18.7 million for the first quarter of 1963, compared with $29.4 million for the first quarter of 1962. Aluminum producers blamed low primary aluminum prices on overcapacity and the introduction of new competitors in the industry – Anaconda, Harvey, Ormet and, beginning in 1963, Conalco. They also blamed competition with Alcan. Demand was forecasted to increase by 200% by the mid-1970s – the average American used 23 pounds of aluminum per year, while the average European only used nine pounds. By 1963, the price for primary aluminum was set as an international commodity item. [96] All that market uncertainty was bound to make its way to court. In 1963, the Sonken-Galamba Corp., an aluminum fabricator located in Kansas City, filed an anti-trust suit against Alcoa, with Reynolds and Kaiser

named as co-conspirators, charging that the Big 3 aluminum producers had conspired to fix prices for primary aluminum and extrusion shapes from 1958 to 1962. The company asked for triple damages of $5 million. A jury in Kansas City exonerated the Big 3 on Nov. 29, 1966. [97]

By July 1964, it was apparent that the U.S. aluminum industry was strong and growing. Smelters on average were producing above their rated capacities. Prices were a little higher and stabilizing. The good news led many U.S. producers to make plans for more expansion. Analysts looking back at setbacks during the late 1950s faulted overexpansion, not weak demand, according to the New York Times. The same effect had taken place in other heavy industries in the U.S., but the aluminum industry was hit the hardest. Having learned a difficult lesson, U.S. aluminum producers were more cautious about expansion, but the strength of the U.S. economy in 1964 indicated expansion was needed. Kaiser announced it would restart its Tacoma plant, which closed in 1958 due to a weak market. Alcoa announced it was building a 35,000 ton-per-year potline at its Warrick plant with plans for three more potlines there in the future. Conalco and AAC had plans for new plants. Alcan had plans to add 20,000 tons per year to its Kitimat, B.C. smelter. In April 1964, Reynolds modernized and restarted its aluminum smelting plant in Troutdale. Reynolds had no plans for new plants but hoped to increase capacity by 21% through modernization. In total, U.S. producers planned to increase capacity by 200,000 tons per year, which by the end of 1965 would increase total U.S. capacity by 4%. The U.S. aluminum industry had expanded by an average rate of about 13% per year from 1955 through 1960. [98]

Releasing the stockpiles

U.S. production of primary aluminum increased from 2.55 million tons in 1964 to 2.75 million tons in 1965. On the whole, 1965 was a good year for most nonferrous metals despite shortages, strikes, stockpiles and price increases. Price increases resulted from extremely heavy demand and what producers considered inadequate profit margins. [99] In the spring of 1965, unions negotiated new labor contracts with major U.S. aluminum producers that increased wages about 4.1%, well above President Lyndon Johnson's guidepost figure of 3.2%. By November, U.S. aluminum producers announced price increases for primary aluminum and blamed the increases partially on higher labor costs. The price increase was the third for the year. The price structure for aluminum in the U.S. was determined by four integrated producers – Alcoa, Reynolds, Kaiser and Olin Mathieson – in what economists called a classic oligopoly, according to the New York Times. [100] By November 1965, demand for aluminum products was strong in both civilian and military markets. The U.S. aluminum industry was producing at above rated capacity and more smelters were under construction. [101] In late 1965 and early 1966,

aluminum supply was tight as the Department of Defense increased its requirements from 2% to 11% in response to the Vietnam War. The shortage was avoided by the release of aluminum from government stockpiles. [102]

For the major aluminum producers, it was one thing for the government to help the market by buying up surplus, but it was another thing to actually put the stockpiles back in the market. In November 1962, Sen. Mike Mansfield expressed concern over plans by the federal government to release 158,000 tons of stockpiled aluminum to the open market. The stockpile was left over from Korean War days. Only one aluminum company continued to sell aluminum to the federal stockpile, the Harvey Aluminum Co., and its contract would expire in 1963. If the federal government released that much aluminum for sale in the open market, when prices were officially 24 cents per pound but aluminum was selling even lower, some curtailment by Pacific Northwest aluminum producers might occur, Mansfield argued. He said he had been in contact with the BPA about the matter, and the BPA supported his efforts to stop the sales. [103]

Three years later, according to the New York Times, President Johnson, who had been struggling to control inflation, grew “sputtering mad” over aluminum price increases announced by major producers on Oct. 29, 1965. The companies had been seeking higher aluminum prices for some time in order to offset increased costs from new labor contracts with the Steelworkers and the Aluminum Workers Union. Johnson scheduled a staff meeting on Nov. 2, 1965, to discuss dumping large amounts of aluminum from the government strategic materials stockpiles in order to create a surplus in the market and force prices down. The stockpiles amounted to about 1.4 million tons, equivalent to about half the U.S. aluminum industry’s annual production and worth several hundred million dollars. About 550,000 tons had been acquired by the government under the Defense Production Act and could be sold openly at market prices. The remainder could not be sold without authorization by Congress. The federal government was already in the midst of a program to reduce its defense stockpiles, and 100,000 tons of aluminum was scheduled to be sold by mid-November. The stockpile reduction program had been taking place at a gradual pace in order to avoid disturbing the open market, but Johnson was prepared to dump all 550,000 tons of defense aluminum on the open market to shake up U.S. aluminum producers. [104]

On Nov. 6, 1965, Johnson’s administration announced it would sell 200,000 tons of stockpiled aluminum in 1966. U.S. aluminum producers announced a plan of their own in which all 1.4 million tons of stockpiled aluminum would be bought by the producers over a 14-year time period. The amount to be sold in 1966 was twice what the producers hoped to see on the open market. Defense Secretary Robert McNamara explained that part of the 200,000 tons of aluminum to be sold in 1966 would be given

to defense companies – 75,000 tons could be used to make aluminum powder for explosives and 40,000 tons could be used to make matting for airfields. The total of 115,000 tons would be given to defense companies, not sold, but it would eliminate that much in sales to the major U.S. aluminum producers. The remaining 85,000 tons would be sold on the open market. Government economists had determined that price increases by aluminum producers were inflationary, and government officials accused aluminum companies of being "completely uncooperative" and of "profiteering" on the stockpile issue since September 1965, according to the New York Times. [105]

Government officials also reminded aluminum companies that the country was at war and they needed to act more responsibly, according to the New York Times. One government official pointed out that aluminum prices had increased five times in the past 25 months for a total of 11%. He also explained that increased labor costs were offset by increased labor efficiency, so new labor contracts could not be blamed for the higher prices. Profits in 1965 had increased over 1964 by 26% at Alcoa, 52% at Reynolds and 29% at Kaiser. Reaction by U.S. aluminum producers to the government decision to release 200,000 tons of aluminum to the market was anger and frustration. Some industry spokesmen said the administration's announcement caught them by surprise. A meeting between representatives from Alcoa, Reynolds, Kaiser and Olin Mathieson and the federal government were broken off without resolution. Industry spokesmen explained that the return on investment for aluminum plants was far below the average for most other manufacturing industries, and that aluminum company stocks sold for less in 1965 than they did in 1955. An Alcoa spokesman noted the irony that the government stockpile was created in the 1950s at a time when the aluminum was needed in the civilian market, and it was being sold in 1966 when it was not needed in the civilian market. Producers also noted that the government stockpile had reached about 1 million tons by July 1, 1965 when the declared goal was only 450,000 tons. [106] In the end, the plan chosen for the systematic disposal of the government's aluminum stockpile allowed participating companies to purchase about 1.45 million tons of aluminum over 16 years. [107]

Primary aluminum production in the U.S. increased to nearly 3 million tons in 1966, compared to 710,000 tons in 1959. It was predicted that growth in the aluminum industry would slow down a little in 1968, as aluminum faced stiff competition from the steel, copper, glass and plastics industries. Meanwhile in Belgium, construction of a nuclear generating plant was planned to provide electric power for an aluminum smelting plant. [108] U.S. aluminum producers set their sixth record year in succession for production of primary aluminum in 1966 with 2.96 million tons, a 7.8% increase over 1965. [109] U.S. aluminum shipments fell by 1% below the previous year in 1967, the first time that happened in seven years, but the trend was reversed within a year. Aluminum

shipments increased 9% through 1968, and forecasts for 1969 were good. Industry officials forecasted three to five years of strong growth, up from 1968's expected level of 4.9 million tons to 7.5 million tons by 1973. [110]

Spokesmen for Olin and Amax, however, cautioned about overcapacity. Despite these cautionary messages, Martin Marietta acquired a 41% interest in Harvey Aluminum, and National Steel joined with Southwire Co. to build a new reduction plant. The United States Steel Corp. was in the process of acquiring Alside Inc., an aluminum siding manufacturer based in Akron, Ohio, which was a major change for a steel company. Another change was increased integration as the U.S. share of ingot shipments fell and producers shipped more fabricated products. Primary ingot production accounted for about 23% of total shipments in 1968, but some industry insiders were forecasting that the ingot share would drop to 12% by 1973. Aluminum cans were the bright side for the industry – in 1963, about 89,000 tons of aluminum went into can production, but that figure had increased 25.5% to 280,000 tons by 1968. [111]

The new aluminum economy

Analysts in mid-1967 believed the U.S. aluminum industry had matured from its start as a "job-shop pots-and-pans" industry through a period of uncertain prices, supplies and markets to a balanced supply and demand for the first time in 10 years by 1966 – and predictions for the future were bright. The U.S. Bureau of Mines projected worldwide aluminum demand would increase 300% by 1980. In the U.S., aluminum consumption had grown from 710,000 tons in 1959 to 3 million tons in 1966. Among the big changes in the industry: 1) increasing stability in prices and an end to feast-or-famine cycles; 2) new market applications, such as beverage cans, that opened up the opportunity for volume production; 3) multinational ventures in bauxite mining, alumina refining and even aluminum smelting in Third World countries; and 4) new technology that cut production costs and opened up new locations for smelters. Among the new market opportunities, aluminum cans were among the newest and fastest growing. [112]

In summer 1966, Alcoa began operating its new Warrick rolling mill, which produced 5-ton coils of precision-rolled light-gauge aluminum for making cans. Five years earlier, aluminum cans were a nonexistent market. Alcoa's enthusiasm was matched by Reynolds and Kaiser. Reynolds began to build plants to fabricate cans from aluminum. Executives from steel and glass companies argued that aluminum producers were losing money as they pushed their way into the can market, but Reynolds insisted it was making a profit on aluminum cans. The steel industry vowed to maintain its share in the soft drink and beer can markets. [113] Meanwhile, Reynolds initiated a program for recycling aluminum cans in 1967. The program took off, and by 1982 secondary aluminum accounted for more than 20% of supplies. Secondary production of aluminum

from scrap or recycling required only 5% of the total energy needed to make aluminum from bauxite. The largest single source of secondary aluminum in 1982 was aluminum cans. In 1977, the industry reclaimed 140,000 tons of aluminum from 6.4 billion aluminum cans. [114]

By 1966, transportation moved into first place in the U.S. aluminum market, followed by construction, consumer durables and machinery. The steel industry vowed to maintain its market share against inroads by aluminum siding, and the copper industry intended to keep its market share in electrical conductors. Per capita consumption of aluminum in the U.S. in 1965 was 28 pounds, compared to 11 pounds in the European Common Market, six pounds in Japan and about one pound in less developed countries. Global aluminum producers were teaming up to develop new bauxite mines, build alumina refineries and even establish new smelter sites. Partnerships were necessary for such large-scale operations. In Australia, a new alumina refinery was built and put into operation by Kaiser, Conzinc-Rio Tinto of Britain, Pechiney of France and Alcan. Harvey Aluminum began mining bauxite in Guinea along with Alcan, Alcoa and three European aluminum companies. The new Alpart alumina refinery in Jamaica was built and put into operation by Kaiser, Reynolds and the Anaconda Company. In Ghana, hydroelectric power from the Volta River was put to use by Kaiser and Reynolds in a new $128 million smelter. Kaiser was also contemplating a new aluminum smelter in Belgium that would be powered by a nearby nuclear generating plant. New technologies were making it possible for aluminum producers to use gas or coal for electrical power rather than hydroelectric power, which opened up the possibilities of locating smelters closer to the raw materials. Other new technologies were reducing the amount of electrical power needed to produce aluminum. [115]

In his 1967 book “Trends in the World Aluminum Industry,” Sterling Brubaker explained how aluminum producers were able to hold on to their electrical power supplies despite competing interests in a rapidly growing economy. Long-term power contracts delayed the diversion of power to other uses. Even if the power rate were to rise sharply over time, aluminum producers might be willing to pay the higher cost rather than lose their investment in their smelter facilities. Some U.S. aluminum companies owned the power plants that supplied their smelters, and they would not divert power to other uses unless the price reached an improbably high level. It was also considered improbable that government agencies responsible for providing power to many U.S. smelters – the BPA, the TVA and the New York State Power Authority – would impose power rates on the aluminum industry so high that it would force their closure. Instead, these government agencies might discourage the building of new smelters, or increase the supply of thermal power tied into the power grid. [116]

Monthly production of primary aluminum in the U.S. reached a record 278,924 tons in May 1967, about 3.9% higher than April and 10.6% above May 1966. The eight domestic producers of primary aluminum included Alcoa, AAC, Conalco, Harvey, Intalco, Kaiser, Ormet and Reynolds. [117] By July, aluminum producers were facing a stiff challenge for markets from the copper industry, according to the New York Times. Additional materials challenging aluminum included other metals, plastics, ceramics, wood and paper. A three-year copper shortage had eased by mid-1967, and the material which most often substituted for aluminum was presenting a challenge. Aluminum, however, was about one-third cheaper than copper, and while the aluminum industry had achieved a good balance between supply and demand, the copper industry could not guarantee supplies. The challenge from aluminum came mostly in industries where metal was used in large quantities, such as new copper-nickel tubes for water treatment. One estimate was that de-salinating plants could utilize 235,000 tons of aluminum for tubing, plate and sheet. A spokesman for the Anaconda American Brass Co. forecasted that aluminum substituting for copper in tubing alone could add up to 200,000 tons over the next 10 years, but noted that copper-nickel tubing was being specified in all current projects. Another contender for the desalinating industry market was stainless steel tubing. [118]

In December 1968, Business Week forecasted a 9% increase in aluminum shipments for 1969 over 1968. A major factor in the industry's growth was the successful introduction of aluminum cans. A total of 560 million pounds of aluminum were used for aluminum cans in 1968, a 25.5% increase over 1967. Transportation and construction industries accounted for about 21% of the aluminum consumed in the U.S., and more aluminum products were expected to be introduced to those sectors. The same could be said for the electrical industry, which accounted for about 14% of the aluminum used in the U.S. There were some indications, however, that a leveling of the industry could be taking place. [119]

Expansion of the Anaconda Aluminum Co.'s smelter in Columbia Falls paralleled rapid growth in the global aluminum industry during the 1960s. Considering how the Anaconda Company was known for making very long-range plans and how the AAC smelter was originally laid out with ample room between the potlines and Teakettle Mountain, it seems likely the plant's expansion in the 1960s was always in the cards. Increased capacity at the AAC plant began slowly – first one new potline, then the announcement of a fourth potline followed up with an announcement of a fourth and fifth potline being built simultaneously. By the end of the 1960s, the Columbia Falls smelter reached its maximum size – five potlines with 10 potrooms. But lacking an adequate air pollution control system, hazardous emissions reached a tipping point with those additional 360 reduction pots.

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