ALUMINIUM

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For aluminium, 2001 is perhaps best described as *annus horribilis*. After 18 consecutive years of positive growth in the Established Market Economy Countries (EMEC), total aluminium consumption is estimated to have fallen by over 6% last year! Consumption was down in every region except Latin America and Africa, as the US slowdown which began in the second half of 2000 turned into a recession and spread to most of the industrialised world. There were signs of an imminent US recovery early in the third quarter but they were snuffed out in the aftermath of the tragic events of September 11. And though the recession in the US was mild in terms of GDP, unemployment and the consumer sectors, manufacturing was devastated with double-digit declines. EMEC apparent primary consumption was also down over 6% in 2001.

The situation was little better on the production side. The only thing that prevented a massive supply surplus was the forced idling of over 2 Mt of capacity in western North America and Brazil owing to power shortages and soaring prices related to low rainfall, poor electricity planning, insufficient investment and botched deregulation. The cutbacks were more than enough to offset the output from new greenfield smelters in Canada and Mozambique, as EMEC production fell almost 4%. Only in the former East Bloc, especially China, were there substantial increases in both production and consumption. The largest percentage decline in EMEC total consumption in over a quarter-century had the expected effect on prices, which fell through most of the year. The profits of aluminium companies also suffered.

Based on production, estimated net flows from the former East Bloc and reported producer and commodity exchange inventory changes (IAI unwrought, LME and Nymex/Comex warranted stocks), primary shipments were down 6.2% in 2001 to 18.9 Mt.

EMEC Primary Metal Balance (Mt)

	1998	1999	2000	2001
Primary Capacity	17.51	17.94	18.28	18.95
Operating Rate (%)	93.9	94.5	94.9	88.0
Primary Production	16.43	16.95	17.35	16.67
Net East Bloc flow	2.70	2.65	2.40	2.70
Primary Supply	19.13	19.60	19.75	19.37
Primary Shipments	19.07	19.51	20.18	18.92
Reported Unwrought Inventory Change	+0.07	+0.09	-0.44	+0.45

Sources: International Aluminium Institute, London Metal Exchange, Nymex/Comex, Alcan estimates.

The supply surplus last year caused reported EMEC unwrought inventories to rise by 446,000 t, wiping out the decline of the previous year. They are now slightly above their average of the past five years. Total reported EMEC inventories rose by 404,000 t. While IAI producer stocks declined slightly during 2001, LME inventories rose quite steadily throughout the year, up 499,000 t. LME stocks continued to rise in early 2002, reaching levels not seen in almost seven years. Nymex/Comex warranted stocks ended 2001 down slightly but unwarranted metal (which includes secondary and other non-P1020 aluminium) soared from 121,000 to 268,000 t. As in 2000, Japanese port stocks rose during the spring but ended the year little changed.

Prices

The price of aluminium declined through most of 2001. After ending 2000 at US$1,568/t, the benchmark LME three-months price rose in January to reach a high of US$1,650 on January 31. This proved to be the peak for the year. The price slid to the US$1,450s by early April, then recovered to around US$1,580/t by

early May before resuming its decline. The low of US$1,254/t was reached on November 7. Rebounding stock markets, diminishing fears about Afghanistan and global terrorism, and early signs of a US economic recovery led to a sharp rebound in metals prices in November. Aluminium reached as high as US$1,471/t by November 30 before drifting lower to end the year at US$1356/t. The average price for the year was US$1,453/t. This was down from US$1,567/t in 2000 but up from US$1,388/t in 1999 and US$1,380/t in 1998. Indeed, the average for 2001 was only slightly less than the average of US$1,481/t for the past five years (1997-2001).

Regional premiums reflected the local supply-demand balances. Between January and August, the European three-months duty-paid premium fluctuated between US$115/t and US$135/t, peaking in late March. As the recession took hold in Europe, the premium fell further, reaching US$80/t by year-end and even lower in the first quarter of 2002. In Japan, premiums fell steadily from US$68/t early in 2001 down to US$35 by year-end. Premiums for other Asia Pacific nations moved in tandem with those of Japan. On the other hand, the US situation was not affected only by very weak domestic demand (down around 15%). The 1.6 Mt idled capacity in the Pacific Northwest represented about 40% of total US primary smelting capacity. As a result, after falling close to US$0.025/lb. in early February, the Midwest premium rose to average US$0.04/lb. from March through November, peaking near US$0.045/lb. in early October. Late in the year and into 2002 the Midwest premium fell, dipping below US$0.03/lb by early February.

Consumption by Region and End Use

Consumption of total aluminium (semi-fabricated, castings, etc. from both primary and secondary/recycled metal) in the EMEC is estimated to have fallen 6.3% in 2001. This represented the largest percentage decline in over 25 years! Consumption was down in all regions except Latin America and Africa. By far the greatest drop was in the US - down an estimated 13.3% or by over 1.3 Mt. It was also a bad year in Asia: Japan, Korea, India and Malaysia were 'only' down by between 4% and 6% while Taiwan and the Philippines were each down by over 16%. Consumption was up somewhat in Indonesia and Thailand.

The best performance was in Latin America, with an increase of over 11% in Brazil. Some of the latter was pent-up demand from 2000, but it was nonetheless remarkable in light of the 15% to 25% power restrictions imposed on Brazilian industry for the latter half of last year. For 2002, only a muted economic recovery and modest consumption growth of between 1% and 4% is forecast for the major EMEC consuming regions.

Consumption

	00/99 %	2000 ('000 t)	01/00 %	2001e ('000 t)	% of Total
North America	0.4	10,566	-13.3	9,164	32
Latin America	4.2	1,545	3.3	1,597	6
Western Europe	4.6	8,701	-0.9	8,618	30
Asia	7.5	7,138	-5.3	6,763	24
Africa & Oceania	7.5	714	0.4	717	3
Total EMEC	+3.7	27,503	-6.3	28,467	100

Source: Alcan estimates, may not add due to rounding.

EMEC consumption declined in each of the major end-use sectors. Cans and other packaging (primarily foil) are not as closely linked to the economic cycle so suffered relatively small declines. Shipments of US beverage cans were actually up 0.5% last year to 100.75 billion cans. In contrast, aluminium's two largest markets, transportation and construction, suffered declines of 8.5% and 7% respectively last year. Global automobile sales were down less than 1% last year but production was down around 3% as automakers also slashed their inventories. The most severe declines in transportation, however, were in heavy trucks

and aircraft-the latter seriously impacted by the September 11 tragedy. The sharp decline in building and construction was more in the industrial and commercial segments than residential.

EMEC Consumption

	00/99 %	2000 ('000 t)	01/00 %	2001e ('000 t)
Building & Construction	1.8	5,246	-7.0	4,877
Transportation	4.5	8,662	-8.5	7,927
Consumer Durables	2.7	1,811	-8.4	1,659
Machinery & Equipment	5.8	2,631	-5.7	2,482
Electrical	4.7	2,562	-9.7	2,312
Cans	-0.9	3,469	-0.2	3,462
Other Packaging	1.9	1,481	-2.8	1,439
Other	10.3	2,803	-3.6	2,701

Aluminium Expansions and Technology

Only two large expansions were completed in 2001, and both were greenfield projects that had begun coming on stream the previous year. The 245,000 t/y capacity Mozal smelter at Maputo, Mozambique began pouring metal in June 2000 and was completed early in 2001. Shortly thereafter, an US$860 million, 250,000 t/y expansion was approved. Already the smelter has become a major part of the economy of the impoverished African nation, accounting for 60% of Mozambique's export earnings. BHP Billiton has a 47% stake, Mitsubishi 25%, the Industrial Development Bank of South Africa 24% and the Government of Mozambique 4%. Almost half a world away, Alcan's 400,000 t/y smelter at Alma, Quebec began production in October 2000 and reached full capacity a year later. It was designed with the potential for a future 133,000 t/y expansion.

There were also two modest brownfield expansions completed last year. In July, Columbia Ventures expanded its Nordural smelter at Grundartangi, Iceland by 30,000 t to 90,000 t/y. The smelter was originally completed in 1998 and further expansions up to 300,000 t/y have been discussed. In Brazil, Aluminio Brasileiro (Albras) completed its 43,000 t/y expansion to 404,000 t/y at Belem in 2001 but was only able to bring it on line in January 2002 after the power rationing ended in the north of Brazil. As a result, Cia Vale do Rio Doce (CVRD) has set aside plans for a fifth potline in favour of expansions in bauxite and alumina.

A few projects were already in progress last year. In Brazil, Cia Brasileira de Aluminio's (CBA) 100,000 t/y expansion at Sorocaba is expected to come on stream beginning this September and continuing throughout 2003. It will use electricity from the new Machadinho and Piraju hydro plants in which CBA's parent, Votorantim, is a partner. There are two projects well under way in India. Nalco's 115,000 t/y expansion should take the Angul smelter to a 345,000 t/y capacity by the second quarter of 2002. It is seeking approval for a further expansion to 600,000 t/y. Hindalco, meanwhile, has a 100,000 t/y expansion that should take the Renukoot smelter to 342,000 t/y over the next year.

There are also two projects in progress in Norway. A NK1.8 billion (US$200 million) expansion to the 120,000 t/y Mosjoen smelter (Elkem 50%, Alcoa 50%) will boost primary output to 180,000 t/y by the second half of next year. And Norsk Hydro is investing US$600 million to modernise and expand its Sunndal smelter through a 234,000 t/y expansion while closing an old 66,000 t/y Soderberg potline. In Slovakia, an US$80 million expansion to the 110,000 t/y Ziar nad Hronom smelter should take capacity to 155,000 t/y by late 2003. Work also began last year on the Al-Ghadir project in western Iran. The first phase involves a US$50 million, 22,500 t/y capacity greenfield smelter. The track record for projects in Iran, however, is not good.

Given the aluminium supply surplus and economic uncertainty, only a limited number of firm, new projects have been announced over

the past year. Besides the Mozal expansion, BHP Billiton is going ahead with a US$449 million, 132,000 t/y expansion to its 500,000 t/y Hillside smelter, which was built less than a decade ago. Unlike their previous arrangements with South Africa's Eskom utility, the power for this expansion will be priced in rand and not linked to LME prices. In the Persian Gulf, Aluminium Bahrain (Alba) approved a US$1.7 billion project involving an 800-900 MW power plant and 250,000 t/y smelter expansion. The expansion would take Alba's smelter capacity to 750,000 t/y by 2005, making it the largest outside Russia. Early in 2002, Alba commissioned a US$400 million project involving a 450,000 t/y petroleum coke calcining plant, water desalination facility and jetty. Late last year, SNC Lavalin received a US$100 million contract to modernise the 185,000 t/y Vlissingen smelter in the Netherlands (Pechiney 85% Hunter Douglas 15%), which will increase its capacity by 25%.

Based on figures from the International Aluminium Institute, EMEC capacity is expected to rise modestly over the next few years: from 19.2 Mt at the end of 2001 to 19.5 Mt by the end of 2002, and 20.4 Mt by the end of 2004.

Over the past year there has not been much discussion on new smelter technologies. Alcoa has been silent as to the success or failure of its trials with inert anodes. The technology (perhaps coupled with wettable cathodes) would cut costs for labour as well as carbon and slash the output of greenhouse gasses - if it can be made both technologically and economically viable. The other anticipated development is the first project using Pechiney's new AP50 technology, now likely in South Africa.

Aluminium Production and Power

It was not a good year for aluminium production, as power shortages led to the curtailment of over 2 Mt of annual capacity. Hardest hit were the US and Brazil, but there were also power-related cutbacks in Canada, New Zealand and Indonesia. In the US, Brazil (and to a certain degree in New Zealand) the story was much the same:

- partial deregulation which reduced prices to industrial users but left a ceiling on residential electricity prices;
- lack of investment in new generating capacity owing to insufficient returns and an uncertain regulatory outlook (and severe environmental constraints and red tape in the case of California);
- failure by governments to recognise and act on diminishing electricity reserve margins as consumption grew but capacity failed to keep up; and
- sharply reduced rainfall and snowfall which pushed the situation into crisis.

There are 1.64 Mt of capacity in the US Pacific Northwest of which about 100,000 t was already idled before the recent crisis began. Up until October 1996, most of the smelters had their power supplied under long-term, take-or-pay contracts with the Bonneville Power Authority (BPA), a federal government agency. But in the mid-1990s, spot power prices were considerably less than the US$23.50/MW the BPA would charge under its 1996-2001 contract, so some smelters switched all or part of their requirements to third parties at spot rates. When those spot electricity rates skyrocketed to as high as US$2,000/MW in the second half of 2000, the capacity using spot power was idled. By the start of 2001, about 700,000 t of such capacity had been shut down.

Many US primary and secondary smelters and fabricators added energy surcharges to their products to try to recoup some of the higher costs of electricity and natural gas. As the high rates continued (and aluminium demand faltered), it was clearly much more profitable for smelters to sell their power allocations rather than produce aluminium. So one smelter after another shut down and sold its allocations back

The following table lists a number of other projects that have been discussed but not yet commenced, roughly in order of their near-term likelihood:

Company	Location	Size ('000 t)	Timing	Comments
Consortium	Alouette, Quebec, Canada	250 brownfield	2004-05	US$1 billion; power supply obtained; decision expected shortly
Pechiney	Port Elizabeth, South Africa	460 greenfield	2005	US$1.6 billion; first using new AP50 technology; power deal reached with S. Africa's Eskom utility
Aldoga Group	Gladstone, Queensland, Australia	450+ greenfield	2005	Formerly Lithgow project in NSW; fast-tracked by government; A$3 billion; decision expected shortly
Unknown	Sohar, Oman	530	2006?	US$2.5 billion; feasibility completed Jan. 2000
Charus, Perak state, Hong Kong investors, Perak Gov't	Malaysia	250+250 greenfield	2005-06	Much discussion
Hindalco	Orissa state, India	300 greenfield		Delayed by land claims problems
Bharat Aluminium	Korba, India	100~150 brownfield		Said needed to make smelter more viable
Norsk Hydro, Icelandic investors	Reydarfjordur, Iceland	240+240 greenfield	2006?	Delayed by environmental issues
Dubal	Jebel Ali, Dubai	250 brownfield		Less likely than Oman project
Noranda	Aisen, Chile	230 greenfield		In process of obtaining environmental permits
Aluar	Puerto Madryn, Argentina	150~200 brownfield		Electricity infrastructure delayed by economic crisis
Alcan	Kitimat, British Columbia	225 brownfield		Problems with reduced water in region
Unknown	Kuwait	230 greenfield		Discussed for many years but less likely than Oman, Dubai projects
Pechiney, others	Tomago, Australia	220 brownfield		Not discussed recently
BHP Billiton	Beira, Mozambique	240 greenfield		BHP Billiton busy with Hillside and Mozal expansions
VAW (Norsk)	Kurri Kurri, Australia	100 brownfield		Uncertain, particularly with take-over by Norsk Hydro
Aluar	Patagonia, Argentina	250 greenfield		Delayed by economic crisis; after Puerto Madryn expansion
KAI Technology & Development	Port Alberni, British Columbia	360 greenfield		Problems with reduced water in region
Etibank (gov't)	Seydisehir, Turkey	50 brownfield		Long discussed but trouble getting US$300 million financing
Al-mahdi investors	Bandar Abbas, Iran	110 brownfield		110,000 t/y smelter has never operated at more than fraction of existing capacity
Norsk Hydro	Point Lisas, Trinidad & Tobago	237+237 greenfield		Not discussed recently
Unknown	Guinea	240		US$2.5 billion project including power station, refinery
Alcoa	Newfoundland, Canada			Newfoundland government said unlikely after feasibility study

to the BPA. The exception was Kaiser, which incurred the BPA's ire by selling its BPA power to third parties. By the summer of 2001, all Pacific Northwest capacity had closed except for a small amount at Goldendale.

When the previous five-year contracts expired at the end of September 2001, the BPA was in a difficult situation. Its mandate to supply electricity exceeded its own power-generating capacity by about 3 GWe. It predicted rate hikes of 250-300% to cover the cost of buying that third party power unless it could get its customers to reduce their demand. So negotiations were undertaken with the BPA's large, industrial users (including the aluminium smelters) offering compensation, partly to pay laid-off workers. All smelter owners except Kaiser worked out deals to be paid a generous US$20/MW for between six months and two years, in return for giving up their right to operate using BPA power. Not surprisingly, the BPA was able to reduce its load by about 88% of the 2.4 GWe. it had sought and the rate for October-March was set at US$37.50/MW, including transmission costs.

(Situation as of September 2001) **Production cutbacks ('000 t/y)**

Company	Smelter	Capacity ('000 t)	Pre-2000	2000	2001
Alcoa	Wenatchee	215	45		170
"Troutdale	121	41	80		
Intalco (Alcoa 61%)	Ferndale	280			280
Michigan Ave. Partners	Longview	204			204
Golden NW	Goldendale	168		141	
"The Dalles	82		82		
Glencore	Colombia Falls	168		84	84
Kaiser	Mead	205		205	
"Tacoma	81	16	65		
Vanalco	Vancouver	115		115	
US Pacific NW totals	1,639	102	772	738	
Alcan	Kitimat, Canada	272		50	86
Alcan	Aratu	58			17
"Saramenha/ Ouro Preto	51			14	
CBA	Sorocaba	237			12
CVRD 54.5% Billiton 45.5%	Santa Cruz/ Valesul	93			25
Alcoa 59%	Pocos de Caldas	93			47
Alcoa 54% Billiton 46%	Alumar/Sao Luis	370			91
CVRD 54.5%	Albras/Belem*	415			128
Brazil total	1,317			334	

** including 45,000 t/y expansion.*

Though it was thought otherwise at the time, the BPA did not require the smelters to stay closed. So in 2002 we have a ridiculous situation. Glencore's Columbia Falls has announced plans to restart some production. It will apparently continue to receive full compensation from the BPA, ostensibly to help pay for laid-off workers though many of them will be back at work. And Columbia Falls has been buying up third-party power which, partly as a result, has jumped in price from around US$18/MW to over US$40/MW. This is the same relatively finite pool from which the BPA also must purchase power to meet some of its needs, presumably pushing up its costs. On the plus side, the higher spot power rates should deter other smelters from restarting capacity in a surplus market, even those whose BPA take-or-pay clauses partly come into effect on April 1 (Longview and Golden Northwest). In British Columbia, Canada, Alcan shut down half of its Kitimat smelter due to low water levels and the ability to profit from power sales.

While capacity was being closed in the Pacific Northwest, Alcoa restarted idled potlines elsewhere in the US: 25,000 t at Warrick and 30,000 t at Eastalco/Frederick. But in early December, Warrick suffered two power failures within 24 hours that damaged four of six potlines at the 300,000 t/y smelter. Ironically, Alcoa had only taken over the coal-fired Warrick power plant in March, it having been run by Southern Indiana Gas & Electric for 40 years.

In Brazil, almost all electricity comes from hydroelectric sources. Water levels had been declining for a few years, particularly in south-eastern Brazil, as power consumption grew much faster than capacity. Finally, poor summer rainfall (end 2000) led to a crisis. Despite numerous political and legal challenges, compulsory rationing of 25% for heavy industrial users (including aluminium smelters) and 15% for other users was introduced everywhere except in the north from June 1. In July, 'voluntary' rationing of 15% was introduced in the north and later made a mandatory 25% for large industrial users. Some smelters cut production more than 25% in order to sell the power or divert it to fabrication plants. Only CBA's Sorocaba smelter was able to get by with minimal cutbacks because of its reliance on self-generated power. Alcoa, Billiton and CVRD announced plans to spend billions of dollars on energy projects in Brazil. In January 2002, smelters rushed to restart idled capacity as power rationing was lifted in the north and eased in the rest of the country. From the end of February, rationing ended everywhere in Brazil.

Two other smelters on the other side of the world were also affected by power shortages. In New Zealand, Comalco's 330,000 t/y Tiwai Point smelter idled the 6% (20,000 t/y) of its capacity that relied on spot power (whose prices soared to over NZ$300/MW). And in Indonesia, Asahan hoped to return finally to full production (225,000 t/y) last year. Instead, receding water levels in Lake Toba, due to both lower rainfall and deforestation, forced further production cutbacks. By early 2002, Asahan was operating at less than two-thirds of capacity. Elsewhere, heavy snowfall in South Africa in September caused a power failure that closed pots at Billiton's Hillside and Bayside smelters; a strike shut the 100,000 t/y Korba smelter in India and about 50,000 t/y of capacity was idled in the spring and summer at Aluar's Puerto Madryn smelter.

In Venezuela, CVG restarted one of the two 25,000 t/y potlines at Alcasa that had been idled since 1998 with plans to restart the other shortly. Nothing came of repeated reports that Nigeria's troubled Ikot Abasi smelter would be restarted. In February 2002, Ghana told Valco to shut two more potlines because of problems at the Akosombo hydro plant. Growing evidence of another El Niño weather system in 2002 could further impact precipitation, hydroelectric power output, and smelter production, particularly in western Africa and Indonesia.

Labour, Legal, Environment and Government

There were numerous layoffs but few strikes last year. Many of the workers laid off from smelters in the US Pacific Northwest continued to receive compensation tied to BPA payments. Those from bankrupt companies like Scottsboro Aluminum and McCook Metals were not so fortunate. Golden Northwest Aluminum and its workers could not reach agreement after their contract expired on September 30. So, after a work stoppage in November, almost 200 workers from the Goldendale and The Dalles smelters were laid off. With the deteriorating economic conditions, Alcoa announced it was cutting about 6,500 jobs or 4.6% of its global workforce, and Alcan roughly 3,000 jobs or 5-7%. Swedish extrusions group Sapa laid off close to 1,000. Pechiney cut 147 jobs at its Sainte-Menehould plant and 90 at its Aviatube aerospace subsidiary in Workington, England. Kaiser laid off 65 at its Trentwood rolling mill. With its January 2002 take-over of VAW, Norsk Hydro's Light Metals Division announced 1,100 layoffs.

Many labour accords were reached without strikes. In September, Alcoa and the United Steel Workers (USW) reached agreement on a five-year master labour contract covering 12,000 hourly employees. Ormet reached separate multi-year agreements with workers at its Hannibal rolling mill, its Iuka Mississippi foil mill and its Burnside Louisiana refinery.

The most serious strike took place at Balco's 100,000 t/y Korba smelter in India. On March 3, about 4,500 workers went on strike to protest its privatisation to Sterlite Industries. More than two months later, 7,000 workers returned following a court order. During the strike and throughout the year, the Indian opposition Congress party and the state government worked to annul the sale and prevent Sterlite from operating the smelter. Numerous legal challenges were made and it was only in December that the Supreme Court ruled the sale legal. Unfortunately, even late in the year, the smelter was still not back at full, normal production.

Labour problems continued at the new Mozal Maputo smelter. There was a brief stoppage in February over inflation and the gap in pay with expatriate workers. Then in October, several hundred workers went out on an illegal three-week strike over wages. BHP Billiton responded by firing a few hundred and bringing in workers from its smelters in South Africa. This led to a one-hour sympathy strike by thousands of workers in South Africa. BHP Billiton had to go to court to prevent a similar walkout in sympathy with workers at its Samancor ferrochrome subsidiary. Also in South Africa, a settlement was reached between Hullet and the National Union of Metalworkers of South Africa after a strike of only a few hours in August. In Venezuela, there was a two-day work stoppage at CVG in June after a picketing union leader was run over and killed by a bus, and another one-day walkout in October.

There were several high-profile changes at the top of the major aluminium companies. At Alcoa, chief executive Alain Belda also assumed the position of chairman after President-elect Bush appointed Paul O'Neill as his Treasury Secretary. Mr O'Neill later decided to sell his US$100 million in Alcoa shares after running into conflict-of-interest issues. Alcoa also named former Clinton press secretary Siewert as vice president, Global Communications and Public Strategy and appointed to its board of directors former Mexican President Ernesto Zedillo and Nissan chief executive Carlos Ghosn. At Alcan, long-time chief executive Jacques Bougie resigned suddenly for personal reasons in January. Travis Engen, the chief executive of ITT was chosen to replace him. At troubled Kaiser, president and chief executive Raymond Milchovich was also named chairman in May but resigned to become chief executive of Foster Wheeler in October. Jack Hockema replaced him as president and chief executive, and George Haymaker again became chairman.

The electricity crisis in the US Pacific Northwest led to many legal actions. When

the five-year BPA contracts came up for renewal in 1996, Vanalco chose to use the then cheaper third-party spot power, forgoing almost all of its previous BPA allocation. So it was ironic that Vanalco blamed its bankruptcy on the BPA and sued it last year. On the opposite side, public utilities sued to have all power sales to direct service industries (including the smelters) declared illegal. Employees and bond holders brought class-action lawsuits against Goldendale Aluminum and chief executive Brett Wilcox alleging that US$285 million from power sales had been illegally diverted to another of his companies (Northwest Energy Development). They were settled out of court.

There were also legal actions associated with bankrupt companies. Lawsuits were brought against out-of-business Aluminium.com by former employees and by McCook Metals. Later, McCook's court ordered administrator called for the dismissal of previous managers while creditors called for forensic accounting to be done, alleging fraudulent practices by Michigan Avenue Partners (MAP) in overstating inventories and transferring assets. Enron also fought with MAP over a power supply deal.

One of the biggest environmental stories concerned Alcoa's 320,000 t/y Rockdale, Texas smelter and its lignite coal power plant. It was referred to in the press as one of the worst polluters in America's most polluted state. A grandfather clause allowed the smelter an exemption to the 1971 Texas Clean Air Act provided no major modifications were made. Three public interest groups sued Alcoa, alleging that Rockdale's exemption had been lost owing to major renovations in the 1980s. Legislators also moved to force Alcoa to cut emissions or close Rockdale. Alcoa said it wanted to become eligible for the state's voluntary emissions reduction programme and would cut sulphur dioxide emissions by 90% by the end of 2006 and nitrogen oxide by 50% by the end of 2002 if financially viable to do so. The US also ordered Hovensa Oil Refinery and Alcoa's St Croix Alumina refinery to clean up nearly 3 million g/d of oil and other contaminants that had seeped into the ground.

Noranda faced criticism from some environmental groups after filing an environmental impact study with Chile's Environmental National Commission of Region XI related to the proposed 440,000 t/y Aisen project.

There have been mixed results in aluminium recycling. While beverage can recycling rates continued to rise to more than 80% in places like Brazil and Japan, rates have declined below 60% in the US. Brazil's largest recycler, Tomra Latasa, announced plans for automated recycling centres in parking lots of 40 supermarkets nation-wide. In the European Union, which has often been at the forefront of environmental action, proposed new targets would increase aluminium recycling requirements from 15% to 50% over five years. However, it was feared that weight-based recycling objectives in the UK could hurt light materials like aluminium.

To comply with strict environmental regulations that will come into force in Norway, Norsk Hydro was looking at replacing technology at its Norwegian plants. And Alcan said it would reduce greenhouse gas emissions by 500,000 t over the next four years under its new TARGET programme, after cutting them by over 2,000,000 t over the past decade.

In the US, there were setbacks on the environmental front. Though the Bush administration announced US$4 billion of planned tax breaks for buyers of hybrid and fuel cell vehicles, it abolished the Partnership for a New Generation of Vehicles (PNGV) and its objective of 80 miles-per-gallon family cars-which would have made substantial use of aluminium. It replaced it with the Freedom Co-operative Automotive Research focusing on the distant objective of hydrogen fuel cells. Efforts to boost the long-frozen Corporate Average Fuel Economy rates appeared to be faltering.

The Federation of Aluminium Consumers in Europe (FACE) changed tactics, pushing for a reduction in the EU duty on primary aluminium from 6% to 3% rather than its immediate abolition. It also published a report on the damage done to independent fabricators by the tariff. The six nations of Bahrain, Dubai, Kuwait, Oman, Saudi Arabia and Qatar made plans for a customs union but said they may reconsider a free-trade pact with the EU over stalling on the 6% tariff. Though the EU Commission met with Arab leaders, French opposition continued to prevent action on the tariff. FACE hoped that the next WTO round would bring about its end.

In June, the US expressed anger over a Russian shipment of special, high-strength aluminium to Iran, fearing it would be used in nuclear weapons.

Mergers, Acquisitions, Privatisations and Restructuring

It was relatively quiet last year from the viewpoint of industry restructuring, with no mega-mergers or take-overs such as APA or Alcoa-Reynolds. In fact, there have perhaps been more significant announcements in early 2002 than in all of 2001. That said, there were quite a number of smaller acquisitions, privatisations and restructurings.

Unlike recent years, Alcoa sold off a few units and had little success in making acquisitions. As a condition of being allowed to acquire Reynolds, the European Union (EU) had required Alcoa to sell off Reynolds' interests in its three alumina refineries and at least 25% of the 204,000 t/y capacity Longview smelter. (Reynolds' Sherwin Texas refinery and 56% stake in the Worsley Australia refinery were sold off in 2000.) After some delays, the entire Longview smelter was sold in late February last year to Michigan Avenue Partners' McCook Metals who promptly closed it down to sell the power back to the BPA. The sale of the 50% interest in the 800,000 t/y Stade Germany refinery was completed in April to investment and trading company Dadco Alumina and Chemicals. Alcoa also sold its Thoikol rocket propulsion systems unit to ATK Inc. for US$685 million.

Alcoa was thwarted in its attempts to acquire Slovalco, Bharat Aluminium Co. (Balco) and Western Mining Corp. (WMC). In Slovakia, Norsk Hydro and the European Bank for Reconstruction and Development (EBRD) had been involved with the 110,000 t/y Ziar nad Hronom smelter for several years and held stakes of 14.5% and 10%, respectively, in owner Zavod SNP. In February, Alcoa mounted an unsuccessful challenge to their plans to purchase a controlling stake. The following month, Norsk and EBRD proceeded to acquire an additional 40.8% of the equity and 40% each of the voting shares of Slovalco from the state privatisation agency. Norsk also gained an option to acquire EBRD's stake by the end of 2006. In India, Alcoa teamed up with Hindalco to make a bid for the 51% of Balco being sold off by the government. Given the labour, political and legal troubles which followed, Alcoa and Hindalco may be glad they were bested by a Rs5.51 billion (US$118.5 million) bid from Sterlite Industries in February.

In the autumn of 2001, Alcoa entered into talks to acquire Australia's WMC. WMC has nickel, copper, fertiliser and alumina assets, but Alcoa's interest was in the latter - specifically, WMC's 40% stake in their Alcoa World Alumina and Chemicals (AWAC) partnership. WMC's management and board rejected Alcoa's bid of A$11 billion or A$10.20 per share for the whole company as being insufficient and a series of acrimonious public remarks followed, along with the resignation of WMC's chief executive Hugh Morgan from Alcoa's board. To increase its value and attract suitors, WMC proposed de-merging its alumina and other assets into WMC Alumina and WMC Minerals. One problem for any acquirer of WMC and its interest in AWAC is the stipulation in the partnership agreement that all bauxite, alumina and industrial chemical assets must be held by the partnership. WMC brought up this clause concerning Alcoa's subsequent investment in China's Chalco. Alcoa was successful in

acquiring the extrusion business of Dooray Air Metal. Its 8,400 t/y capacity plant in Changwon, South Korea, specialises in hard alloy extrusions for aircraft and other transportation.

Alcoa continued to increase its stake in Norway's Elkem despite its opposition. From less than 23% at the start of 2000, Alcoa's holding reached 32.9% by early 2001 and around 40% by year-end. This triggered a Norwegian law, requiring Alcoa to make a bid for all other shares at a price not less than the highest previously paid. Alcoa made its bid at the minimum (NK155), which was rejected as insufficient by Elkem's board. With a 40.2% stake, Alcoa said it would not buy any more for now.

The EU also required Alcan to make several divestitures as part of its merger with Algroup (Alusuisse). These included: an alumina specialties plant at Martinswerk, Germany to Albermarle Corp. for US$44 million; the Palco foil container plant in Madrid to Aliberico SA; 12 presses for smooth-wall containers in Ohle Germany to Alupack AG; and the Star Litho plant in the UK to Elval Hellenic Aluminium Industry SA. Alcan also sold all of its long-time Jamaican assets (including bauxite deposits and two refineries with 1.2 Mt of capacity) to Glencore. Early in 2002, Alcan announced that it was buying the 20% stake in the 243,000 t/y Alouette smelter held by Quebec's Société Générale de Financement for US$165 million.

Pechiney was quite active last year. After the failure of the merger with Alcan and Algroup in 2000 (due to the European Commission), Pechiney announced plans to spend about €500 million annually over the next five years on mid-sized acquisitions in aluminium and packaging. After extending talks with Venezuela's CVG, a revised deal was reached whereby Pechiney is to spend US$100 million on environmental clean-up and US$108 million to expand Bauxilum's annual alumina output by 300,000 t to 2.0 Mt over three years. Pechiney is to be repaid over 12 years from the additional alumina. During the year, Pechiney bought hard-alloy extruder British Aluminium Specialty Extrusions from Luxfer Holdings plc, Eurofoil from Sapa, and flexible packaging group Soplaril from TotalFinaElf. However, negotiations to buy Kaiser's Trentwood rolling mill failed over price. As announced the previous year, Pechiney exercised the option to increase its stake in the 452,000 t/y capacity Tomago smelter to 51.55% by buying 15.5% from Australia's AMP Life. Gove Aluminium Finance Ltd (36.05%) and VAW (12.4%) hold the remaining shares.

An important metals and minerals story last year (though not expected to have any major impact for aluminium) was the merger of Australia's Broken Hill Pty (BHP) and Billiton to create metals giant BHP Billiton with a market capitalisation of US$28 billion. With its smelter projects in southern Africa and acquisition of the Worsley refinery in Australia, Billiton has been a growing force in aluminium in recent years.

In other news:

- Norsk Hydro became the world's large producer of aluminium building systems through its purchase of Technal of France;
- the UK's Novar plc secured a marketing agreement and acquired 25% of leading extruder China Aluminium Group, a subsidiary of Hong Kong's Global Applied Technologies Holding Ltd for £46.3 million- the combined entity is said to be the second largest extruder in the world;
- metals processor Reliance Steel & Aluminum Co. bought privately-owned, Lafayette, Louisiana-based metals service centre Aluminum & Stainless Inc.;
- Billet maker Ohio Valley bought the assets of Alumnitec's Jefferson Indiana extrusion plant (three presses, paint line);
- Berzelius Umwelt-Service (BUS) bought a 30% stake in secondary smelter Karl Konzelmann GmbH Metalzwerk and also dross recycler Recyclage Aluminium du Quebec from Philip Services

There have been two important changes in early 2002. Since the merger of utility conglomerates Veba and Viag (VAW's parent) in 1999, the resulting E.ON has talked about selling off its aluminium unit. Holding non-utility assets like VAW restricted its ability to participate in the deregulating US market. But E.ON decided to wait until the abolition of German capital gains taxes on sales of corporate holdings at the beginning of this year. Norsk Hydro is buying VAW for €3.1 billion to create the largest aluminium company in Europe and third largest in the EMEC, behind Alcoa and Alcan. The combined entity will have annual sales of around €10 billion per year and 30,000 employees, though 1,100 job cuts are expected. Annual cost savings of €200 million are anticipated beginning in 2004. Norsk has said it wants to sell VAW's flexible packaging unit that had annual sales of €505 million. Alcan has gone to court over pre-emptive rights it claims to VAW's 50% stake in the 500,000 t/y Norf rolling mill. In May 2001, VAW had acquired a 65% stake in Malaysia's Aluminium Industries, with plans for upgrades.

The other major story of early 2002 is the bankruptcy of Kaiser. Owned by Maxxam since the late 1980s, the company has some old, relatively unprofitable assets, including the 200,000 t/y Mead and 74,000 t/y Tacoma smelters that were built during World War II. It also had to deal with growing pension, medical and asbestos liability costs and poor labour relations-its workers were on strike from September 1998 to September 2000 and launched several legal actions. Large profits on power sales to third parties kept Kaiser afloat last year but also antagonised the BPA that wanted the power back to meet its own obligations. That, and asking for higher compensation than everyone else, left Kaiser as the only company with Pacific Northwest smelters not to receive US$20/MW cash payments for giving up BPA power. And the new BPA contracts from October 1 do not permit third party power sales. With a reported US$3.3 billion in assets and US$3.1 billion in liabilities, and faced with large interest payments and the expiration of major debt issues, Kaiser missed a payment on January 30 and filed for chapter 11 on February 12. Interestingly, the bankruptcy filing does not include Kaiser's more attractive overseas assets, including:

- 20% of Queensland Alumina (it sold 8.3% to Rio Tinto for US$189 million last summer);
- 49% of the 144,000 t/y Holyhead/Anglesey smelter in the UK;
- 90% of the 200,000 t/y Valco/Tema smelter in Ghana;
- 65% of the Alpart refinery in Jamaica;
- 49% of Kaiser Jamaica Bauxite Co.; and
- an extrusion plant in Canada

Most in the industry expect more assets to be sold off, though Kaiser denies that this is part of the solution.

With the economic recession, Kaiser was not the only company in financial trouble. At the beginning of the year Vanalco filed for Chapter 11. The two major rolling units acquired in recent years by Michigan Avenue Partners, Scottsboro Aluminum of Alabama and McCook Metals of Chicago both went bankrupt last year. Neither could be sold as an ongoing business, so the trustees auctioned off the equipment to Alcoa and Pechiney, respectively. Other major North American bankruptcies were US aluminium wheel maker Hayes Lemmerz; aluminium diecasters Jackson Precision Die Casting, Central Die Casting, Tennessee Aluminum Casting, Harvey Industries (for a third time) and Heick; and Canadian metals trader Dominion Metals & Refining Works. Aluminium companies had a difficult time dealing with credit risks and most had to take charges for bad debts. Over environmental and safety concerns, Norsk Hydro cancelled a deal that would have saved Swiss remelter Aluminium Martigny and its 25,000 t/y foundry.

Sell-offs of state-owned aluminium companies did not go well. The political, legal and labour troubles arising from the privatisation of Balco in India, have raised questions and brought delays in plans by the Indian Government to sell off 30% of Nalco. Slovenia apparently did not carry through with plans to sell off its aluminium smelter last year.

There was much controversy over plans by Romania to sell off its stake in the 174,000 t/y capacity Slatina smelter. In May and again in August, potential foreign investors protested planned capital boosts that would have diluted the state's share in Alro from 54.72% to a minority stake and thus made it less attractive. The plan was twice postponed and then dropped altogether. Meanwhile, Romania's Conef and its US affiliate Marco Acquisitions, increased their combined stake to 42%. Although Pechiney (supplier of the smelter's technology), Balli and Glencore all expressed interest, by February 2002 only Marco/Conef remained in the bidding.

Venezuela appeared to have given up on privatisation. Plans were made to split Corporacion Aluminios de Venezuela (CAVSA), formed in 1997 to facilitate privatisation, back into its four components: Venalum, Alcasa, Bauxilum and Carbonorca. The strange explanation was to improve management efficiency after 12 years of poor performance (the majority as those same separate companies).

Secondary, Fabricating and Downstream Investments

With the poor economic climate, there were fewer investments and more cutbacks in the downstream part of the aluminium business, particularly in North America. Soaring electricity and natural gas prices also forced some closures. The worst hit sectors were secondary casting, beverage cans and extrusions, including:

- IMCO's Bedford Indiana secondary plant;
- Wabash Alloys' Guelph secondary smelter (from 12.5 to 6 Mlb/y);
- Indalex's 100,000 t/y secondary casting plant at Ahoskie North Carolina;
- Liston Aluminum's 5,000 t/y California secondary alloy plant;
- Hamilton Die Cast;
- Capral's remelting plant at Granville, New South Wales;
- Intermet's Alexander City, Alabama lost-foam casting plant;
- a total of six of Ball Corp.'s North American can plants as well as output cuts in China;
- two of Crown Cork & Seal's lines at Weston Ontario (converted from aluminium beverage cans to 2-piece steel food cans);
- Rexam's beverage can plants in Houston, Texas and Brunswick, New Jersey;
- Alcoa's foil rolling mill at Lebanon, Pennsylvania, extrusion plant at Elizabethton, Tennessee and Kawneer architectural division extrusion plant at Jonesboro, Georgia;
- Ormet's Jackson, Tennessee coated and foil products plant by 73%;
- Noranda's American Racing Equipment wheel plant in Warsaw, Kentucky;
- Alcan's foil plant in St. Laurent, Quebec;
- Tredegar/Bonnell's extrusion plant at El Campo, Texas;
- Corus' service centre at Hemel Hempstead, UK; and
- Indian extruder Jindal Aluminium, blaming high import duties.

There were also positive developments, particularly in the automotive field. In France, the mass produced Peugeot 307, Renault Laguna II and Citroen C5 are all to have aluminium hoods from Pechiney and average 120-160 kg of aluminium per car. The typical European car currently contains about 90 kg of aluminium, which is expected to rise to 125 kg by 2005. Pechiney, currently second to Alcan in sales of car parts in Europe, aims to double its sales by 2005. Pechiney reached accords with Volkswagen, Audi, Renault and Daimler Chrysler after signing a ten-year pact with PSA Peugeot Citroen in 2000. Jaguar announced that its new XJ sedan would have an aluminium body, powertrain and suspension parts to reduce weight and fuel consumption but Ford had yet to see a boom in aluminium use in cars.

In Japan, Sky Aluminium introduced its new 6000-series alloy sheet (the first auto sheet alloy containing copper) in hoods of the Nissan Skyline. In Thailand, the recovering automotive sector led Mitsubishi to increase the secondary aluminium alloy capacity at MC Aluminium by 30%.

General Motors acknowledged that it had not been aggressive enough on fuel efficiency, particularly for light trucks, and wanted to avoid falling behind Ford. It planned to produce a new all-aluminium V8 and was looking at an aluminium body structure and closures for a new Buick sports coupe planned for 2004. IMCO Recycling started up its US$16.5 million plant in Saginaw, County Michigan, dedicated to producing specific aluminium alloys for GM under its 13-year supply agreement. Norwegian auto parts supplier Raufoss A/S was building a C$60 million plant in Quebec to supply GM with aluminium suspension parts.

Hydro Aluminium officially opened its first 90,000 t/y primary-quality, secondary billet plant at Henderson, Kentucky, and later announced a similar plant for Commerce, Texas, by 2003. In the spring, Alcoa announced plans to raise capacity at its Kitts Green alloy plate plant by 20% within three years and to invest US$90 million at its large Davenport mill to increase capacity for aircraft and tooling plate by 30%. Slack aircraft demand after September 11 led Alcoa to put the Davenport expansion on hold.

With Brazil's relatively healthy economy, Latasa started building a fith beverage can plant, at Viamão in the south, and Alcan has announced plans to enter the aluminium food packaging market. Under EU pressure, Denmark finally ended its 20-year ban on canned beverages. Dubal was again looking at a US$110 million rolling mill project, after an earlier plan with Elval fell through. In nearby Qatar, Bahrain Aluminium Extrusion Co. announced plans for a plant with an extrusion line, anodising line, and a powder coating line.

Alumina and Bauxite

The closure of 2 Mt/y of primary aluminium capacity had its effect on alumina that, because of humidity, cannot be easily stored like aluminium. Alcoa World Alumina and Chemicals (AWAC) closed about 25% of its 2.3 Mt/y capacity Point Comfort, Texas, refinery in February. And when workers at Jamalco's (AWAC 50%, Government of Jamaica 50%) Halse Hall, Jamaica, refinery went on strike in October (over Alcoa's refusal to repeat a special retention payment), Alcoa closed the refinery for 2½ months. In December, Ormet closed its 600,000 t/y refinery at Burnside Louisiana. Nonetheless, International Aluminium Institute members' alumina output (which excludes China and a few other countries) rose to 48.49 Mt in 2001 from 48.12 Mt in 2000, with metallurgical output reaching 44.49 Mt from 43.78 Mt. The increase was principally due to the ramp-up of Kaiser's rebuilt 1.25 Mt Gramercy refinery and Nalco's expansion.

After plummeting in 2000 from over US$400/t to about US$170/t, alumina prices were relatively stable last year dropping to around US$150/t in May. They have begun to rise in 2002 as there are concerns that a shortage may develop over the next few years if the

Pacific Northwest smelters restart and there are too many smelter expansions in China.

In India, late summer, Nalco completed the expansion at Damanjodi, Orissa to 1.58 Mt/y of alumina from 800,000 t/y and of bauxite to 4.8 Mt/y from 2.4 Mt/y. But with the excess capacity, there was less talk of new alumina projects or expansions. AWAC had been considering a A$995 million expansion at Wagerup to raise capacity by 50% to 3.3 Mt. But in early 2002, Alcoa announced that it might be forced to idle 6% (150,000 t) at the refinery unless it reduced emissions of odours and nitrous oxides by June 30. A couple of projects were delayed in India's Orissa state. Land problems delayed plans by Hindalco for a 1.5 Mt/y refinery as well as a 300,000 t/y smelter and 660 MW power plant. And there was much local opposition to the Utkal project with three deaths in clashes with police. Norsk Hydro decided to pull out of the project and sell its 45% stake, possibly to partners Alcan (35%) and Hindalco/Indal (20%). Indal also had plans to double capacity at the 100,000 t/y Muri refinery.

Iran said it was seeking US$4.3 billion in investments in aluminium and alumina over the next 10 years. It hoped to boost annual output of aluminium to 1 Mt and alumina to 1.5 Mt. However, start-up of the US$300 million Al-Jajarm refinery has been delayed for years, with Chinese companies taking over from a Czechoslovak firm. Early in 2002 it said it would start up in April using imported Indian bauxite until digestion problems were resolved.

Vietnam has bauxite reserves estimated at several billion tonnes. So it is not surprising that there have been discussions about alumina-bauxite projects (many also involving a smelter) for several years. Pechiney has been involved in feasibility studies and frequently mentioned as a partner. In early-2002, Vietnam was asking Pechiney to reconsider its decision not to participate in a US$800 million project in the central highlands (Tay Nguyen).

After taking a few years to decide on Queensland as the location, Rio Tinto started construction on the first US$750 million stage of its refinery project in January 2002. It is designed to reach 1.4 Mt/y capacity after 2005, using bauxite from the Weipa mine. In Brazil, Mineracao Rio do Norte (MRN) is working on a US$180 million bauxite expansion from 11 Mt to 16.3 Mt/y and Alunorte is still looking to double annual capacity at its huge refinery to 4.8 Mt over the next few years.

The idling of aluminium and alumina capacity also had its effect on bauxite mining. Alcoa withdrew from Guyana and its 50% interest in Aroraima Bauxite Co. after the government refused to allow it access to the better reserves of state-run Berbice Mining. In central India, Hindalco had to close temporarily two bauxite mines in Jharkhand and Chattisgarh states due to insurgencies from leftist extremists. In Indonesia, the existing Kendagawangan mine has only about 3 Mt of remaining reserves and will be closed in the next couple of years. By that time, Aneka Tambang expects bauxite production to begin at its Tayan prospect. Ghana Bauxite Co. (Alcan 80%) hopes to produce 1 Mt in 2002 after 700,000 t in 2001 and 500,000 t in 2000. And in Jamaica, bauxite production reached a 20-year high at 12.55 Mt, up 12.8% over 2000.

There were also a few developments with other aluminium smelting raw materials. Finland's Outokumpu purchased anode technology supplier KHD Aluminium Technology of Germany, and in April, there were concerns about the supply of calcined petroleum coke after an explosion at Conoco's Humber refinery in the UK. In June, Alba began trials of its new 450,000 t/y coke calcining plant. And Norsk Hydro announced plans to invest NK610 million (US$69 million) in an expansion of Dutch anode producer Aluchemie (Norsk 21.2%) to meet in part the needs of the Sunndal expansion.

The CIS

Primary aluminium production in the CIS grew again in 2001, though at a slower rate of 2.4%:

CIS Smelter Output ('000 t)

	2000	2001
Bratsk	895	919
Krasnoyarsk	838	857
Sayansk	403	407
Novokuznetsk	279	282
Total RusAl	2,415	2,464
Irkutsk	271	272
Uralsky	84	85
Bogoslovsk	169	175
Kandalaksha	70	70
Nadvoitsky (SUAL 37%)	69	72
Total SUAL	662	674
Volgograd	142	142
Volkhov	21	22
Total Russia	3,239	3,302
Zaporozhky, Ukraine	104	106
Tursunzade, Tajikistan	268	289
Total CIS	**3,611**	**3,698**

Unlike recent years, there was also a sharp rise in production of semi-fabricated and fabricated aluminium. For example, rolled products output at Russky Aluminium (RusAl) increased 30% to 306,648 t and the number of cans by 67% to 721.8 million, mostly at the Rostar can plant. The latter was to meet soaring demand for canned beer. With fabrication growing much faster than primary output, Russia's non-CIS aluminium exports fell by 105,000 t to 3.07 Mt. Exports from Tajikistan, however, rose by 13,500 t to 287,000 t.

Russia continued to have problems collecting sufficient tax revenues and with metals theft and illegal exports. A bill to ban ferrous and non-ferrous scrap exports was vetoed by President Putin. The Duma, the lower house of parliament, overturned his veto but the upper Federation Council failed to do so. Nonetheless, new regulations, mandatory licences, more documents and stiffer penalties were brought in to curtail theft of metal, such as from overhead electrical cables. The Duma brought in an 8% tax on non-ferrous metals production. Later in the year, low aluminium prices and escalating power and rail tariffs hurt the profitability of Russian aluminium companies. RusAl announced it was cutting 7% of its 73,500 employees including 25% of head office staff. Separately, and through Concern Aluminiy, the companies called for a cut in the 5% export tax and the 6% EU duty, as well as controls on electricity and rail prices. They threatened to cut social subsidies and production, and to defer modernisations and expansions.

Again, there were interesting organisational developments and legal skirmishes. In April, Russia's Anti-Monopoly Minister approved the merger by Sibirsky and shareholders of Sibneft to create RusAl though the EU later spoke out against Russia's mega-mergers. Former deputy Prime Minister Alexander Livshits was appointed RusAl's deputy chief executive. In August, an affiliate of RusAl bought a further 14% of bankrupt Novokuznetsk from the Federal Property Fund. Late in the year, RusAl completed its consolidation, holding 98.35% of Bratsk, 66.13% of Krasnoyarsk, 66% of Novokuznetsk, 95.79% of Siberian Aluminium (Sayansk, Samara, Sayanskaya Folga) and 54.09% of Achinsk. Interestingly, the shareholders in some of Russia's major corporations (including Sibneft, RusAl and Aeroflot) last year transferred their holdings to a new offshore asset management firm, Millhouse Capital, with Sibneft president Eugene Schvidler as chairman.

There continued to be ramifications from RusAl's taking control of Novokuznetsk from Mikom. In December 2000, Base Metal Trading had brought a US$2.7 billion Racketeering-Influenced and Corrupt

Organisations Act (RICO) lawsuit in New York. This led a Swiss court to freeze US$846,000 in the bank account of RusAl's chief executive Oleg Deripaska and caused a European bank loan to fall through. Mikhail Zhivilo was arrested in Paris on a charge of involvement in an assassination plot against Aman Tuleyev, governor of the Kemerovo region. Tuleyev had declared three Mikom plants bankrupt and turned Novokuznetsk over to Sibirsky Aluminium. Though Russia sought his extradition, Zhivilo was released from a French prison three months later. In December, an explosion damaged two pots at Novokuznetsk.

As usual, there were legal tussles involving Krasnoyarsk (KrAZ). During the 1990s, when both KrAZ and the Krasnoyarskenergo utility were managed by TaNaKo, a long-term contract was signed at a low 19.2 kopecks per kWh versus 33 kopecks for other customers. The utility has been seeking to have KrAZ pay the higher rate (still only about US$11/MW) retroactively-which would involve millions of dollars. In early May, the utility cut power to the smelter for four hours and threatened further cuts unless KrAZ paid the disputed arrears. The following week, power was cut to local hotels and sports clubs but not to the smelter. The dispute moved back to the courts after bailiffs entered the utility's property the next day. When an increase to 28.05 kopecks was approved, KrAZ threatened to spend US$50 million to build its own power line to the Krasnoyarsk power station. To circumvent escalating rail costs, KrAZ shipped a test cargo via the Yennisey River and Arctic Ocean (the 'Great North Route') to Rotterdam. In October, KrAZ issued 57 million shares at 12.5 kopecks each, which were all bought by RusAl, diluting the 21% stake of former general director Anatoly Bykov (who remained in prison).

There was also a struggle between aluminium smelters and electrical utilities in the Irkutsk region. RusAl and SUAL were able to put five representatives on the 11-member board of directors of the Irkutskenergo utility, and install Sergei Yesapov as deputy general director. Not surprisingly, the utility deferred a tariff increase in 2001.

RusAl continued to look at growth both upstream and downstream, in the CIS and abroad. Though capital expenditures were sharply reduced, it did sign a memorandum of co-operation with SNC Lavalin to undertake a feasibility study for the long-discussed expansion of Sayansk from 400,000 t to 660,000 t. RusAl shareholders gained a large stake in building products producer Mosmetallokonstruktsiya. In Guinea, RusAl secured a 25-year contract to manage the Kindia bauxite mine (the main source for the Nikolayev alumina refinery in the Ukraine) on condition of restoring and expanding output. RusAl was also given the concession to develop the Dian Dian deposit, though Compagnie de Bauxite de Guinea claimed a right of first-refusal. RusAl announced plans to set up its own distribution system in China and to expand its position in Japan and Korea. Early in 2002, RusAl signed a memorandum of intent to participate in building a cable plant in Brazil.

Sharply declining alumina prices affected RusAl's refineries. Owing to costs of US$230-240/t, RusAl closed the 240,000 t/y Oradea refinery in Romania it had acquired the previous year. And Ukraine agreed to extend the tolling regime for Nikolayev beyond 2002.

Russia's other major aluminium group also announced cutbacks in investment. Most of SUAL's focus is on the Sredni Timan bauxite deposit in the northern Komi republic. It was seeking foreign investment in a US$2 billion project involving a 1-1.2 Mt refinery, a 500,000-600,000 t/y smelter and 270,000 t/y semis plant. Canada's Hatch group was engaged to do a pre-feasibility study. SUAL is increasingly using bauxite from Sredni Timan in its South Urals refinery as it closes down the 65-year-old money-losing South Urals bauxite mine.

Outside Russia's two major aluminium groups, the small 20,000 t/y Volkhov smelter

merged with the Pikalyevo refinery to become JSC Metallurg.

No new smelters have been built in Russia since Sayansk in 1985 and few greenfield projects were being seriously discussed last year. A former general manager of Bratsk was said to be involved in a 250,000-300,000 t/y project in the Irkutsk region called Alucom-Taishet, with an experimental potline beginning production last August. A few projects have been discussed in the northwest using electricity from the Leningrad nuclear power plant. Timing of the US$300 million, 150,000 t/y smelter project in the Ukraine (a condition of RusAl's acquisition of Nikolayev) was uncertain.

There was also controversy elsewhere in the CIS. The Kremechuhsky auto company made the highest bid (US$101.5 million) for 68% of the 115,000 t/y Zaporizhky smelter but was unable to meet bank guarantee conditions. So the stake went for US$70 million to Avto-VAZ, which was expected to invest US$200 million to upgrade the smelter to prebaked anodes and increase capacity to 157,000 t/y. Ukraine was unable to sell its remaining 10% stake in the Nikolayev refinery. Aluminium imports were expected to increase after the Ukraine exempted materials, parts and equipment for the aircraft industry from taxes.

In Azerbaijan, Fondel was awarded a 25-year contract to manage state-owned Zagligliksk Mining, Gandja Alumina and the Sumgait smelter, promising to invest US$300 million over three years. The high-cost Gandja refinery was closed in December but Fondel promised to restart Sumgait. Kazakhstan continues to increase output at the Pavlodar refinery while commissioning a feasibility study for an 80,000 t/y capacity smelter.

China

The Chinese aluminium industry was little affected by the troubles in the rest of the world as production and consumption continued to soar. Indeed, China surpassed Russia and the US last year to become the largest primary producer in the world.

Production (Mt)

	2001	2000	Change %
China	3.428	2.989	+14.7*
Russia	3.299	3.243	+1.7
US	2.637	3.670	-28.1
Canada	2.585	2.371	+9.0

** Official reported % change of +19.3%.*

It should be noted that reported Chinese output is subject to frequent and major revisions, and it is seldom possible to reconcile year-on-year and year-to-date figures with those previously published. Indeed, one of the blots on China's stunning economic performance has been the serious flaws in its data collection, something which it finally admitted last November. The problems are compounded by having more than 100 primary smelters, many of them tiny by world standards. The following gives reported figures for the largest smelters and refineries:

Smelter Output ('000t)

Smelter	2000	2001	2002[f]
Guizhou	238	242	240
Qinghai	206	208	230
Qingtongxia	104	145	230
Pingguo	128	134	134
Yunnan	110	123	100
Baotou	115	119	120
Shanxi Guanlu		117	110
Lanzhou		88	185
Fushun	100	90	90

[f] *forecast*

Refinery Output ('000t)

Refinery	2000	2001
Shanxi	1,249	1,318
Zhengzhou (Great Wall)	965	1,070
Shandong	733	802
Zhongzhou	442	545
Guizhou	480	519
Pingguo	420	443

After numerous changes in name and structure over the past few years, China's major state-owned aluminium group, Chalco, had a successful initial public offering last year. The company had 2001 capacity of about 4.2 Mt of alumina and almost 700,000 t of aluminium. Its Yu35.6 billion (US$4.3 billion) in assets included two research units, two engineering companies, the Shanxi Carbon Plant and the following alumina and aluminium plants (with 2001 capacity):

- Zhengzhou (Great Wall) - alumina 950,000 t, aluminium 52,600 t
- Zhongzhou - alumina 440,000 t
- Shanxi - alumina 1.2 Mt
- Shandong - alumina 730,000 t, aluminium 55,000 t
- Guizhou - alumina 450,000 t, aluminium 235,000 t
- Pingguo - alumina 400,000 t, aluminium 130,000 t
- Qinghai - aluminium 205,000 t

Early last year, Morgan Stanley and China International Capital Corp. were appointed to handle the initial public offering in New York and Hong Kong. In November, it was announced that Alcoa would take an 8% stake in Chalco through the IPO, have one seat on Chalco's board and invest in a 50-year joint venture at Pingguo. Pingguo is one of China's most modern smelters and its nearby bauxite deposits (unlike the diasporic ones elsewhere in China), can use the normal Bayer process without costly sintering. Alcoa would pay US$250 million for 50% of Pingguo and share the US$540 million in planned investment to nearly double alumina and aluminium output. Alcoa also secured certain rights of first refusal and will make additional payments in four years if certain targets are met.

In December, the issue was completed at a price of US$1.38/share and US$17.70/ADS, raising over US$450 million. Following the offering, Chinalco held 45.1% of Chalco, China Cinda Development 15.6%, China Orient 5.8%, China Development Bank 5.4%, Guangxi Development 1.8%, Guizhou Development 1.3%, Alcoa 8.0% and other public shareholders 17.0%. Much of the offering proceeds will go towards expansions. Through 2005, Chalco plans capital expenditures of Yu17.81 billion to double smelting capacity to 1.38 Mt from 689,600 t kt and raise refining capacity by 44.5% to 6.04 Mt.

A large number of smelter projects have been announced. So much so that, in early 2002, China's State Economic and Trade Commission warned of declining prices due to overproduction.

The commission reported that the federal government had approved 15 new smelters with 2.1 Mt of annual capacity and local governments had approved upgrades and expansions of 810,000 t. It forecast that Chinese aluminium capacity would increase by 1.25 Mt by the end of 2003 and reach 6 Mt/y by 2005, even with closures. But they forecast demand would only reach 5.5 Mt/y. A couple of years ago, the federal government ordered the closure of all small, Soderberg smelters. However, few have actually closed; instead, many have been undergoing

expansions. And though they promise otherwise, when the new capacity comes on line, they continue to operate the old as well.

Some projects have been used to justify new power plants and some have received zero interest loans. It is debatable as to how many could be justified on the basis of return on investment, particularly with declining tariff protection. Even from a public policy standpoint, in a country with such a huge population and rapid industrialisation, the enormous amounts of power would be better used for manufacturing plants than for aluminium smelters. With production growing faster than consumption, unalloyed primary aluminium exports exceeded imports in 2001, though not when unwrought alloys are included.

Aluminium Import/Export ('000 t)

	2001	2000	1999
Unwrought Imports	529	914	534
Unwrought Exports	409	209	207
Unwrought Net	121	705	327
Semis Imports	404	457	427
Semis Exports	136	130	95
Semis - Net	268	327	332
Scrap Imports	369	805	399
Scrap exports	9	8	7
Scrap - Net	360	797	392

Admission to the World Trade Organisation will impact China's aluminium industry through declining tariffs. Most of China's refineries are relatively high cost because of the sintering required for the diasporic bauxite, as are most of its smelters owing to their small size and relatively high prices for alumina and electricity. High tariffs have provided protection against lower-cost imports. Indeed, last year the government eliminated the 50% reduction in tariffs and VAT for imports through certain cities in Inner Mongolia, which mainly affected imports of Russian aluminium. From October 1, all alumina imports had to be approved by the State Economic and Trade Commission. The latter action was strongly opposed by Chinese smelters as a measure to prop up the Chalco IPO. But duties on alumina are scheduled to fall from 18% in 2001 to 12% in 2002, 10% in 2003 and 8% in 2004. Those on primary aluminium are to fall from 9% to 5% and on scrap from 6% to 1.5%. Chalco has said that it wants to cut alumina costs by 22% over the next three years to remain competitive. It remains to be seen whether China will become a large net exporter over the next few years.

Markets, Trading and Websites

The year 2001 was a poor one for aluminium trading. After several years of sharp increases, aluminium futures and options volumes on the London Metals Exchange (by far the largest exchange for aluminium) dropped to 25.4 million contracts (or 635 Mt) from 28.1 million in 2000. The year was not without excitement, however. Cash to three-months was in backwardation for most of January, February and the first half of May, with the 'back' reaching US$100/t at the end of January. There were several days in June when the LME reported that a single entity held between 50% and 80% of all warrants; and one day in May there was one entity with 40-50% of warrants and another with 30-40%. Late in the year, when Enron liquidated positions and put metal into LME warehouses to raise cash, there were no backwardations or large warrant holdings. In 2002, the LME is launching another secondary alloy contract, this one using North American A380 specifications.

It was also a terrible year for internet-based e-commerce metals exchanges. After all the hype (and IPOs) in 1999, 2000 and even early 2001, and dozens of launches, one after another ceased operation owing to low acceptance and high costs. Beginning last

June, the casualties included MetalSite, MetalMaker, MetalSpectrum, Aluminium.com and Enron Online. MetalSpectrum, in particular, was a surprise because it had the backing of numerous large metals companies including Alcoa, Commonwealth, Kaiser and Pechiney in aluminium.

Outlook

The prospects for aluminium have begun to brighten in 2002. In the US, most economic indicators have turned up (some quite sharply) and this has also been reflected in improving aluminium orders and shipments. By March, the LME three-months price had risen back to the low US$1,400s-almost US$200/y above the early-November lows. But this is still well below the long-term trend or levels which could provide a reasonable return on smelter investments.

Most expect the US recovery to be muted. A typical, post-recession rebound in the important consumer sector is not likely because US consumers continued to spend throughout the recession. Capacity utilisation rates (and corporate profits) are still relatively low, so capital investment spending may not recover much from the poor levels of last year. In Europe, the slowdown began after that in the US, so its recovery will also likely lag. And Japan's economy is very weak, still facing serious impediments to a recovery. Thus, EMEC demand growth in 2002 may only recover half of the over 6% decline in 2001. On the supply side, little new EMEC capacity will come on stream, but any rise in aluminium prices will encourage restarts in the US Pacific Northwest.

One of the 'wild cards' for the next couple of years is China. Some predict that undisciplined capacity growth will result in China becoming a major net exporter of aluminium, causing problems for the industry similar to those following the break-up of the former Soviet Union. Others believe that relatively high costs combined with foreign competition from declining tariff barriers will deter many planned expansions.

So it is likely that there will be another aluminium supply surplus in 2002, though probably not as large as in 2001. Restocking of seriously depleted inventories later this year and into 2003 should then push the market back into deficit provided the situation stabilises in China.