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ZINC IN MAY 2002

Domestic mine production in May, at 57,400 metric tons (t), was the same as in April but was nearly 17% lower than in May 2001. Smelter production, at 18,100 t, was about 3% higher than in April but about 37% lower than a year ago. Apparent consumption, at 71,200 t, was about 2% higher than during the previous month, but was nearly 11% lower than in May 2001.

The Platts Metals Week average monthly composite price for North American Special High grade zinc declined by about 4% to 38.16 cents per pound (¢/lb) in May. Compared with May of the previous year, the zinc price declined by nearly 18%, or 8.18 ¢/lb.

The schedule for upgrading Big River Zinc Corp.'s refinery calls for work to begin about mid-year and to continue through September. When completed, the project will decrease labor requirements and lower maintenance cost; the capacity will remain about the same as before—92,000 metric tons per year (t/yr). Located in Sauget, IL, Big River is owned by Korea Zinc Co. Ltd. KZ Engineering (a subsidiary of Korea Zinc) is conducting the upgrading at a cost of more than $10 million (Platts Metals Week, 2002a).

Resumption of production at the Tara zinc mine in Ireland has been delayed, again, until the beginning of September. Outokumpu Oy launched a mine improvement program in mid-March with a hope of reopening in June, which was later postponed until July. The company attributes the latest postponement to the continuing low prices of zinc on the international market (Platts Metals Week, 2002c).

Navan Mining plc of the United Kingdom hopes to sell its Spanish zinc and copper operations, which languish in financial difficulties. Navan's Spanish operations are in "suspension of payments," which is the equivalent of Chapter 11 bankruptcy in the United States. According to a Navan spokesperson, divestment has been vigorously pursued over the last few months and the company is hopeful that a transaction will take place in the near future (Platts Metals Week, 2002b).

Kagara Zinc Ltd. of Australia continued development work at its Mt Garnet zinc project in northern Queensland with projected completion in February to March 2003. After output begins, it will take another three months to achieve an initial design capacity of 80,000 t/yr of zinc concentrate. The pre-strip of the open cut project has begun; clearing activity and road construction at the site is well advanced. The expected mine life is 11 years, with production sourced sequentially from the Mt Garnet and Surveyor deposits, followed by the underground Mt Garnet, King Vol, and Dry River South deposits. Kagara plans to raise output to 150,000 t/yr of concentrate over the next 5 years. Concentrate will be shipped to Korea Zinc Co. Ltd.'s smelter in Townsville (Metal Bulletin, 2002).

Several Chinese smelters have announced curtailments in zinc production. Although not all cutbacks have been caused by the market, they highlight how a tight market for zinc concentrates, coupled with low zinc prices, is causing rates of capacity utilization to fall. The Zhuzhu Smelter in Hunan Province has cut its zinc output by 40,000 t, and will produce only 240,000 t in 2002. Northwest Lead & Zinc Smelter began a one-month maintenance shutdown at its 110,000-t/yr electrolytic smelter in the Gansu Province on June 10. The Huidong Lead & Zinc Mine suspended operations at its 30,000-t/yr Xixhang Zinc Plant in the Sichan Province, claiming a shortage of concentrates. The Huludao Zinc Plant still has not reactivated its 130,000-t/yr electrolytic zinc line that closed in July of last year. The Jijie Smelter suspended production of its 25,000-t/yr zinc line at Yunnan Province (CRU International Ltd., 2002). Altogether, reduction of Chinese output may amount to about 100,000 t for the first half of 2002. The reduction of refined zinc output was not caused entirely by low zinc prices. Closures of many small mines, mainly in the Guangxi Autonomous Region, where the local Government closed 1,602 mines between Sept. 2001 and May 2002, forced some smelters to import zinc concentrates, primarily from Australia (Antaike, 2002). While the cost of imported concentrate is acceptable to smelters located near

ports, inland smelters must add transportation costs. Consequently, these smelters rely mainly on domestic sources, which are dwindling.

Fuel cell developer, Metallic Power Inc., has completed tests of what the company believes is the world's first refuelable zinc fuel-cell-powered vehicle. A "Geo Force" vehicle was equipped with a new zinc fuel cell battery system and driven at speeds reaching more than 50 miles per hour. The vehicle was refueled in about 30 minutes using fuel hoses that Metallic Power said can be optimized to make the process as simple as pumping gasoline. The fuel, in the form of small zinc pellets, is consumed in the fuel cells and releases electrons to drive a load (the anodic part of the electrochemical process), while the oxygen from the atmosphere accepts electrons from the load (the cathodic part). During the refueling, the zinc oxide (which remains dissolved in a liquid electrolyte) is pumped out of the vehicle while fresh fuel (zinc pellets) and electrolyte is pumped back in (Metallic Power, Inc., 2002§[1]).

One of the smallest uses of zinc is in the silver-zinc (AgZn) rechargeable battery. The AgZn battery has the lowest sales of all rechargeable batteries, about $20 million per year, although it has the highest energy density in its applications. The reason for low sales is that the battery has the shortest recharge cycle (up to 50 recharges) and calendar life (2 years in the field). Therefore, AgZn batteries are mostly used in military applications where their high capacity and very high rates of discharge are often required in the smallest volume and weight. Another reason for the military uses of AgZn batteries is that their end-of-life is characterized by declining capacity to recharge rather than by sudden failure that could have catastrophic consequences in military applications. Cost is also an important factor—although lithium batteries last 5 times longer than AgZn batteries, they cost 10 times more. The positive electrodes of AgZn batteries are made of pure silver powder of a very small particle size. The negative electrodes are made of pure zinc oxide powder mixed with small amount of additive lead or cadmium (Himy, 2002).

Update

A strike by 410 workers at n.v. Umicore s.a.'s Overpelt zinc operation in Belgium began on June 11. The walkout by workers did not interrupt the negotiations, which continued until June 13, but no agreement was reached. The strike began when Umicore announced that it intends to cut production by 30,000 t. Because of continuing low zinc prices and the oversupply of zinc on the world market, the company decided to limit the feedstock for thermal refining of battery grade zinc to its own zinc cathodes until further notice. In addition, some maintenance work was awarded to outside contractors. As a result, Umicore's workforce will be reduced by 66 employees. Production loss is estimated to be about 950 metric tons per day. The zinc market did not appear to be affected by the output loss; on June 12, following news of the strike, the London Metal Exchange price per metric ton of zinc metal declined by $7 (Platts Metals Week, 2002d).

BHP Billiton announced that its Pering Mine in South Africa will cease operations at the end of 2002. The mine was expected to close in early 2004, but low zinc prices accelerated Billiton's shutdown schedule. The mine has been in operation for 16 years and the reserves are being depleted. Pering will continue to operate until the economically mineable reserve is depleted, which should take place by December 2002 (BHP Billiton, 2002§).

References Cited

Antaike, 2002, Guangxi clamp down 1602 illegal mines by now: Antaike Monthly, no. 69, July, p. 8.

CRU International Ltd., 2002, Production news: CRU zinc monitor, June, p. 7.

Himy, Albert, 2002, New aerospace, Army, and Navy battery applications—The silver-zinc battery: Advanced Battery Design, v. 38, no. 6, June, p. 24.

Metal Bulletin, 2002, Kagara Zinc starts work on Mt Garnet: Metal Bulletin, no. 8687, July 1, p. 5.

Platts Metals Week, 2002a, Big River upgrade is proceeding: Platts Metals Week, v. 73, no. 23, June 10, p. 3.

Platts Metals Week, 2002b, Navan hopes to sell Spanish operations: Platts Metals Week, v. 73, no. 26, July 1, p. 4.

Platts Metals Week, 2002c, Tara restart delayed to September: Platts Metals Week, v. 73, no. 23, June 10, p. 3.

Platts Metals Week, 2002d, Umicore zinc strike enters third day; talks abandoned: Platts Metals Week, v. 73, no. 24, June 17, p. 1, 10.

Internet References Cited

Metallic Power, Inc., 2002, Fuel cell operation, accessed July 18, 2002, at URL http://www.metallicpower.com/rtfuel.htm.

BHP Billiton, 2002, BHP Billiton announces closure of Pering lead zinc mine, South Africa, accessed July 23, 2002, at URL http://www.bhpbilliton.com.

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

TABLE 1
SALIENT ZINC STATISTICS 1/

(Metric tons, unless otherwise specified)

	2001	2002			
	January-December p/	March	April	May	January-May
Production:					
Mine, zinc content of concentrate	798,000	70,400 r/	57,400 r/	57,400	312,000
Mine, recoverable zinc	761,000	67,800 r/	55,200 r/	55,400	301,000
Smelter, refined zinc	299,000	16,900	17,600	18,100	91,300
Consumption:					
Refined zinc, reported	453,000	30,400 r/	33,100 r/	34,900	161,000
Ores e/ (zinc content)	228	19	19	19	95
Zinc-base scrap e/ (zinc content)	223,000	18,600	18,600	18,600	93,000
Copper-base scrap e/ (zinc content)	211,000	17,600	17,600	17,600	88,000
Aluminum- and magnesium-base scrap e/ (zinc content)	1,360	113	113	113	565
Total e/	889,000	66,800 r/	69,500 r/	71,200	342,000
Apparent consumption, metal 2/	1,040,000	88,300 r/	97,100 r/	127,000 3/	490,000
Stocks of refined (slab) zinc, end of period:					
Producer 4/	7,380 r/	9,760	9,420	7,470	XX
Consumer 5/	57,100 r/	60,100 r/	59,000 r/	55,200	XX
Merchant	10,300 r/	10,400	10,600	9,920	XX
Total	74,700 r/	80,200 r/	79,000 r/	72,600	XX
Shipments of zinc metal from Government stockpile	17,900	202 r/	197 r/	1,220	1,840
Imports for consumption:					
Refined (slab) zinc	813,000	78,200	101,000	NA	314,000 6/
Oxide (gross weight)	72,000	5,590	5,560	NA	21,900 6/
Ore and concentrate (zinc content)	84,000	10,000	15,200	NA	44,600 6/
Exports:					
Refined (slab) zinc	1,180	102	65	NA	350 6/
Oxide (gross weight)	11,300	913	1,050	NA	3,620 6/
Ore and concentrate (zinc content)	696,000	7,540	9,840	NA	44,200 6/
Waste and scrap (gross weight)	44,000	4,530	3,470	NA	15,000 6/
Price:					
London Metal Exchange, average, dollars per metric ton	$885.43	$818.96	$807.80	$769.19	$791.94
Platts Metals Week North American Special High Grade, average, cents per pound	43.96	40.30	39.89	38.16	39.16

p/ Preliminary. r/ Revised. NA Not available. XX Not applicable.

1/ Data are rounded to no more than three significant digits; except prices; may not add to totals shown.

2/ Smelter production plus imports minus exports plus shipments from Government stockpile plus stock change.

3/ Data based on reported consumption, stocks, and estimated trade data.

4/ Data from U.S. Geological Survey and American Bureau of Metal Statistics.

5/ Includes an estimate for companies that report annually.

6/ Includes data through April only.

TABLE 2
REFINED ZINC PRODUCED IN THE UNITED STATES 1/

(Metric tons)

Month	Beginning stocks 2/	Production	Shipments	Ending stocks 2/
2001:				
May	10,700	28,800	30,500	9,000
June	9,000	22,600	23,000	8,580
July	8,580	18,900	20,100	7,340
August	7,340	19,800	20,600	6,540
September	6,540	24,800	24,500	6,760
October	6,760	19,900	19,900	6,750
November	6,750	20,000	19,500	7,210
December	7,210	18,400	18,200	7,380
Year	XX	299,000	299,000	XX
2002:				
January	7,380	18,800	15,400	10,800
February	10,800	19,800	19,600	11,000
March	11,000	16,900	18,200	9,760
April	9,760	17,600	18,000	9,420
May	9,420	18,100	20,000	7,470
January-May	XX	91,300	91,200	XX

XX Not applicable.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes stocks held at locations other than smelters.

Sources: U.S. Geological Survey and American Bureau of Metal Statistics.

TABLE 3
APPARENT CONSUMPTION OF REFINED ZINC ACCORDING TO INDUSTRY USE AND PRODUCT 1/

(Metric tons)

Industry and product	2001 January-December p/	2002 March r/	April	May 2/	January-May
Galvanizing:					
Sheet and strip	432,000	38,100	40,800 r/	51,500	206,000
Other	146,000	13,900	15,300 r/	21,200	77,800
Total	578,000	52,000	56,100 r/	72,700	284,000
Brass and bronze	148,000	15,000	16,000 r/	22,500	82,900
Zinc-base alloy	190,000	16,000	19,100	23,900	93,200
Other uses 3/	123,000	5,200	6,000 r/	8,000	30,000
Grand total	1,040,000	88,300	97,100 r/	127,000	490,000

p/ Preliminary. r/ Revised.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Data based on reported consumption, stocks and estimated trade data.
3/ Includes zinc used in making zinc dust, desilvering lead, powder, alloys, anodes, chemicals, castings, light metal alloys, rolled zinc, and miscellaneous uses not elsewhere specified.

TABLE 4
AVERAGE MONTHLY ZINC PRICES 1/

Period	North American ¢/lb.	LME cash ¢/lb.	LME cash $/t
2001:			
May	46.34	42.53	937.62
June	44.34	40.58	894.57
July	42.42	38.65	852.06
August	41.31	37.54	827.68
September	39.97	36.21	798.21
October	38.04	34.52	761.14
November	38.39	35.04	772.49
December	37.48	34.21	754.28
Year	43.96	40.16	885.43
2002:			
January	39.23	35.96	792.86
February	38.23	34.97	770.86
March	40.30	37.15	818.96
April	39.89	36.64	807.80
May	38.16	34.89	769.19
January-May	39.16	35.92	791.94

1/ Special High Grade.

Source: Platts Metals Week.

TABLE 5
U.S. EXPORTS OF ZINC 1/

Material	2001 Quantity (metric tons)	2001 Value (thousands)	2002 2/ April Quantity (metric tons)	2002 2/ April Value (thousands)	2002 2/ Year to date Quantity (metric tons)	2002 2/ Year to date Value (thousands)
Refined (slab) zinc	1,180	$1,290	65	$62	350	$326
Ore and concentrate (zinc content)	696,000	285,000	9,840	4,000	44,200	15,400
Waste and scrap (gross weight)	44,000	22,800	3,470	1,530	15,000	7,550
Powders, flakes, dust (zinc content)	4,690	7,230	507	710	1,640	2,460
Oxide (gross weight)	11,300	17,600	1,050	1,110	3,620	5,000
Chloride (gross weight)	1,730	1,630	124	126	630	692
Sulfate (gross weight)	4,780	2,900	261	158	927	559
Compounds, other (gross weight)	227	499	10	39	29	87

1/ Data are rounded to no more than three significant digits.
2/ Data for May 2002 were not available at time of publication.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF ZINC 1/

Material	2001 Quantity (metric tons)	2001 Value (thousands)	2002 2/ April Quantity (metric tons)	2002 2/ April Value (thousands)	2002 2/ Year to date Quantity (metric tons)	2002 2/ Year to date Value (thousands)
Refined (slab) zinc	813,000	$773,000	101,000	$84,800	314,000	$259,000
Ore and concentrate (zinc content)	84,000	31,600	15,200	6,090	44,600	16,400
Waste and scrap (gross weight)	39,300	11,600	2,210	643	9,080	2,890
Powders, flakes, dust (zinc content)	26,700	45,000	2,200	3,540	10,100	15,700
Oxide (gross weight)	72,000	66,200	5,560	4,620	21,900	18,100
Chloride (gross weight)	946	1,020	62	52	226	206
Sulfate (gross weight)	16,200	7,330	1,680	1,010	7,620	4,140
Compounds, other (gross weight)	1,400	1,360	92	99	403	427

1/ Data are rounded to no more than three significant digits.
2/ Data for May 2002 were not available at time of publication.

Source: U.S. Census Bureau.

TABLE 7
SHIPMENTS OF ZINC METAL FROM THE NATIONAL DEFENSE STOCKPILE 1/

(Metric tons)

Period	Beginning inventory	Shipments	Ending inventory
2001:			
May	130,000	1,710	129,000
June	129,000	771	128,000
July	128,000	2,570	125,000
August	125,000	3,340	122,000
September	122,000	1,680	120,000
October	120,000	--	120,000
November	120,000	--	120,000
December	120,000	100 r/	120,000
Year	XX	17,900	XX
2002:			
January	120,000	220 r/	120,000
February	120,000	--	120,000
March	120,000	202 r/	120,000
April	120,000	197 r/	119,000 r/
May	119,000	1,220	118,000
January-May	XX	1,840	XX

r/ Revised. XX Not applicable. -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.

Source: Defense Logistics Agency.

TABLE 8
U.S. IMPORTS OF ZINC, BY TYPE OF MATERIAL AND COUNTRY 1/ 2/

(Metric tons)

Material and country	General imports			Imports for consumption		
		2002 2/			2002 2/	
	2001	April	Year to date	2001	April	Year to date
Ore and concentrate (zinc content):						
Australia	17,200	6,610	22,600	17,200	6,610	22,600
Mexico	10,700	3,390	6,640	10,700	3,390	6,640
Peru	54,900	5,240	15,300	54,900	5,240	15,300
Other	1,150	--	88	1,150	--	88
Total	84,000	15,200	44,600	84,000	15,200	44,600
Blocks, pigs, or slab:						
Argentina	1,270	1,270	3,810	1,270	1,270	3,810
Australia	55,700	25,000	28,000	29,700	18,000	21,000
Brazil	17,900	1,330	8,610	17,900	1,330	8,610
Canada	442,000	48,000	174,000	438,000	48,000	174,000
China	31,800	3,920	18,800	7,260	2	13
Kazakhstan	88,900	19,400	40,500	88,900	19,400	40,500
Korea, Republic of	30,600	8,040	16,000	10,800	--	13
Mexico	141,000	10,100	48,400	140,000	10,100	48,400
Peru	48,800	2,360	12,100	47,600	1,360	11,100
Russia	14,400	503	1,260	14,400	503	1,260
South Africa, Republic of	7,030	1,500	1,500	7,030	1,500	1,500
Other	23,600 r/	37	4,340	10,500 r/	38	4,340
Total	903,000	121,000	357,000	813,000	101,000	314,000
Dross, ashes, fume (zinc content)	12,000	1,490	4,600	12,000	1,490	4,600
Grand total	999,000	138,000	406,000	909,000	118,000	363,000
Oxide (gross weight):						
Canada	47,500	3,680	13,900	47,500	3,680	13,900
Japan	1,110	71	234	1,110	71	234
Mexico	18,900	1,390	6,480	18,900	1,390	6,480
Netherlands	2,820	346	830	2,820	346	830
Other	1,620	76	419	1,620	76	419
Total	72,000	5,560	21,900	72,000	5,560	21,900
Other (gross weight):						
Waste and scrap	39,300	2,210	9,080	39,300	2,210	9,080
Sheets	7,240	182	348	7,240	182	348
Powders, flakes, dust (zinc content)	26,700	2,200	10,100	26,700	2,200	10,100

r/ Revised. -- Zero.

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

2/ Data for May 2002 were not available at time of publication.

Source: U.S. Census Bureau.