

# Mineral Industry Surveys

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## MAGNESIUM IN THE SECOND QUARTER 2001

Domestic production of primary magnesium in the second quarter of 2001 was lower than that in the first quarter, according to the U.S. Geological Survey. Producers' stocks and shipments in the second quarter also declined from those in the previous quarter.

On June 22, 2001, Alcoa Inc. announced that it would close its Northwest Alloys Inc. 45,000-metric-ton-per-year (t/yr) magnesium plant in Addy, WA, on October 1. High production costs and unfavorable market conditions were cited as the reasons for the closure (Alcoa Inc., June 22, 2001, Alcoa shuts down Northwest Alloys magnesium smelter, accessed July 2, 2001, at URL [http://www.alcoa.com/site/news/news\\_release/2001/JUN/73157-2001\\_06\\_22.asp](http://www.alcoa.com/site/news/news_release/2001/JUN/73157-2001_06_22.asp)). This closure will leave the United States with only one primary magnesium producer—Magnesium Corp. of America (Magcorp), with its 43,000-t/yr plant in Rowley, UT.

Renco Metals Co., the parent company of Magcorp, filed for

chapter 11 bankruptcy in August saying the price pressures from imports have prevented Magcorp from generating enough profits to service its long-term debt. The company reached an agreement with its lender and expects to have debtor-in-possession financing available soon. When this financing becomes available, Magcorp expects that it will be able to maintain a normal supply of products to its customers (Platts Metals Week, 2001e).

Exports of magnesium through May 2001 were 7% lower than those in the same period of 2000. Magnesium imports through May 2001 were 19% less than those in the corresponding period of 2000. Russia (44%) and Israel (21%) were the principal sources of imported metal. China (38%) and Canada (34%) were the principal sources of imported alloys.

Magnesium prices showed little change during the second quarter. Second quarter prices are shown in the following table.

	Units	Beginning of quarter	End of quarter
Metals Week U.S. spot Western	Dollars per pound	\$1.21-\$1.30	\$1.22-\$1.29
Metals Week U.S. spot dealer import	do.	1.00-1.10	1.00-1.10
Metals Week European free market	Dollars per metric ton	1,800-2,000	1,700-1,900
Metal Bulletin free market	do.	1,800-1,900	1,750-1,850
Metal Bulletin China free market	do.	1,350-1,390	1,260-1,280

Magcorp reported that it had cut its overall operating costs by 20% following the installation of some new electrolytic cells. The company has reached 20,000 t/yr of capacity with its new cells, which are larger than the ones they replaced. Cost savings have been made in energy, labor, and maintenance. Cost of developing and installing the new cells was estimated at \$1,000 per metric ton of capacity, compared to estimated costs for greenfield development of \$3,000 to \$15,000 per metric ton. Magcorp also claimed that the new cells reduced thermal emissions by 30% and captured 99.9% of chlorine

emissions (Platts Metals Week, 2001b).

The International Trade Administration (ITA) published the preliminary results of its review of countervailing duties on pure and alloy magnesium imported from Canada. The ITA determined that magnesium imported from Norsk Hydro Canada Inc. during calendar year 1999 would be subject to a countervailing duty of 1.21% ad valorem. Final results were to be published in 120 days from the date of publication in the Federal Register (U.S. Department of Commerce, 2001).

In France, a decision on the closure of Pechiney's 17,000-

t/yr Marignac primary magnesium plant was postponed until September 12. A group of management and union officials appointed the firm CIDECOS to prepare a report on whether or not the plant should close, and this report is due to be completed by September 12. The plant has been idle since the end of June (Platts Metals Week, 2001d).

Timminco Ltd. restarted production of magnesium alloy billet on May 14. The cast house had been closed for 5½ months after a fire had caused extensive damage to two induction furnaces. Cost of the cast house reconstruction, combined with additional modifications to the equipment, was estimated at \$4 million, most of which was covered by a property insurance policy (Platts Metals Week, 2001f).

Progress continued at Australian Magnesium Corp. Ltd.'s (AMC) proposed 90,000-t/yr magnesium plant in Stanwell, Queensland. The company opened a A\$680 million share offering on June 25 to fund the development of the plant. The offer was scheduled to close on July 19, and on July 20 AMC withdrew the offering because it did not receive sufficient funding. The company announced that it would pursue alternative means of funding (Australian Magnesium Corp. Ltd., July 20, 2001, AMC share offer withdrawn alternative funding options to be pursued, accessed August 1, 2001, via URL <http://www.austmg.com/html%20files/news.htm>). On August 9, the Australian Government announced that it would act as a guarantor for an A\$100 million loan to reduce the amount of equity that needs to be raised by AMC. The Government cited the number of jobs that the new plant would create in its engineering and construction and operating phases as one of the reasons for the loan. In addition, this loan from the Government would help ensure that AMC's technology, of which the Government owns 50%, would be commercialized (Senator Nick Minchin, August 9, 2001, Minchin announces government backing for AMC, accessed August 9, 2001, at URL <http://www.minister.industry.gov.au/minchin/releases/2001/August/cmr423%2D01.doc>).

Pima Mining NL's subsidiary SAMAG Ltd. continued to move forward on its planned magnesium plant. In May, the company acquired fluidized bed driers from Dow Chemical Co.'s closed plant in Freeport, TX. The driers can dry enough magnesium chloride brine into prills to produce 100,000 t/yr of magnesium metal. SAMAG estimated that acquisition of the driers and engineering design improvements would significantly reduce its estimated capital cost for the plant (Pima Mining NL, May 8, 2001, SAMAG acquires driers from Dow Freeport magnesium plant, accessed June 13, 2001, via URL <http://www.pima.com.au/pima.asp>). The company also signed a power agreement with Australian National Power (ANP) to provide power and gas to the Port Pirie plant site. Under the agreement, ANP would build a 230-megawatt power station adjacent to the plant, of which 170 megawatts would be dedicated to the plant. ANP also would convert gas supplied to SAMAG into electricity under a 20-year tolling agreement (Pima Mining NL, June 4, 2001, Power deal to drive \$700m magnesium project, accessed June 13, 2001, via URL <http://www.pima.com.au/pima.asp>). After the power agreement was signed, SAMAG announced that it would increase the capacity of its proposed plant to 65,000 t/yr from the originally planned capacity of 52,500 t/yr. In July, the

company was granted environmental approval for the larger plant by the South Australian government. With this approval, the company planned to begin plant construction in 2002 (Pima Mining NL, July 6, 2001, SAMAG granted environmental approval for 65,000 tpa magnesium plant, accessed July 26, 2001, via <http://www.pima.com.au/pima.asp>).

By the end of July, the company had raised A\$5.8 million from KTM Capital Pty. Ltd. to fund plant development. SAMAG was reported to be meeting with the Australian Government on August 9 to discuss potential Government assistance (Senator Nick Minchin, August 9, 2001, Government considers support for SAMAG, accessed August 9, 2001, at URL <http://www.minister.industry.gov.au/minchin/releases/2001/August/cmr422%2D01.doc>).

Mt. Grace Resources NL announced that it had signed a memorandum of understanding (MOU) with the German firm Frank & Schulte Group to purchase at least 10,000 metric tons of magnesium metal annually for at least 10 years. The magnesium will be purchased at a price to be determined by a pre-agreed formula that would enable successful debt-equity financing of the proposed magnesium plant (Mt. Grace Resources NL, May 2, 2001, Mt[.] Grace signs up global raw materials giant in key magnesium off-take deal, accessed June 13, 2001, via URL <http://www.mtgrace.com>). According to a feasibility study prepared for Mt. Grace Resources, the optimum capacity for the initial stage of a magnesium plant would be 12,500 t/yr, and total capital cost for a plant that size (including the mine and additional infrastructure) located 85 kilometers south of Darwin, Northern Territory, would be \$38 million (Metal Bulletin, 2001a).

Golden Triangle Resources NL received shareholder approval to change its name to Pacific Magnesium Corp. Ltd. in June. Pacific Magnesium planned to build an 80,000-t/yr magnesium plant in New South Wales by 2006.

In the first quarter of 2001, Crest Magnesium NL made a complete change in its management and recapitalized the company so it had 100% ownership of its TasMag project. In 1999, Crest Magnesium's financing arrangement had collapsed and its construction partner had withdrawn from the company's proposed 95,000-t/yr magnesium plant in Bell Bay, Tasmania. Crest Magnesium also planned to change the company's name to Indcor Ltd. (Indcor Ltd., April 30, 2001, Quarterly report for the 3 months ending 31 March 2001, accessed June 22, 2001, via URL <http://www.indcor.com.au/reports.htm>). By the end of the second quarter, the company was looking for a partner for the TasMag operation and had extended its existing technology option with the Ukrainian National Research and Design Titanium Institute and the Russian National Aluminum-Magnesium Institute for an exclusive license for their magnesium production technology through December 31, 2001.

Magnesium Alloy Corp. announced that it had signed an MOU with the German firm Siemens AG that addressed power supply and distribution issues that are needed to develop the Kouilou magnesium project in Congo (Brazzaville). Initial investigations by both firms suggested that power could be supplied to the proposed 60,000-t/yr plant from the Inga hydroelectric facility on the Congo River (Magnesium Alloy Corp., May 30, 2001, MOU signed with Siemens to assist in

the development of Kouilou magnesium project, accessed July 26, 2001, at URL <http://www.magnesiumalloy.ca/press/010530.htm>). In addition, a presidential decree was signed in June by President Sassou-Nguesso appointing a steering committee to assist in the implementation of the project. The steering committee will report directly to the presidency and is expected to fast-track development of the project (Magnesium Alloy Corp., June 13, 2001, Private placement completed and Congo fast-track committee appointed, accessed July 26, 2001, at URL <http://www.magnesiumalloy.ca/press/010613.htm>).

China's magnesium producers continued to announce expansion plans. Ningxia Zhongning Aluminium planned to complete a 12,000-t/yr magnesium plant by February 2002. If the plant is completed, it would be China's largest individual magnesium plant; construction of the plant has already begun (Platts Metals Week, 2001c). In addition, Tongxiang Magnesium Co. expected to complete a new 3,000-t/yr expansion by yearend 2001. According to the company, the expansion would bring total capacity to 20,000 t/yr. The second phase of the expansion that would increase capacity by 10,000 t/yr was expected to be completed by the end of 2002 (Platts Metals Week, 2001g).

China also was adding magnesium alloy production capacity. Xindi Magnesium Industries Co. planned to double its capacity to 4,800 t/yr by August, once a plant upgrade is completed (Platts Metals Week, 2001h). Construction of Norsk Hydro A/S's 10,000-t/yr magnesium alloy plant in Xi'an was expected to be completed in August. Jinghua Magnesium Industry Group announced that it would build a new 10,000-t/yr magnesium alloy line by the end of 2002. The company, which has about 17,000 t/yr of magnesium powder production capacity, planned to spend \$6 million on the expansion, and construction was estimated to take about 6 months (Platts Metals Week, 2001a).

A new company, Magnii LLC, was established to run the Kalush Potassium and Magnesium Works in Ukraine, which has been closed since January 1999. The company is owned by Oriana (25%) and ESKO-Pivnich (75%), which were awarded the plant in a tender offer by the government. Magnii estimated that it will take 8 to 10 months to complete the upgrades necessary to get the plant running again. When the plant is operational, it is expected have the capacity to produce 17,000 t/yr of magnesium (Interfax Mining & Metals Report, 2001).

High energy costs were affecting magnesium plants in Russia. Solikamsk Magnesium Works was negotiating with the State power supplier, Unified Energy Systems, regarding a sharp increase in energy prices. Additional tariffs that were implemented on July 10 resulted in a 32% increase in Solikamsk's electricity costs. Russia's other magnesium producer, Avisma, said that its electricity costs had increased by 65% and that it would have to abandon plans to implement new magnesium technology that was expected to double its magnesium production capacity to 40,000 t/yr (American Metal Market, 2001).

A consortium of the "Big Three" automakers—the Chrysler Group of DaimlerChrysler AG, Ford Motor Co., and General Motors Corp., their suppliers, and the U.S. Department of

Energy planned to begin a 4-year project to develop magnesium-intensive auto engines. The project, conducted by the U.S. Automotive Materials Partnership, will use newly developed creep-resistant magnesium alloys to produce components such as cylinder blocks, engine covers, oil pans, and transmission cases and determine the alloys' suitability for these type of applications. The new project will complement a project started in 2000 that is investigating the potential for magnesium components in the structural undercarriage of automobiles (Wrigley, 2001b).

With the introduction of the new 2002 model cars, industry executives estimated that the average magnesium content in the car will increase to 4.1 kilograms (kg) (9 pounds) compared with 3.9 kg (8.5 pounds) for the 2001 model year. The largest new applications for magnesium in the 2002 models are the instrument panel support beams in the Ford Explorer and Mercury Mountaineer sport-utility vehicles (SUV's). Other new magnesium applications include driver-side instrument panel support castings and steering wheel armatures in the Chevrolet Trailblazer and GMC Envoy SUV's; cam covers in some of DaimlerChrysler's 3.7-liter, V-6 truck engines; and steering column jackets, steering column/pedal bracket supports, steering wheel armatures, and alternator brackets in the Chevrolet Avalanche and Cadillac Escalade SUV's (Wrigley, 2001a).

DaimlerChrysler announced that it would introduce the first dash panels made from magnesium in the 2003 model of its Dodge Viper sports car. The one-piece dash panel, made from magnesium alloy AM60, will replace several steel components so it will require less assembly. With the dash panel and other magnesium parts, the redesigned Viper was expected to have almost five times the magnesium content of the average North American automobile (Wrigley, 2001c).

Germany's ThyssenKrupp AG announced that it would set up a new company to research and develop magnesium sheet for automotive applications. The new company is called Magnesium Flachprodukte GmbH, and the Saxony State Ministry for Economics and Labour was expected to fund the research project. ThyssenKrupp signed a long-term sales agreement with SAMAG in November 2000 for all of its proposed output of magnesium metal and alloys (Metal Bulletin, 2001b).

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TABLE 1  
U.S. IMPORTS FOR CONSUMPTION AND EXPORTS OF MAGNESIUM 1/

(Metric tons)

	2001					
	2000	January- February	March	April	May	January- May
<b>Imports:</b>						
Metal	22,900	3,950	1,730	1,900	787	8,370
Waste and scrap	9,890	1,810	857	793	1,160	4,630
Alloys (magnesium content)	56,300	6,990	2,920	3,170	3,110	16,200
Sheet, tubing, ribbons, wire, powder, other (magnesium content)	2,300	456	216	217	318	1,210
Total	91,400	13,200	5,720	6,080	5,370	30,400
<b>Exports:</b>						
Metal	7,300	748	609	882	639	2,880
Waste and scrap	6,400	1,110	592	639	484	2,830
Alloys (gross weight)	6,020	463	229	296	145	1,130
Sheet, tubing, ribbons, wire, powder, other (gross weight)	4,060	687	314	294	478	1,770
Total	23,800	3,010	1,740	2,110	1,750	8,610

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

Source: U.S. Census Bureau.