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# Mineral Industry Surveys

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## MAGNESIUM IN THE FIRST QUARTER 1999

Because the closure of Dow Chemical Co.'s magnesium plant in Texas leaves the United States with only two primary magnesium producers, U.S. production and stock data are withheld. Domestic production and stocks were significantly lower than those in the fourth quarter of 1998. Total shipments of magnesium in the first quarter were 23,300 metric tons.

Total magnesium exports in 1998 were 35,400 tons, a decrease of 13% from the total in 1997. Canada (53%), the Netherlands (25%), and Japan (10%) were the principal destinations. Exports of magnesium through February 1999 were 25% less than those in the same period of 1998.

Total 1998 imports of magnesium of 82,500 tons were 27% greater than the imports in 1997. Canada (45%), China (19%), Russia (18%), and Israel (11%) were the principal source countries. Magnesium imports through February 1999 were 5% higher than those in the corresponding period of 1998.

Quoted prices of primary magnesium continued the increase that began in the fourth quarter of 1998. Prices are shown in the following table.

| | Units | Beginning of quarter | End of quarter |
|---|---|---|---|
| Metals Week U.S. spot Western | Dollars per pound | $1.52-$1.62 | $1.52-$1.62 |
| Metals Week U.S. spot dealer import | do. | 1.30-1.35 | 1.38-1.42 |
| Metals Week European free market | Dollars per metric ton | 2,300-2,450 | 2,500-2,650 |
| Metal Bulletin free market | do. | 1,900-2,150 | 1,900-2,500 |

Magnesium Corp. of America (Magcorp) has experienced delays in its cell upgrade program at its Rowley, UT, primary magnesium facility. Originally scheduled for completion by the end of 2000, the upgrading program is not expected to be completed until mid-2001 or 2002. Prototype cell work was expected to be completed by early 1999, but is still continuing because of technological problems. Magcorp also has installed new scrubbers to meet new HCl emission standards (Platt's Metals Week, 1999g).

In its administrative review of the antidumping order on pure magnesium from Norsk Hydro Canada Inc., the International Trade Administration (ITA) found that there were no dumping margins for the period August 1, 1996, to July 31, 1997. ITA also determined the Norsk Hydro did not sell magnesium in sufficient quantities in a 3-year period to support its request for revocation of the duties, so it does not qualify for revocation of the duty order for pure magnesium (U.S. Department of Commerce, 1999).

Norsk Hydro postponed the proposed expansion of its Becancour, Quebec, primary magnesium plant because the company is limiting its capital expenditure programs in 1999. The expansion, which was originally announced in June 1997, would add 25,000 tons of annual capacity by 2000. This expansion has been delayed by 1 to 2 years, depending on Norsk Hydro's financial situation (Platt's Metals Week, 1999f). Because the January 19 explosion at its direct chill caster caused more extensive damage than was originally thought, Norsk Hydro plans to construct a new direct-chill caster rather than repair the old one. A study is being conducted to determine the cost and location for the new caster, and Norsk Hydro expects to begin construction later in 1999. Norsk Hydro is supplying its customers with sows, which are similar in shape to the T-bars that are produced by the direct-chill caster, and other types of ingots that the customers can melt (Metal Bulletin, 1999a).

In China, the Ningxia Metal Magnesium works closed in March to restructure and increase production capacity by 1,000 tons per year, to bring the total plant capacity to 2,400 tons per year. The company expects to complete the work by July and be running at the new capacity by August. Ningxia originally planned to increase

capacity to 4,000 tons per year by 2000 in a joint venture with a Taiwanese investor, but the Taiwan firm backed out of the project (Platt's Metals Week, 1999i). Another magnesium producer in China, Chaoyang Rich Magnesium, closed its 4,000-ton-per-year primary plant, ostensibly in response to poor prices. According to the company, the current magnesium price of $1,600 per ton does not cover its production costs, which are $1,900 per ton. The company will concentrate on producing alloys and powder, and does not plan to reopen its primary ingot production line until prices increase (Platt's Metals Week, 1999c).

At a meeting if the China Magnesium Association, officials announced that they plan to penalize producers that export magnesium at prices lower than their production costs, and authorities are considering establishing an export licensing system to control exports. The association also looked at ways to address the pollution problem including shutting down plants that fail to comply with national environmental protection standards. China's total magnesium production in 1999 is estimated to be between 80,000 and 90,000 tons, about the same as in 1998, although the total number of plants operating is about 50 to 60 of the 120 total. A few years ago, when the price was high, as many as 400 primary magnesium plants were operating (Platt's Metals Week, 1999b). China also plans to control magnesium expansion projects by banning bank loans on projects less than 3,000 tons per year (Platt's Metals Week, 1999a).

In Australia, work continued to develop two magnesium metal production plants. Crest Magnesium Ltd. signed a joint venture with the construction group Multiplex Corp. to construct a 95,000-ton-per-year magnesium plant in Bell Bay Tasmania at a cost of $1 billion. When the agreement closes in January 2000, Crest will have a 40% share of the project and Multiplex, 60%. As part of the agreement, Multiplex will guarantee the completion of plant construction by the end of 2002 and will organize financing for the project. Construction is scheduled to begin in January 2000. A nearby magnesite deposit will supply feed to the plant, which will convert the magnesite to magnesium chloride brine by leaching the material with hydrochloric acid. This brine will be converted to synthetic carnallite by crystallization, dried, the converted to magnesium metal and chlorine gas through electrolysis (Minerals Gazette, 1999).

Golden Triangle Resources reportedly reached an agreement with Energy Brix, a Victoria-based electricity firm, to assist in evaluating plans to construct an 80,000-ton-per-year magnesium facility in southern Australia. A prefeasibility study of the project, which would use magnesite from Golden Triangle's Main Creek magnesite deposit in Tasmania as feed, projects a capital cost of $421 million and an operating cost of 62 cents per pound. Golden Triangle plans to have a feasibility study completed by the second quarter of 2000, with construction beginning at the end of 2001 and production scheduled for 2003. Golden Triangle also is awaiting studies for the state governments of New South Wales, Tasmania, and Victoria to identify the best site for the plant (Platt's Metals Week, 1999d).

A prefeasibility study was completed for the Antheus Magnesium project in the Netherlands. Results of the study indicate that a demonstration plant with a capacity of 10,000 to 15,000 tons per year can be operating by 2005, and a full-scale plant of 40,000 tons per year can be in operation by 2008. Total investment needed for the project is estimated to be $10 million; the project includes a pipeline for transporting brine from an existing production facility at Veendam, a magnesium production plant, an ethylene pipeline, and a chlorine processing plant (Metal Bulletin, 1999c).

Magnesium Elektron, a unit of the Luxfer Group, announced that it was increasing capacity at its recycling operation in Manchester, United Kingdom, to 3,000 tons per year. The expansion is scheduled to be operational by September 1999, and will be able to process residues, drosses, and end-of-life vehicle parts. Magnesium Elektron also plans to build a 10,000-ton-per-year recycling center in Germany, to be completed by September 2000. This center will provide recycled magnesium to the diecasting industry in Germany. If demand warrants, annual capacity at the recycling center could be expanded to 20,000 tons (Luxfer Group, April 8, 1999, Magnesium Elektron announces plans to expand magnesium recycling capacity, accessed April 27, at URL http://www.luxfer.com/press/080499.html).

A new magnesium recycling plant opened in Gifu Prefecture, Japan, in April. The new facility, owned by Morimura Brothers and Onoda Trading, has a capacity of 1,200 tons per year, and the recycled scrap will be used in magnesium alloy production. The company plans to increase capacity in response to increase demand for recycling magnesium (Platt's Metals Week, 1999h).

Japan's Nippon Kinzoku increased the melting capacity at its secondary magnesium plants in Japan from 2,200 to 4,800 tons per year. Expansion plans are concentrated at the company's Kimitsu, Chiba, and Futajima, Kitakyushu, plants. At Kimitsu, two melting furnaces are being adding to increase the plant's annual capacity from 1,600 to 2,600 tons of secondary magnesium and magnesium alloys. At Futajima, magnesium melting facilities are being added to the plant's existing aluminum melting operations, to give the plant a total capacity of 1,200 tons per year of magnesium alloys. In addition, Nippon Kinzoku is increasing production of secondary magnesium alloys at is Yawata, Kyushu, facility from 600 to 1,000 tons per year. The company completed an expansion at its joint-venture plant in China, Silver River Corp., increasing production of primary magnesium and alloys from 1,500 to 1,800 tons per year (Metal Bulletin, 1999b).

General Motors Corp. (GM) plans to switch from steel to magnesium alloy instrument panel support beams in the 2000 models of its Pontiac Bonneville, Oldsmobile Aurora, and Buick Le Sabre standard-size automobiles; total production of the automobiles is estimated to be 320,000 annually. The support beams will be cast in one piece from alloy AM60 by Magnesium Products Ltd. of Strathroy, Ontario, Canada, and will replace beams that were assembled from several steel components. GM expects that the one-piece assembly will eliminate the rattles and squeaks that often occurred with multipiece assemblies (Wrigley, 1999a).

The 1999 models of North American-built family vehicles contained about 7.0 pounds of magnesium per vehicle, 0.5 pound more than the 1998 models. GM's 1999 model sports utility vehicles (SUV's), however, contain 26 to 28 pounds of magnesium per vehicle, a record for SUV's. Total consumption of magnesium in GM's SUV's is estimated to be 8.5 million pounds, based on an annual production volume of 400,000 vehicles. Magnesium applications include instrument panel/pedal bracket supports, alternator brackets, four-wheel-drive transfer case covers, and steering wheel armatures (Wrigley, 1999b).

Harvard Industries plans to close its Hayes-Albion diecasting plant in Ripley, TN, at the end of August. The company, which emerged from chapter 11 bankruptcy in 1998, had tried to sell the

plant, but reportedly had no acceptable offers. The Tennessee plant makes magnesium alloy parts for automotive applications (Platt's Metals Week, 1999e).

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

(Metric tons)

| | | 1999 | | |
|---|---|---|---|---|
| | 1998 | January | February | January-February |
| Imports: | | | | |
| Metal | 26,500 | 3,110 | 2,650 | 5,760 |
| Waste and scrap | 5,720 | 666 | 330 | 996 |
| Alloys (magnesium content) | 49,600 | 4,310 | 3,930 | 8,240 |
| Sheet, tubing, ribbons, wire, powder, and other (magnesium content) | 756 | 37 | 34 | 71 |
| Total | 82,500 | 8,120 | 6,950 | 15,100 |
| Exports: | | | | |
| Metal | 11,500 | 324 | 558 | 882 |
| Waste and scrap | 13,200 | 1,260 | 1,260 | 2,520 |
| Alloys (gross weight) | 9,220 | 114 | 231 | 344 |
| Sheet, tubing, ribbons, wire, powder, and other (gross weight) | 1,470 | 142 | 466 | 608 |
| Total | 35,400 | 1,840 | 2,520 | 4,350 |

1/ Data are rounded to three significant digits; may not add to totals shown.

Source: Bureau of the Census.