

# Mineral Industry Surveys

For information, contact:

Deborah A. Kramer, Magnesium Commodity Specialist  
 U.S. Geological Survey  
 983 National Center  
 Reston, VA 20192  
 Telephone: (703) 648-7719, Fax: (703) 648-7722  
 E-mail: dkramer@usgs.gov

Jesse Inestroza (Data)  
 Telephone: (703) 648-7968  
 Fax: (703) 648-7975

Internet: <http://minerals.usgs.gov/minerals>

## MAGNESIUM IN THE FOURTH QUARTER 2001

Domestic production of primary magnesium in the fourth quarter of 2001 declined significantly from that in the third quarter, according to the U.S. Geological Survey. The significant decline reflects the closure of Northwest Alloys Inc.'s Addy, WA, magnesium plant on October 1. Producers' stocks and shipments in the fourth quarter also declined from those in the previous quarter.

Exports of magnesium through November 2001 were 18% lower than those in the same period of 2000. Magnesium imports through November 2001 were 25% less than those in

the corresponding period of 2000. Russia (55%) and Israel (14%) were the principal sources of imported metal. Canada (39%) and China (33%) were the principal sources of imported alloys.

Magnesium prices quoted in Platts Metals Week at the end of the third quarter were unchanged from those at the end of the second quarter. Metal Bulletin's European free market price rose during the fourth quarter, and the China free market price dropped. 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-\$1.28	\$1.21-\$1.28
Metals Week U.S. spot dealer import	do.	1.03-1.09	1.03-1.09
Metals Week European free market	Dollars per metric ton	1,700-1,900	1,700-1,900
Metal Bulletin European free market	do.	1,700-1,800	1,775-1,875
Metal Bulletin China free market	do.	1,250-1,260	1,230-1,250

Plans continued to develop new magnesium production facilities in Australia. At the end of November, Australian Magnesium Corp. Ltd. (AMC) was given formal approval by its board of directors to begin construction of a 97,000-metric-ton-per-year (t/yr) magnesium plant in Stanwell, Queensland. The formal approval to proceed followed the successful completion of an A\$525 million issue of securities and the confirmation of Ford Motor Co.'s 10-year take-or-pay magnesium supply agreement with AMC. Construction was scheduled to begin in February 2002, with first metal production by the fourth quarter of 2004 (Australian Magnesium Corp. Ltd., November 22, 2001, Stanwell magnesium project development, accessed December 5, 2001, at URL <http://www.austmg.com/documents/ASX221101greenlight.pdf>).

Pima Mining NL announced that the South Australian Government has planned to commit up to A\$25 million toward

improving industrial infrastructure in the Port Pirie area where it plans to build a 65,000-t/yr magnesium plant by 2005. Key areas under consideration include gas, electricity, and water supplies into the region (Pima Mining NL, December 12, 2001, Pima Mining's [sic] SAMAG benefits from SA government's \$25 million infrastructure initiative, accessed December 14, 2001, at URL <http://www.pima.com.au/pima.asp>).

In October, Mt. Grace Resources NL announced that it negotiated an option agreement to purchase the Princhester magnesite deposit, located 95 kilometers north of Rockhampton in central Queensland, Australia. Resource definition work completed by previous owners delineated 5.4 million metric tons (Mt) of very-high-grade (46.8% MgO) magnesite with a low silica (1.8% SiO<sub>2</sub>) content. The deposit occurs as a near-surface horizontal sheet with an average thickness of about 12 meters. Mt. Grace was in the final stages

of awarding a contract to undertake a bankable feasibility study for its Batchelor Project; plans were to begin production at a new 12,500-t/yr magnesium plant by early 2003 (Mt. Grace Resources NL, October 30, 2001, Mt[.] Grace secures additional magnesite resource, accessed November 26, 2001, via URL <http://www.mtgrace.com>).

In November, Australia's Rambora Technologies Ltd. announced that it would begin a 6-month prefeasibility study into extracting and processing magnesium from brown coal ash in Victoria's Latrobe Valley. Rambora entered into an agreement with Magnesium Investments Pty. Ltd. and Hazelwood Power to undertake the study. Ash currently being produced would be combined with ash contained in Hazelwood Power's tailings dams. A feasibility study will evaluate the potential to build a 100,000 t/yr of magnesium metal plant. Recent studies conducted by HRL Technology have verified the feasibility of extracting magnesium from the Latrobe Valley ash. Initial magnesium extraction tests used a standard acid leach process, followed by purification of the magnesium chloride solution. The company anticipated that this process could be followed by electrolysis using established Alcan cell technology to produce magnesium metal. The Hazelwood tailings ponds are currently estimated to contain more than 5 Mt of ash that have magnesium content of between 8% and 12%. In addition, the power station produces approximately 200,000 t/yr of ash. An initial review undertaken by Magnesium Investments estimated that the capital cost of a 100,000-t/yr plant would be about \$800 million, and the projected operating costs would be between \$0.75 and \$0.80 per pound of magnesium metal (Australian Mining, November 15, 2001, Magnesium may flow from fly ash, accessed February 7, 2002, at URL <http://www.miningaustralia.com.au/articles/a1/0c0090a1.asp>).

In Canada, Timminco Ltd. announced that it has entered into a forbearance agreement with its principal lender, the Bank of Nova Scotia in December. Under this agreement, the bank will not enforce its rights arising from certain defaults under the loan agreement while Timminco pursues alternatives to maximize shareholder value, which may include a direct investment, strategic alliance, refinancing or a sale of all or a part of its operations. Timminco operates a 6,000-t/yr primary magnesium plant in Haley, Ontario, which primarily serves high-end product lines, and the company operates a magnesium extrusion facility in Aurora, CO (Platts Metals Week, 2001c).

In October 2001, Hatch Associates Ltd. conducted test work on material from Leader Mining International Inc.'s Cogburn magnesium project, about 29 kilometers west of Hope, British Columbia, and concluded that the magnesium silicate mineral can be efficiently leached to a pure magnesium chloride brine suitable for subsequent dehydration and fused salt electrolysis to magnesium metal. The Cogburn deposit is in an ultramafic complex that covers almost 20 square kilometers. Surface sampling suggested fairly uniform magnesium distribution with values consistently greater than 25%. Boron, calcium, and sulfur, considered impurities in magnesium metal production, showed low values in large areas of the deposit. Leader Mining was continuing drilling to define the total resource and to obtain bulk metallurgical test material as part of a feasibility

study (Leader Mining International Inc., December 12, 2001, Leader Mining International Inc. - Cogburn magnesium results independently verified, accessed January 11, 2002, at URL <http://www.leadermining.com/company-frame.html>).

In November, Magnesium Alloy Corp. announced that it terminated a financing framework agreement for its Kouilou magnesium project in Congo (Brazzaville) with Amphora Group Holding Luxembourg S.A. as announced on September 10, 2001. Amphora was unable to meet certain commitments on a timely basis due to financial difficulties (Magnesium Alloy Corp., November 13, 2001, Financing framework agreement terminated, accessed November 26, 2001, at URL <http://www.magnesiumalloy.ca/press/011113.htm>).

Several magnesium companies in China announced increases in production capacity. Jishan Huayu Enterprises Group planned to complete a 10,000-t/yr expansion at its plant in Shanxi Province by September 2002. Total capacity would be about 20,000 t/yr when the expansion is complete. In addition to magnesium ingot, Jishan Huayu has the capacity to produce 400 metric tons per month (t/mo) of magnesium granules. The company planned to expand this capacity to 8,000 t/yr by September 2002. The company also began producing magnesium powder in January, with a capacity of 400 t/mo, and planned to increase capacity for this product to 10,000 t/yr in October. One-half of the company's products are exported to customers in Japan and the Republic of Korea under long-term contracts (Platts Metals Week, 2001a). Tongxiang Magnesium Co. began production at a new 3,500 t/yr magnesium ingot line in November, which is part of the first phase of a 13,000-t/yr expansion project (Platts Metals Week, 2001d).

Ningxia Wanhui Magnesium Works in Ningxia Autonomous Region began producing magnesium powder in October from a 3,000-t/yr line and announced plans to expand this capacity to 5,000 t/yr by June 2002. The company also has the capability to produce 3,000 t/yr of magnesium ingot and 2,000 t/yr of magnesium alloy. All of the company's ingot and alloy were exported, and Ningxia Wanhui planned to export almost all of its powder (Platts Metals Week, 2001b).

U.S.-based Gibbs Die Casting Corp. planned to construct a new die-casting facility in Hungary by 2003 to meet the needs of its European die-casting customers. The new facility will produce both aluminum and magnesium die castings from two 850-ton verti-cast presses (North American Die Casting Association, November 6, 2001, Hungary is latest expansion for Gibbs Die Casting, accessed November 26, 2001, at URL <http://www.diecasting.org/news/archive.asp>).

Xstrata Magnesium Corp. began shipping magnesium from its new recycled magnesium plant in Anderson, IN, in December. Total plant capacity is about 25,000 t/yr; however, only one of the two lines was operating at yearend. Xstrata hopes to have the second line operating by late 2002, if demand is sufficient (Platts Metals Week, 2002).

Ford announced two new applications for magnesium in its automotive products. The company is introducing magnesium valve covers in its 5.4-liter Triton V-8 engines, which are due out in the spring of 2002. These engines will be used in several standard-size and heavy-duty pickup trucks and in some sport-utility vehicles (SUVs). Magnesium consumption for this

application is expected to be between 1,900 and 2,100 t/yr. Spartan Light Metal Products Inc., Sparta, IL, will manufacture the valve covers (Wrigley, 2001b). In addition, Ford is developing a magnesium frame for the liftgate for standard-size SUVs. This frame could support inner and outer aluminum or plastic panels, with an estimated weight savings of 50% over the currently used steel assembly. Ford also is working on a front-end radiator-support module made entirely of magnesium for use in Explorer SUVs. Neither of these products has been approved for production use yet (Wrigley, 2001a).

## References Cited

- Platts Metals Week, 2001a, Huayu to hike magnesium ingot output: Platts Metals Week, v. 72, no. 50, December 10, p. 4.
- 2001b, Ningxia Wanhui exports first magnesium powder: Platts Metals Week, v. 72, no. 50, December 10, p. 4.
- 2001c, Timminco gains bank reprieve, eyes return to profitability: Platts Metals Week, v. 72, no. 53, December 31, p. 5.
- 2001d, Tongxiang to start new magnesium line: Platts Metals Week, v. 72, no. 45, November 5, p. 7.
- 2002, Xstrata nears planned Indiana output: Platts Metals Week, v. 73, no. 4, January 28, p. 5.
- Wrigley, AI, 2001a, Ford Motor eyeing magnesium frame for SUV: American Metal Market, v. 109, no. 227, November 21, p. 5.
- 2001b, Ford planning magnesium cover-up: American Metal Market, v. 109, no. 236, December 6, p. 5.

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

(Metric tons)

	2001					
	2000	January- August	September	October	November	January- November
<b>Imports:</b>						
Metal	22,900	12,500	1,640	1,950	1,670	17,800
Waste and scrap	9,890	6,890	1,010	1,260	1,060	10,200
Alloys (magnesium content)	56,300	24,500	2,600	2,120	2,830	32,100
Sheet, tubing, ribbons, wire, powder, other (magnesium content)	2,300	2,110	206	213	200	2,730
Total	91,400	46,000	5,460	5,550	5,760	62,800
<b>Exports:</b>						
Metal	7,300	3,760	240	332	405	4,740
Waste and scrap	6,400	4,270	655	749	624	6,300
Alloys (gross weight)	6,020	1,760	517	888	370	3,530
Sheet, tubing, ribbons, wire, powder, other (gross weight)	4,060	2,980	282	150	211	3,630
Total	23,800	12,800	1,700	2,120	1,610	18,200

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

Source: U.S. Census Bureau.