

Malaga breaks Chinese grip on tungsten

BY TRISH SAYWELL

PASTO BUENO, PERU — It's a story that is starting to sound all too familiar: China holds a lock on the supply of a strategic metal and is holding the rest of the world by the throat.

It's been true of rare earth elements and now the producers of high-tech products requiring other metals are realizing that it is also true of tungsten — a relatively rare metal with few substitutes used in a variety of advanced industrial, commercial and defense applications.

Just how tight a stranglehold does China have? More than half of the world's known tungsten reserves are in China and the country produced 43,500 tonnes of the metal in 2008. The next largest producer was Russia with 3,100 tonnes (see charts on page 2).

In the 1980s and 1990s, China flooded the market with cheap tungsten, dragging global prices down and putting many non-Chinese producers out of business.

That dynamic began to change at the outset of this decade, however, when the importance of tungsten and widespread demand for it in China dawned on policymakers in Beijing, who then cut back on its release into the global market.

By 2003, China started tightening exports, consolidating its tungsten mines and encouraging downstream processing of concentrates into higher value-added products.

In June 2007, China implemented a uniform 15% export tax on all primary tungsten products and in October of that year slashed its tungsten export quota from 15,400 tonnes per year to 14,900 tonnes per year. A month later, it banned



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At Malaga's Pasto Bueno tungsten project in Peru, from left: Alonso Sanchez, chief geologist; Pierre Monet, vice president and CFO; Jean Martineau, president and CEO; Martin Wong, board member.

foreigners from investing in tungsten, according to a report by Haywood Securities.

By the end of 2007, China had become a net importer of tungsten concentrates and scrap materials and in October 2008, the Chinese cut their overall tungsten export quota by an additional 2%.

Fast forward several years and in March 2010, China's Ministry of Land and Resources announced on its website that it would stop accepting applications for tungsten mines until mid-2011, *Bloomberg* reported. China also capped 2010 tungsten production to 80,000

tonnes.

World tungsten production has declined each year between 2004 and 2007, "primarily owing to a decrease in estimated production from China," the U.S. Geological Survey states in its online literature.

Sensing the urgency of nailing down non-Chinese supplies of tungsten, the European Commission published a report earlier this year in June identifying tungsten (among 13 other technology minerals) as critical to the European industry.

The study explored the supply risks

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facing European producers and consumers of the materials and warned: “If the European mining and metals industry is to remain competitive in the future supply of these critical technological minerals, and if customers are to limit their supply chain risks, now is the time to take notice.”

That concern is starting to echo in the U.S. — as it has been for some time with rare earth elements. The U.S. Geological Survey notes that in 2007, 39% of tungsten imports into the U.S. came from China, putting the U.S. net import reliance as a percentage of apparent consumption at 68%.

Tungsten is the hardest of all metals with the highest boiling point (5,700 degrees Celsius) or roughly the temperature at the sun’s surface.

It is used in everything from industrial metal-cutting tools to drill bits for the mining and oil industries, mobile phones, circuit boards, power plants and light bulb filaments. Tungsten also goes into making heavy-metal alloys for things like armaments and radiation shielding, as well as super alloys for turbine blades.

Demand for tungsten is likely to continue to rise, particularly for high-tech applications. Goodall Business and Resource Management, a leading tungsten consultant, estimated in a January 2008 report that global tungsten consumption will increase from about 81,200 tonnes

Tungsten reserves (tonnes)	
Austria	10,000
Bolivia	53,000
Canada	110,000
China	1,800,000
Portugal	4,200
Russia	250,000
United States	140,000
Other countries	400,000
World total (rounded)	2,800,000

Source: U.S. Geological Survey 2010

per year in 2007 to 109,328 tonnes by 2012. “Chinese domestic consumption (of tungsten) is forecast to continue growing in excess of 10% per annum, largely driven by the increase in requirements for cutting and drilling tools,” the report stated. “However it should also be noted that China’s (consumption) growth over the past five years has averaged 15% and if these levels were to be maintained world tungsten demand will exceed 122,000 tonnes by 2012.”

Prices are mounting. In the 1990s, the price for ammonium paratungstate, or APT, the most sought-after intermediate product, remained extremely low at roughly US\$50-US\$55 per metric tonne unit, or mtu. (An mtu equals 10 kilograms or 22.04 lbs.)

But prices started to pick up early this decade. By 2004, APT had reached a peak of more than US\$300 per mtu, according to Haywood Securities. Between 2002 and 2007, the APT price jumped by about 376%, while production rose by just 19%.

APT is now selling for about US\$270-US\$273 per mtu, after dipping to US\$160 per mtu during the financial crisis and global recession of 2009. Since January 2010, the price of APT has increased 24 times, rising 46% from US\$185 per mtu

Tungsten production in 2008	
Country/ Continent	Production (tonnes)
China	43,500
Russia	3,100
Canada	2,300
Africa	2,000
Bolivia	1,200
Austria	1,100
Portugal	1,000
Thailand	850
Peru	400
Brazil	300
Mongolia	150

Source: International Tungsten Industry Association, 2009

to US\$270 per mtu.

Unlike most other metals, tungsten prices are not traded on an exchange. The only information on prices is published by London’s *Metal Bulletin*, which sources its information from producers, consumers and traders.

APT is the most widely traded primary tungsten material. Tungsten ore concentrates are upstream materials, while tungsten metal powder and tungsten carbide powder are downstream materials.

Malaga

In February, Chinese visitors approached **Malaga** (MLG-T) — South America’s sole tungsten producer and one of the few publicly listed primary tungsten producers in the world.

The Chinese were hungry for a deal or partnership with the Montreal-based company and travelled to Lima to see whether they could sign an offtake agreement or invest in Malaga’s producing Pasto Bueno underground tungsten mine.

The mine is expected to produce about 15% of the world’s tungsten outside of China this year, or about 100,000 mtus, most of which is sold under an offtake agreement at prices tied to the posted APT market price.

“The Chinese are looking desperately around the world for tungsten supply and are even buying lower grade concentrate from Africa,” Jean Martineau, Malaga’s president and chief executive, explained to a group of investors, bankers and journalists touring the mine in early September. “They have fewer mines in production and their tungsten is getting to be lower grade.”

Nestled high in the Andes at between 3,200-4,200 metres above sea level, the Pasto Bueno mine is situated within a 600-km long mineral belt that winds its way along the northern half of Peru’s coastline.

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THE GLOBAL
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Visitors are typically flown by charter aircraft (about a 45-minute flight) from Lima's international airport to a mountain-top landing strip, and then travel the remaining 387 km in vehicles on narrow roads that wind up and down steep mountain passes. You can also reach the mine by driving 657 km from Lima, a journey that usually takes about 12 hours.

Malaga bought the mine in November 2005 and put it back into production in 2007 after upgrading the mill with new equipment.

Today the mine is turning out 500 tonnes of ore per day and by the end of 2011, management expects that number should grow to 700 tonnes.

Mill recovery rates stand at 80% but Malaga believes it can rise to the 85%-90% range with powerful new magnets from the United States that it is installing to improve the separation process at the mill.

It also is considering whether to build a second mill. "We can expand the existing mill to 1,000 tonnes per day quite easily, but we may decide to build another mill on the other side of the mountain, if we want to expand our capacity to 3,000 tonnes per day," explains Martin Wong, a member of Malaga's board of directors.

A local Peruvian family discovered the deposit in 1910 and mined it successfully as a private company (Minera Malaga Santolalla) from the 1940s until the 1970s. At the height of production, the mine was turning out 1,000 tonnes of tungsten per day.

Avocet Mining (AVM-L) stepped in briefly from 1994-1998 before selling it back to the original owners, who eventually went bankrupt in 2002.

By the time Malaga entered the picture, the mine had already turned out nearly six million tonnes of tungsten (42,000 tonnes of tungsten concentrate grading an average of 75%) over a 60-year

period, from just five of 31 veins identified on the property.

Since taking 100% ownership and changing its name from Dynacor Mines to Malaga in 2007, the junior has identified another 47 veins for a total of 78, of which 28 are major structures with widths greater than 1 metre.

"There was only one drill hole on the property when Malaga bought the mine," Martineau says.

Pierre Monet, Malaga's vice-president and chief financial officer, adds: "Considering the mine previously produced from just five veins and turned out nearly six million tonnes of tungsten, we can only imagine how much it can produce given that we actually have 28 veins that are significant."

Currently, measured and indicated resources stand at 398,845 tonnes grading 0.75% tungsten for 299,134 mtus. Inferred resources add an additional 1.82 million tonnes grading 0.70% tungsten for 1.27 million mtus.

Institutional shareholders own about 65% of Malaga and include: Resource Capital Fund V (RCF) (18%), Trapeze Asset Management (17%), Sprott Asset Management, AGF, Sodemex and others.

What sets Malaga apart

Over the last 20 years the lack of significant exploration for tungsten has caused a supply bottleneck with few pure primary tungsten producers outside of China.

Moreover, Malaga's mill produces a premium tungsten concentrate averaging 75% tungsten trioxide. Concentrate sold in the world market needs to be a minimum of 65%.

The average grade of Malaga's tungsten ore is 0.7%-0.8%, while typically the average grade of tungsten from mines in other parts of the world falls in the range of 0.2%-0.3% all the way up to 1%.

"The tungsten Malaga produces is

pure, containing no impurities such as traces of arsenic or radioactive elements like uranium, which are common in tungsten mined at other mines," Martineau says. "Because of its purity level, the company's tungsten can also command a higher price."

It was the purity level that initially attracted Pennsylvania-based Global Tungsten & Powders Corp. (GTP). Last year GTP, formerly a division of lighting firm Osram Sylvania, signed a US\$5-million, long-term agreement with Malaga for all of its forward production until 2014.

Under the arrangement, GTP also has the right of first refusal for excess capacity above 7,500 mtu per month, up to 12,500 mtu. GTP is now part of the Plansee Group, a private German company.

"We are GTP's main supplier and send them six containers a month, but they tell us they could take four to five times that amount," Martineau says. "GTP sent a geologist down to see the mine and while he could see that Malaga only had 14 months of reserves, he said he could also tell that the company would be mining in Peru for a very long time. They knew this concentrate. They know this mine has been in production for sixty years."

Today, reserves stand at about 24 months.

GTP also recognized that the higher quality of Pasto Bueno's concentrate would allow it to buy lower-grade tungsten elsewhere and blend it.

The Pasto Bueno mine is also distinctive in the universe of mining projects because of its very low electricity costs. Energy bills account for just 8% of the mine's cash costs, and assures Malaga can flat line and control its operating costs going forward, below the recent historically low APT price of US\$165 per mtu.

In 2009, Malaga built a 600-kilovolt

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NOVEMBER 8-14, 2010 VOL. 96, NO. 38 • SINCE 1915

hydroelectric generating plant that provides 70% to 80% of the mine's and mill's power needs with the balance coming from the national grid. The project was a joint-venture with Emerging Power Developers (EPD), a subsidiary of Stucky S.A., a Swiss company that specializes in hydroelectric projects. Malaga holds 49% of the joint venture and EPD has the rest.

The plant — partly funded by the Clean Development Mechanism under the Kyoto Protocol — is near the mine on the Pelagatos River, which runs directly through the Pasto Bueno property.

Now Malaga plans to build a second hydro-powered plant. Excess capacity would be sold to private companies on long-term contracts and would generate future cash flow as well as hold down cash costs, the company believes.

"It guarantees that we've got enough power to get control over the cost of hydroelectricity over a long-term period so we know electricity costs won't kill us," Monet explains. "It also keeps our costs low and we can sell some of the excess capacity to other companies or the national grid."

Malaga got a pretty good deal when it bought the mine for US\$1.25 million in cash and took over US\$2.4 million in debt from the previous owners. (Malaga still owes about US\$1.2 million of that debt.)

The junior then invested \$5 million to put the mine and plant back into production. It also spent an additional \$300,000 to build the US\$3-million hydropower plant. (The balance came from its Swiss partner, carbon credits and bank loans.)

Malaga's capital expenditure in return for a producing tungsten mine seems quite reasonable when compared with other acquisitions in the tungsten space. In 2007, for instance, Japanese trading company Sojitz acquired Primary Metals and its Panasqueira tungsten mine in central Portugal for about \$54 million.

Other deals on tungsten assets also have been signed in recent years but often at undisclosed prices. In February 2009, Swedish engineering group Sandvik acquired Wolfram Bergbau-und Hutten-GmbH Nfg of Austria for an undisclosed sum. Sandvik, the world's biggest maker of metal-cutting tools, was Wolfram's biggest customer, buying tungsten from its Mittersill mine in Austria.

On the financial front, the company's situation is improving. Since the first quarter of 2010, cash flow before working capital turned positive, and Malaga expects to be in the black by the end of the fourth quarter. The more favourable economics and outlook have helped more than double the stock price from 11¢ in June to its 28.5¢ close on Oct. 29.

Last year, Malaga posted a net loss of \$7.64 million. In the first eight months of 2010, net losses stood at \$2.09 million.

"While the market was collapsing in 2009 and others had to shut down, Malaga was able to undertake the expansion of its plant and thereby double capacity," Monet says. "This and the potential of the property validated by their geologist convinced RCF to invest in Malaga even if it might have been considered small by their standards."

Cash costs of sales have dropped from US\$154 per mtu in 2009 to US\$125 per mtu so far this year, confirming Pasto Bueno as a low-cost producer. Malaga expects to reduce that figure to about US\$105 per mtu in the first quarter of 2011.

Management predicts average cash costs of sales for the entire calendar year should be about US\$120 per mtu, and could drop to US\$105 per mtu in 2011.

Malaga extracts tungsten concentrate from the ore in a simple gravity process that uses jigs, tables and high-intensity magnetic separators to produce a wolframite or tungsten concentrate.

The ore is first crushed and then sent through jigs and two rod mills. The concentrate production from the jigging, milling and tabling circuits is then dried on three 2.2-by-1.2-metre electrical hot plates and then bagged and transported to the magnetic separation plant, where it passes between several magnets.

The first magnet removes tramp steel and other ferromagnetic material and the second magnet captures the liberated particles of wolframite. The third and fourth magnets capture intermediate-grade composite wolframite particles, which are then recycled through a roll crusher and rescreened before being sent back to magnetic separation. The non-magnetic tailings are discharged.

The new magnets Malaga has recently installed are stronger permanent rare earth magnetic separators called the Rare Earth Roll separator. The roll is built with ERIUM 3000 permanent magnetic discs, alternating with thin steel pole pieces along a shaft. The steel poles are saturated with magnetic flux and produce a magnetic field in excess of 21,000 gauss.

Water for the mill is supplied from alpine lakes, 2.5 km east of the plant, and from surface water and underground workings.

Exploration continues

Over the next two years, with free cash flow generated from the mine, Malaga will begin to focus on some of the low-hanging fruit and start a stepped-up exploration program on high-potential target areas.

"Our focus and objective is to have ongoing reserves of 18-24 months and increase significantly the inferred resources in the coming years in order to put into numbers the huge potential of the property," Monet says

The 6.9-sq.-km property is divided into three sectors: Consuzo, Huaura and

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NOVEMBER 8-14, 2010 VOL. 96, NO. 38 • SINCE 1915

Huayllapon.

In the 1970s, all three sectors operated at the same time. Today, just two sectors are in operation: Huaura, where 80% of the production currently comes from, and Huayllapon, which makes up the remainder.

Some veins are very long, such as the 4-km Consuelo vein in the Huaura sector, which ranges in thickness from 1.6 metres to 5.2 metres. The other important vein is the Chabuca vein in the Huayllapon sector.

The Consuzo sector has three main mantos and no exploration has been carried out to date. Malaga believes the potential of finding skarn-type mineralization in the lithological contact of the intrusive. A channel sample showed a grade of 1.17% tungsten over 6.8 metres.

"I think we can find 20 million tonnes," says Malaga's chief geologist, Alonso Sanchez. "We think we can find tungsten down to depths of 1 km."

Sanchez left an 11-year career at **Buenaventura** (BVN-N), Peru's largest publicly listed precious metals company, to join Malaga four years ago.

Christopher Ecclestone, an analyst at Hallgarten & Company in New York, holds a buy on the stock and a one-year price target of 40¢ per share. (In Toronto at presstime, Malaga was trading at 32.5¢. Over the last year, the company has traded in a range of 8¢-29¢.)

Malaga "has come through the valley of darkness into which specialty metals fell in 2008 but has still not captured the market's interest due to generalized ignorance of tungsten and its supply-demand dynamics," Ecclestone wrote in a June research report.

"If investors can get into a lather over rare earths and lithium, then we feel that tungsten is just as deserving of attention, maybe even more so."

Newsletter writer John Kaiser, who visited the mine in September, recom-

mends the stock as a core proxy for the tungsten sector with a minimum target price of 60¢.

In a research note to clients on Nov. 1, Kaiser also described Malaga as "the preferable vehicle for speculators seeking leveraged exposure to the tungsten price," when judged against **North American Tungsten** (NTC-V), its "closest comparable." (North American Tungsten recently restarted production at its Cantung underground mine in the Northwest Territories and has also seen its share price rise.)

"During 2010 Malaga has undergone an operational turnaround," Kaiser wrote, "and its stock price has gained 150% in the past few weeks as tungsten prices strengthened and the market began to appreciate the 'security of supply' issues tungsten shares with the rare earth sector."