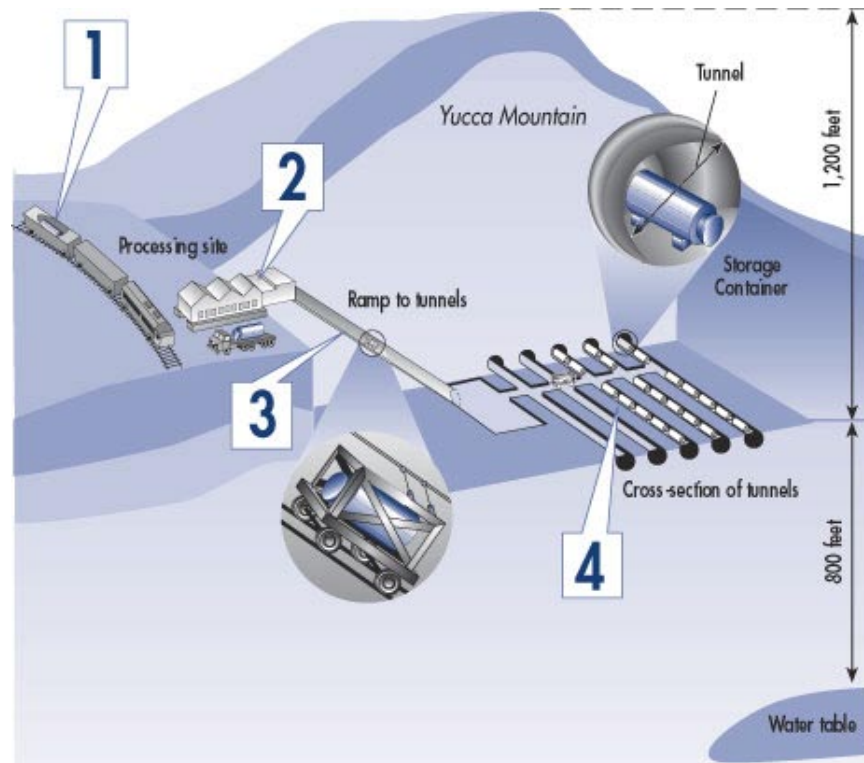


ROASTING BOTTLENECKS COULD SUPPORT FIRM MOLYBDENUM PRICE PAST 2010

Part One of a Two-Part StockInterview Series



The 11,000 containers at the proposed Yucca Mountain nuclear waste storage facility could require as much as 33 million pounds of molybdenum. The inner container would be made of Type 316L stainless steel (2.2 percent Mo) and nickel-base Alloy 22 (13.5 percent Mo) for the outer container. Will there be sufficient molybdenum roasting capacity to provide enough of the corrosive-resistant element for these containers required in the next decade? If not, will a substitute element be allowed by the Nuclear Regulatory Commission? (Photo Courtesy of NRC)

By James Finch

This past summer we reviewed how molybdenum may be another way of investing in the long-term energy bull market. There is some common ground between uranium and molybdenum with regards to the nuclear renaissance and the providing of energy. For example, will there be sufficient and readily available molybdenum to help construct containers for the mammoth nuclear waste storage facility at Nevada's Yucca Mountain?

Much like uranium, the cost of molybdenum isn't considered significant compared to the overall benefit provided. Both are required for their respective uses and not readily substitutable. No futures markets exist to hedge either met-

al's price change as one finds with copper or nickel. Uranium's price might have to run to \$200/pound before power plant operators would shelve their plans for nuclear energy. Similarly, the moly content in various alloys generally starts at 0.3 percent, which is negligible. So, how does molybdenum appear in terms of availability and price?

The molybdenum price could stay firm, through the end of this decade, because of tight roasting capacity and continued strong demand. In a fourth quarter global equity research report, recently issued by UBS Investment Research (London), analyst Daniel Brebner wrote, "We don't believe that the Molybdenum market is well analysed, thus there is no reliable market consensus forecast." Brebner cited "constraints on molybdenum roasting capacity," as the main driver in pro-

viding price support for this silvery metal at current levels.

Echoing other analysts and insiders we interviewed, Brebner wrote, "The supply of molybdenum concentrates (molybdenum sulfide) is reasonably plentiful; however the capacity to roast molybdenum concentrates as final process is limited as expansions have significantly lagged mined output." The analyst sees prices "well supported near current spot levels over the next couple of years."

Two years ago, a bottleneck development in the roasting of molybdenum. According to William G. Cook, who is the North American representative for Derek Raphael & Company, presently the world's largest molybdenum trader, "The roasting sector has not been able to keep pace with the rapid increase in moly demand." He explained this was a concern, "Roasters are very expensive to build and are environmentally sensitive so this is an area to focus on in the future when evaluating the moly market."



*USGS Molybdenum Specialist,
Michael Magyar*

"The molybdenum industry does have the ability to produce more moly," Michael Magyar told StockInterview, "but we can't roast much more moly right now." Magyar is the molybdenum commodity specialist for the United States Geological Survey (USGS), based in Reston, Virginia. He explained that increased molybdenum in steel demand could create another bottleneck at the roasters. Worse yet, he added, "No one is actively permitting for more roasting capacity in North America."

This may help explain why some analysts are bullish on molybdenum. On Monday, Saloman Partners Raymond Goldie wrote, "Molybdenum, like copper, nickel and zinc, is also enjoying prices which are remarkably high and remarkably sustained." The Toronto-based senior mining analyst updated his long-term forecasts for molybdenum prices. But not all analysts are bullish on moly. Citigroup Global Commodities Analyst Alan Heap predicted molybdenum prices would head lower the next few years. In his half-yearly estimates, the Sydney, Australia-based analyst estimated molybdenum would average \$15/pound through 2007.

Cook summed it up, "I don't see much change (in the moly price) looking forward to 2007. I think the market will still be strong." Magyar was blunter, "The price is not trending anywhere. It's just drifting around \$25/pound."

Roasting Molybdenum



*An inside look at one of three MOLYMET's roasting furnaces in a production complex located south of Santiago, Chile.
(Photo Courtesy of MOLYMET, Chile.)*

After molybdenum is mined, it goes through several more steps before being refined into Technical Molybdenum Oxide. Before the moly can be roasted, it must first be milled, dipped into a floatation cell and leached.

First the large chunks of ore are crushed into gravel. Next, the material is ground down into powder. Molybdenum is floated into aerated tanks to produce a molybdenum sulphide concentrate. Acid leaching may be required to dissolve copper and lead impurities remaining in the material.

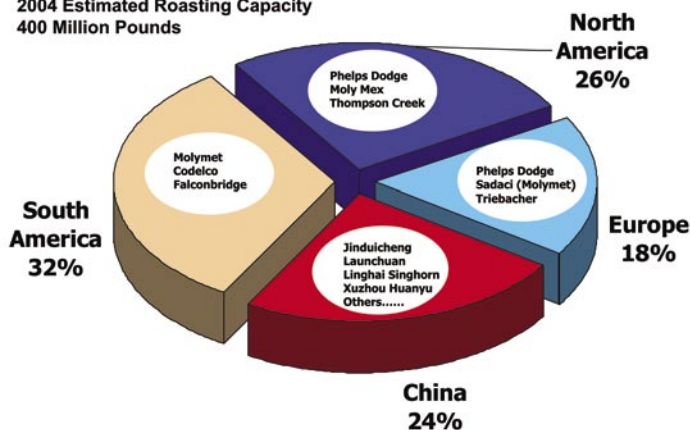
And then the molybdenum sulphide is roasted in multi-level hearth furnaces at temperatures up to 650 degrees centigrade to become 'roasted molybdenite concentrate.' The roasting process gets rid of the sulphur. Large rakes are used to move around the concentrate to stir up the 'exothermic' process, against a current of heated air and gases blowing up from the bottom of the hearth. Literally, the sulphur burns itself off the molybdenite. The material starts at the top, falling down level after level, burning more sulphur off at each of about one dozen levels, until the roasted final product arrives at the bottom. The gases are scrubbed separately and converted to sulfuric acid, later sold in Chile's domestic market.

Annually, MOLYMET produces about 46 million pounds of molybdenum concentrates, more than 10 percent of the world's production. The Chilean company plans to add another 40 million pounds of roasting capacity in 2007 to accommodate the growing demand for molybdenum. "The new roasting capacity could accommodate new production

of about 12 to 15 million pounds per year – about what we would expect if the moly market continues growing at three to four percent per year – that’s three years growth in mining production,” Magyar explained. “That will use up MOLYMET’s new roasting capacity in about three years.

Molybdenum Roasting Capacity

2004 Estimated Roasting Capacity
400 Million Pounds



Source: Company Reports, IMOA, Industry Sources

By 2009, MOLYMET in Belgium will add 10 million pounds of roasting capacity. But is that enough molybdenum to meet the current percentage growth rate of the market? “After 2010, the molybdenum industry may need more roasting capacity,” Magyar said. “I don’t see where the roasting capacity will come from, but additional roasting capacity will likely be needed if the market continues to grow by 3 to 4 percent annually.” He advised, “Worldwide, the industry might need another MOLYMET (with 100 million pounds of roasting capacity) if the current growth continues.”

In the United States, there are three states where molybdenum can be roasted: Arizona, Iowa and Pennsylvania.

No New Mines, Producers Falling Short

The moly market is tight. “Supply is in balance with demand, but there is not enough excess supply to rebuild inventories,” Magyar observed. “Inventory is still below historic levels.” Prices are impacted by production. “New production that was anticipated, particularly during the first half of 2006, has not materialized,” William Cook told us. “We have yet to see one pound of new production coming from a number of mines we had anticipated.”

Magyar explained, “There are too many factors affecting prices, such as production problems in Mexico and Chile.” He pointed to the extended strike at La Caridad in Mexico. At the end of October, Chile’s state copper and molybdenum mining company, Codelco reported nearly 24 percent lower molybdenum production in the first nine months of 2006



Will there be enough molybdenum ore for pipelines, nuclear power plants and for the Yucca Mountain nuclear waste storage facility? (Courtesy of IMOA).

compared to the same period a year ago. They cited supply disruptions.

Those weren’t the only countries whose molybdenum contributed to firmer prices in 2006. “A lot of the producing mines are not producing what they had budgeted,” Cook explained. Magyar pointed to Kennecott’s Bingham Canyon mine, “They are producing below their mine plan this year.”

But unlike Cameco’s flooded Cigar Lake uranium project, which was anticipated as a ‘must have’ uranium supply source for numerous utilities, the world’s moly production comes from many mines. “I don’t see any one particular mine being that critical,” Magyar said. Still, Phelps Dodge accounts for about 63 million pounds of annual moly production of the 400 million pounds mined each year. Both Magyar and Cook felt the current supply is in balance with demand. “But there is not enough excess to rebuild inventories,” Magyar added.

As we found in covering the uranium sector, China can become a powerful and aggressive wild card. “China could be an impact on the market in 2007 if the mines in the Huludao Region come back online,” Magyar said. There were about 200 molybdenum mines in the country’s Huludao Region. “The central government pulled the mining permits in Huludao because of accidents, environmental and health and safety checks, mostly having to do with coal mines,” Magyar explained. He also pointed out that China’s production “hasn’t fallen off that much even with the Huludao mines offline.” Phelps Dodge, however, doesn’t believe China’s molybdenum production will return to the 2005 levels by next year.

Another Chinese development was the imposition of an export tax. Jack Lifton of Resource Investor reported, “Ferromolybdenum was selling on Halloween for about \$30 per pound. A 10-percent increase in cost adds \$186 per tonne to my costs.” In an emailed response to our query about this, Magyar responded, “As for the export tax, I don’t know what impact that might have yet, it is just too soon to tell. You have



the new export tax, a VAT of 13 percent on toll converting MoX to FeMo in addition to the 10-percent export tax, unless the company currently exists in a Free Trade Zone as of Nov 1, and a temporary lifting of the anti-dumping tax on Chinese FeMo imported into Europe. Too many things happening at once to tell what the impact will be.”

China’s decisions and advances in the uranium market has had rippling effects across the industry. The same is true for molybdenum. “China will also be the major supply source of moly concentrates in the future,” Cook told StockInterview. “As their steel industry matures, they will go from crude steel to more value-added products, which contain moly. The largest percentage growth (for the use of moly in the future) would likely be coming out of China.”

Just as we find in uranium, nuclear energy and the pebble bed modular reactor, China appears to be the global driver for molybdenum and the metal’s impact upon our energy decisions.

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