The eternal temptation of tantalum, Alkane and MDN lead the pack

One hears a lot more about Tantalum than is actually going on in the metal. It seems to be always promising to become a mining sub-space of relevance and yet never get there. This is maybe not too surprising as the words “tantalise” and Tantalum come from the same mythological roots for Tantalus was a Greek mythological figure, most famous for his eternal punishment in Tartarus. He was made to stand in a pool of water beneath a fruit tree with low branches, with the fruit ever eluding his grasp, and the water always receding before he could take a drink.

On the more practical side Tantalum is a chemical element with the symbol Ta and atomic number 73. It is a rare, hard, blue-gray, lustrous transition metal that is highly corrosion-resistant. Tantalum is estimated to make up about 1 to 2 ppm of the Earth’s crust by weight. Tantalum, always together with the chemically similar niobium, occurs in the minerals tantalite, columbite and coltan (a mix of columbite and tantalite).

Applications – A Very High-Tech Metal

Tantalum is part of the refractory metals group, which are widely used as minor components in alloys. The chemical inertness of tantalum makes it a valuable substance for laboratory equipment and a substitute for platinum. Tantalum is also used for medical implants and bone repair. Its main use today is in tantalum capacitors in electronic equipment such as mobile phones, DVD players, video game systems and computers.

One could almost argue that it is like some of the rarer REEs

and Scandium in that further applications are restricted because of supply issues, not by human ingenuity. For this reason the current squeeze on supply by the implementation of anti-Conflict Mineral measures just makes the metal even tougher to source.

As can be seen from the price chart, the metal went for an almighty run and then crashed back to earth.

It is estimated that there are less than 50 years left of tantalum resources, based on extraction at current rates, demonstrating the need for increased recycling.

The intriguing thing about Tantalum is its fluctuating supply. The chart below shows supply over recent decades and it’s been a wild ride. This irregularity of supply also gives a good reason why inventors of applications may be wary of creating some new usage that cannot then be supplied.

Source: USGS

Supply Sources

So we have a swathe of quasi-artisanal sources in Africa and secondary by-product sources make up much of the rest of global supply. Some of this by-product flow comes from the large-scale producers of niobium, CMM (in Brazil) and Niobec (in Canada), with the ore at these mines also yielding a small percentage of tantalum. Tantalum is also produced in Thailand and Malaysia as a by-product of the tin mining there. The slag from the tin smelters then contains economically useful amounts of tantalum, which is leached from the slag.

I always like to highlight the US strategic position in a

given metal and at least according to the USGS, the US position in Tantalum is feeble to non-existent, and yet it is one of the biggest users (1.2mn lbs in 2011). No significant U.S. tantalum mine production has been reported since 1959. US domestic tantalum resources are of low grade, some mineralogically complex, and most are not commercially recoverable. Despite this the strategic stockpiles are reportedly insignificant as well.

Conflict Metals

As can be seen by the pie chart showing sources of current production there is a heavy preponderance towards Africa as a supply source with a very high proportion of production emanating from those hot-spots of the last 20 years, the DRC, Burundi and Rwanda. Mozambique is not respectable but for a long time was riven by civil war and Nigeria has been an on-again, off-again trouble spot currently tormented by the Boko Haram movement. This puts the vast majority of tantalum production in the category of conflict minerals.

It seems that the current definition of Conflict Metals is limited to just tantalum, tin, tungsten and gold. However in our view it could be widened to include all metals that come out of zones where conflict is present and in some ways the trafficking in those metals funds the conflict. Using this as the definition then Antimony, for instance, which comes from the areas of tribal separatists in Upper Burma and is then smuggled across to China, where it makes up a significant part of Chinese dominance in this metal could also be called a conflict metal. Using this criteria it is then a fine line to draw in also the whole area of “exploitation minerals” which in quite a few cases includes artisanal mining where dubious middle-men are involved. If there was a crackdown on exploitation of the artisanal sector globally, then the party most likely to be negatively effected would be the Chinese.

Tantalum Mining Corp. of Canada (Tanco)

It is worth mentioning that the “major” producer of Tantalum in North America at the moment is the Tanco Mine, owned by Tantalum Mining Corp. of Canada (Tanco), a subsidiary of Cabot Corp. This is an underground cesium and tantalum mine on the North West shore of Bernic Lake, Manitoba, Canada. The pegmatite ore body was discovered in the late 1920s and the first mining started in 1929. Several times the mine was closed, reopened and closed, until in 1969 when it was reopened as a tantalum mine. Cabot Corporation bought the mine in 1993, and began the production of cesium brine from pollucite in 1996. The mine has the largest known deposit of pollucite and is also the world’s largest producer of cesium. Cesium is an interesting mineral in itself for its use as a drill-bit lubricant, however, I cannot find anything in the way of statistics on how much Tantalum Cabot actually produces.

MDN Inc. – the Main Play in Canada

This Quebec-based company MDN Inc. (TSXV: MDN), which many refer to as “MDN Mines”, has two specialty metals projects in the province and one gold prospect in Tanzania. Of most interest (and most advanced) is the Crevier Tantalum/Niobium project in Quebec. Interestingly this project is owned 72.5% by MDN and 27.5% by IAMgold. The latter of course owns the massive Niobec, Niobium mine in Quebec that is the largest producer of this metal outside of Brazil.

The Crevier project is located in Crevier Township 50 kilometers north of Girardville, in the Lac Saint-Jean region, Québec and covers 83 contiguous concessions covering a total of 4,645 hectares.

SOQUEM discovered the deposit in 1975 and after completing a number of exploration phases, transferred the property to Cambior in 1986, when SOQUEM’s assets were privatized. IAMgold acquired the property in 2006 with its takeover of Cambior, and Les Minéraux Crevier Inc. became sole owner in

April 2008

The property comprises a nepheline syenite dyke exhibiting pegmatitic texture that stretches more than three kilometers. It hosts a niobium and tantalum mineralization estimated at 25.8 million metric tons of mineralization.

A preliminary economic assessment conducted in 2009 by Met-Chem, an independent engineering firm confirmed the economic viability of the project. The plan considered both open pit and underground but dismissed the latter as a viable option. The resulting engineered pit recovers 25.8 Mt (or 98.3%) of the economic pit resources and increases the waste to ore ratio to 6.4 (10% increase) due to placement of the main ramps. A 25 year mine plan was developed from the pit design based on a production rate of about one million tpa of ore, an external dilution factor of 5% (at zero grade) and a mineable recovery factor of 95% for uncontrollable losses during mining.

At a production rate of 4,000 metric tons per day, the PEA estimated that the project could generate an average annual income of $125 million. Based on an approximate investment of $316 million, gross annual profits are estimated at $57 million, for a net present value before taxes of $272 million at 5%. As with so many specialty metals investments the big challenge is getting over the hump of funding the capex. At this time $316mn is a sizeable chunk.

Australian Names

The interesting thing to note from the USGS writeup on Tantalum (which is one of their thinner offerings) is that the country with the known largest resource of the metal is Australia (listed as having reserves of 62,000 tonnes, though only 29,000 is JORC-compliant) but currently there is no

production out of the country.

The truth is that Australia is an on-again off-again producer. The largest producer, Global Advanced Metals was formerly known as Talison Minerals and owns two mines in Western Australia, Greenbushes in the Southwest and Wodgina in the Pilbara region. Wodgina produces a primary tantalum concentrate which is further upgraded at the Greenbushes operation before being sold to customers. It might be noted that the lithium past of Talison had merged with Salares Lithium and was taken over by the Chinese last year for over $820mn.

The Wodgina mine was reopened in January 2011 after mining at the site was suspended in late-2008 due to the global financial crisis. Less than a year after it reopened, Global Advanced Metals announced that due to again "… softening tantalum demand …", and other factors, tantalum mining operations were to cease at the end of February 2012.

Having said that, there are quite a flock of ASX-wannabes. First amongst them being Alkane Resources Ltd. (ASX: ALK | OTCQX: ANLKY) on which I have written before with their all-things-to-all-men deposit at Dubbo which is Zircon, Rare Earths, Niobium and Tantalum. Globe Metals & Mining (ASX: GBE) has a Niobium/Tantalum deposit in Malawi while Gippsland (ASX: GIP) has its Abu Dabbab Tantalum-Tin-Feldspar deposit is located within the Central Eastern Desert in Egypt. Galaxy Resources (ASX: GXY) the troubled lithium producer in Western Australia has a Tantalum resource at its Mt Cattlin mine and was, back in 2011, delivering Tantalum under its five-year sales agreement with Global Advanced Metals. However it is not clear with Mt Cattlin's problems whether this flow has been interrupted or not.

Commerce Resources – Chasing Other Metals

In its attempt to be all things to all people Commerce has lost the initial interest we had in its Blue River Tantalum project. With the onset of the rare Earth boomlet it put Tantalum on the backburner and pushed its Ashram Rare Earth prospect instead. Frankly you will need to waste a long time before you see me don a loincloth and murmur a mantra in an ashram..

The most promising aspect of the Blue River Tantalum Niobium prospect is known as Upper Fir. A PEA study by AMEC published back in 2011 estimated a positive cash flow for a potential 7,500 tpd underground operation at the Upper Fir, with cash costs of CAD$24.91 per kilogram of tantalum metal (net of niobium metal credits) in a technical grade oxide product.

AMEC's economic evaluation was based on the September 29, 2011 mineral resource base of 36.4 million tonnes of Indicated mineral resource containing 195 ppm (gpt) Ta_2O_5 and 1,700 ppm (gpt) Nb_2O_5 plus 6.4 million tonnes of Inferred mineral resource containing 199 ppm (gpt) Ta_2O_5 and 1890 ppm (gpt) Nb_2O_5.

However with an NPV of a mere $18.5mn at a 8% discount rate on a whopping $379mn CapEx bill, we can see why Commerce were easily distracted by the beads and mirrors of the Ashram!

Conclusion

So Tantalum is tantalizingly scarce both as a metal and as an investable option. While investors have a choice of number of companies with deposits, those with production are a distinctly rare commodity. Alkane and MDN look like the most likely producers, unless Galaxy stages a Lazarus-like revival from the dead.

MDN developing two of the world's most critical metals: niobium and tantalum

On June 18, MDN-Mines ('MDN', TSX: MDN) announced that it will soon launch a niobium and tantalum exploration program at its 100% owned Samaqua property, in the Saguenay-Lac-Saint-Jean area of Quebec – close to Niobec's Crevier project. The initial geophysical survey and drilling program (1,500 meters) aims to confirm the presence of niobium and tantalum mineralization. The evidence certainly suggests it. The property has shown a magnetic geophysical signature similar to that associated with Iamgold's Niobec's niobium rich carbonatite deposit.

Niobium (Nb) is mainly used in steel alloys to create high strength low alloy steels (called "High Strength Low Alloy Steels"), stainless steel and heat resistant steels. Niobium's properties have generated considerable demand from advanced industrial sectors because it helps increase steel's resistance to high temperatures, corrosion while raising superconductivity. Niobium has, therefore, become essential in the automotive industry, heavy engineering and infrastructure (i.e. bridge construction and earthquake resistant buildings), the petrochemical industry, power plants and oil & gas pipelines. A smaller percentage of high grade niobium is used exclusively to make superalloys used for the manufacture of aircraft engines.

The highest niobium grades (over 99% purity) are used in optical and electronic devices. However, niobium is going to be growing in demand, because it allows for weight reduction, which in automotive and transportation 'language', translates to higher energy efficiency. There are only three major niobium producers worldwide. CBMM in Brazil owns the world's

largest niobium deposit and its Araxa mines supplies some 83% of niobium consumed around the world. Anglo American (UK) also extracts niobium in Brazil but no more than 3% of the world's total, while IAMGOLD in Canada, thanks to its Niobec mine, is the second largest producer of niobium in the world, accounting for 9% of global supply. There is a potentially rich source of niobium in Tanzania as well. Clearly, Brazil enjoys an overly dominant – one might say hegemonic – position over niobium. Given that the European Union and the United States consider niobium to be a critical metal, they are both interested in reducing reliance on Brazil and identifying new sources closer to home. The limited supply and number of plays – and the long supply routes – simply adds too much pressure on prices while CBMM is the only niobium producer that is able to deliver all the varieties, including the highest grades. Therefore, MDN's new niobium venture will be welcomed by the market.

The market for tantalum is equally critical but more complex. MDN and Iamgold have already been working on a tantalum resource at the Crevier project (MDN owns 72.5% of it). Tantalum is crucial in the manufacture of electronic capacitors used in mobile phones, digital tablets, green technology (wind turbines, solar panels, batteries for electric vehicles). Less than 1,000 tons of tantalum is produced each year – worldwide. Tantalum, like so many other critical metals has largely been produced in China. In order to reduce reliance on Chinese tantalum, western countries have developed tantalum resources in Africa. The Democratic Republic of Congo has been one of the leading global tantalum producers; however, tantalum extraction in Africa involves coltan, a so called 'conflict mineral, which has gained more fame for its geo-political risk rather than its industrial applications. Western companies must now prove that the tantalum meets certain standards of extraction, particularly human rights standards. Any company that uses potential conflict minerals to must disclose its supply chain in order

to reduce the amount of coltan mines (and tungsten) operated by rebel militias in the Congo. Meanwhile, in 2013, the Geological Society of South Africa claimed that tantalum would be ever more difficult to find. As in the case of niobium, he European Union and the US Department of Defense have classified tantalum at the top of their list of critical metals. By developing a tantalum resource in Canada, in the mining friendly district of Quebec, MDN Mines will control a very high demand mineral, whose demand is increasing and whose global competition has been hampered by geopolitical risk.