

The emergence of Rhenium as a precious metal

By Anthony Lipmann – Managing Director of Lipmann Walton & Co LTD

Rhenium's inexorable rise towards precious metal status began long before the events of last year – namely, the blockage of exports from Kazakhstan, the world's second largest producer. The problem is the alleged struggle between Kazakhmys (the Kazakh copper producer from whose mines Rhenium is generated as by-product) and the Rare Earth plant 'Zheskazganredmet' who precipitates the Rhenium. The stalemate between these two entities left Europeans scrambling for available spot lots, moving prices up from circa \$900 per kg Re a year ago to \$2000 per kg Re [\$62 per toz Re] for catalyst grade Ammonium Perrhenate today and as much as \$2200 per kg for Rhenium pellets.



At the heart of things is a metal whose two main uses are both in the energy field - as an ingredient in bi-metallic reforming catalysts and as an un-substitutable element in complex alloys for single crystal turbine blades in aero-engines. It is a metal whose supply is generated entirely as by-product.

So what is the low-down on Rhenium?

Only 4 ppb (parts per billion) in the earth's crust, Rhenium is generated by just three main companies & countries – Molymet in Chile [c20 mtpy], Phelps Dodge U.S.A [c6-7 mtpy] and Zheskazgan in Kazakhstan [c8.5 mtpy]. Small amounts – perhaps no more than 2 mt are generated elsewhere in Uzbekistan, Poland, Russia & China, while no more than 4 mt of Re contained is recovered from scrap. It is a small market; larger than Ruthenium (c22mtpy) with whom Rhenium will be allied in new generation complex superalloys, but smaller than Palladium [c230tpy], the platinum-group metal whose development from the 1970s, Rhenium's economic path most closely resembles.

The problem for Rhenium is that because it is only generated as by-product (mainly via its extraction from the flue-dusts of molybdenum roasters) and, in Kazakhstan, via the leaching of copper with acid, the main producers have other more pressing concerns. Molymet has c40,000 tpy Molybdenum to worry about, Phelps Dodge & Zheskazgan c1 mln tpy & c425,000 tpy copper respectively to consider. Rhenium for them, until recently, was not a prime business. The amount of ore that needs to be milled or dusts to be cleaned to obtain a few kilos of Rhenium means that today's economics are still not incentive enough for new entrants to go into the Rhenium business.

Meanwhile, the world values clean energy and has found that bi-metallic reforming catalysts (since the early 1970s) are best at producing low sulfur fuels and that Rhenium in single crystal

turbine blades at the heart of a jet engine (since the 1980s) allows fuel to be burnt at temperatures (c 1300° C) that reduce emissions to the upper atmosphere.

Rhenium has crept up to become a key 21st century metal – one that is used to maximize energy efficiency and one that promotes cleaner emissions. Like palladium, following the introduction of catalytic converters in automobiles in the 1970's, Rhenium is only now emerging into its precious future. It is noteworthy that Palladium in the 1970s was below the price of Rhenium today and it is hard to imagine that palladium was once too much trouble to recover. The spur to the recycling and recovery of Palladium was price – the same will be true of Rhenium. At around USD 900 per kg Re (\$28 per toz) between 2001-2004 there was not sufficient incentive and it is for this reason that it seems likely that a stable price of at least USD 100 per toz (\$3215 per kg) will be needed to produce the necessary incentives for greater Rhenium recycling.

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