

[2007-9-27] **New Rhenium supply from Poland comes on stream but will it close world deficit?**

[Glogow, Poland. 27.9.07] Anthony Lipmann attends the official opening of KGHM ECOREN's new Hydrometallurgical Plant for the recovery of Rhenium.

I am here in Poland to see the opening of the new KGHM Hydrometallurgical Plant which will recover Rhenium. It is a significant moment for the Polish metals industry and also a moment of personal significance. In 1988, I bought my first 10 kgs of Rhenium contained in Ammonium Perrhenate (APR) from the Polish state foreign trading company, Impexmetal. The total cost was about \$10,000. Today, the same 10 kgs would be worth \$100,000.

Behind KGHM's interest in Rhenium extraction is their growing awareness of the importance of Rhenium for today's modern aerospace industry as well as their own need to maximise by-products contained in waste and the potential revenue this will earn.

KGHM is Europe's largest copper producer and 7th largest in the world at 400,000 tpy. They are also the world's third largest silver producer. By 2009 they could be the world's 3rd largest Rhenium producer if their ambition to reach production of 5 mt Rhenium (including 1 mt of Rhenium in metal pellet form is realised). Currently producing 3.5 mtpy APR [about 2 mtpy of Rhenium content], they have every chance of reaching this goal and the potential beyond is even greater.

In KGHM Ecoren's favour, is the fact that it is a truly integrated Rhenium producer, where ownership of the units of Rhenium are KGHM's right from the locally mined shale deposit ore, through to the smelter and now the new state of the art Hydrometallurgical unit. In 2008 recovery is expected to reach 4.5 mtpy APR [about 3 mt Rhenium], worth about \$30 mln at current market prices.

World production of primary Rhenium largely relies on just four producers and is estimated to be no more than 40-44 mt depending upon how much material Kazakhstan is currently producing. The figures are Molymet, Chile (24.5 mt), Phelps Dodge, USA (7 mt), Kazakhmys-Dhezkasghanredmet, Kazakhstan (8.5 mt per year or now thought to be lower at 4.5 mtpy based on reported lower Rhenium contents in their copper ore.) Merchant stocks could amount to about 5 mt but neither the U.S. or Russian stockpile contains any Rhenium.

At the opening ceremony, Mariusz Bober, Chairman of the Board of KGHM ECOREN, said, 'None of us would have believed 50 years ago that our copper works would be a leading producer of Rhenium – or that 1 kgs of Rhenium would be worth the same as 1 mt of copper.'

Poland's Rhenium production has wider significance too. It marks a move away from heavy industry and an appreciation of the proliferation minor metals applications as a whole. While copper is as important as ever to both KGHM and the Polish economy, the company now recognises the significance of all its by-products. Capturing by-products will also reduce pollution. In the case of Rhenium, Sulphur is prevented from blowing into the atmosphere by wet scrubbing flue dusts and the Rhenium passes into a sulphuric acid solution which is the starting point for extraction. Resins are used to adsorb the Rhenium from the acid and this is ultimately precipitated into Ammonium Perrhenate.

In this regard there were two major announcements. The first was Poland's official opening of *KGHM-Ecoren's* new Rhenium recovery circuit at their Lubin copper works. Rhenium, KGHM was saying, was now at the core of their business and would continue to be so. They would produce 2 mtpy in 2007 (4% of total world supply) recovered from flue dusts, aiming to reach 5 mt (or 10% of current supply) by 2010.

KGHM EcoRen has ambitious plans, and does not intend to produce only a basic grade of APR but seeks to produce high grade, pure white crystals suitable for the petroleum catalyst industry. Within two years they wish to be producers of Rhenium metal pellets Re 99.9% suitable for super alloy melting in complex nickel base alloys. Their plant is dedicated, ultra-clean and state of the art and, with the commitment from the board, they should have no problem achieving their ambitions. In the medium to long term production could even rise further when their second smelter Glogow 1 converts to same technology as Glogow 2.

Aero-engine makers, including Rolls-Royce Plc who were present at the opening, are watching developments here closely, only too aware that many of the claims made for the fuel efficiency of new aero-engines, are not achievable without Rhenium. Worldwide, it still remains a frustration to users that Rhenium in scrap complex nickel alloy is often lost when it ends up in the stainless industry where prices have been high over the last two years.

Kazakhstan's internal disputes over who owns Rhenium production have not assisted. And Molymet has yet to open their much mooted new 30 mln lb per year Molybdenum roaster. If brought on stream at full capacity this could over time increase Molymet's production from 25 to 31 mtpy. But this itself depends on a consistent feed of locally generated Rhenium-bearing Molybdenum Sulphide concentrates.

If both Poland's increase in production and Molymet's were available to the market, supply could increase from today's 44 mtpy to 53 mtpy. But with the top three consumers, GE, Pratt & Whitney & PCC-Cannon Muskegon alone needing an estimated 45 mtpy Rhenium, more developments like these in Poland & Chile will be needed.

It is difficult to know where such supply could come from but at least with prices steady, and likely to remain so for the foreseeable future, there is more than enough incentive for the industry to focus on the problem. Certainly, Iran, with its major untapped wealth of Rhenium in its ore remains a most important potential resource which, despite politics, should be seriously examined.

Only with the materials science that allows aero-engines to burn fuel at higher temperatures – which includes the Rhenium in the turbine blades – can the world succeed in trying to reduce emissions in the upper atmosphere. For this the search for Rhenium has become critical.

As one of the KGHM directors said in his speech 'This is a metal for the cosmos'. The lament of aero-engine makers is that, if only the cosmos had a bit more in the first place, there might be a bit more for them to use.