Texas Rare Earth Resources targets lower than $100 Million CAPEX at Round Top Heavy Rare Earths project

Texas Rare Earth Resources Corp. (‘TRER’, OTCQX: TRER) has updated its operational strategy earlier this week in order to reduce operational costs, potentially lowering the initial CAPEX for the Round Top heavy rare earth project to USD$ 60-90 Million. The improved project economics rely on shifting the focus on the production of “a selected group of separated REE products in the range of 350-450 tonnes/year,” based on a mining rate of 2,500-3,500 tons of ore/day. The remaining rare earth elements that will not be separated immediately, according to the scalability based strategy, would be stored on site as a mixed REE product for future separation, based on demand. The idea is to allow the market to absorb the lower initial production rate and to establish TRER as a credible and alternative supplier to critical US industry sectors such as defense where reliable supply chains are essential.

TRER has targeted CAPEX costs ever since the publication of the Preliminary Economic Assessment (PEA) for Round Top. In late 2013, the Company announced that it revised CAPEX from $2.1 billion to under $300 million for its NI 43-101-compliant resource with a net present value (NPV) of over $1 billion and a speculative mine life for Texas Rare Earths is 100-plus years for the sole Round Top Mountain (TRER’s flagship project in Hudspeth, Texas; TRER also has three other mountains, which have not yet been fully developed). One of the reasons for the low CAPEX, apart from production scalability strategies, is that the host rock at Round Top is yttrofluorite, which yields yttrium and high rare earths content. TRER may be the only known deposit in based on yttrofluorite host rock. This has processing advantages, because TRER will be able to use sulfuric acid to heap leach the deposit. Heap leaching is among the lowest cost processing methods available and they have been used widely in China for processing its famous clay deposits. Not all deposits are amenable to heap leaching, but the fineness and evenness of the materials in the Round Top deposit lend themselves to this method.

TRER’s resource is consists largely of what is now referred to as “critical” rare earths such as dysprosium and holmium along with related critical elements such as yttrium (which is not technically a rare earth). While dysprosium and neodymium have received much market attention lately due to their magnetic properties, holmium is one of the more interesting rare elements. TRER has the largest deposit potential resource for holmium in the US and probably the world. Holmium is an interesting element; it is used to generate the most intense artificial magnetic fields and thanks to its ability to absorb neutrons produced by nuclear fission, is also used to make control rods for nuclear reactors. Holmium is also needed to make microwave lasers, which have found important applications in medicine. Holmium lasers are used as an endoscopic technique to remove prostatic adenomas, avoiding any skin incisions. Holmium is also being investigated as a material to build magnetic databases for quantum computers. Certainly, the US federal government has an interest in what TRER is doing.

TRER also presents non-mineral advantages, the main one of which is that the resource is located in Texas. Texas legislation is mining friendly and because the State makes money only if the mine reaches production stage, it has a stake in seeing projects through to completion. TRER’s deposit is based exclusively on non-federal property, which means it is not subject to Bureau of Land Management (BLM) or Forest Service management. TRER’s lower projected CAPEX render it one of the contenders to become a major US domestic rare earths supplier. It has a world class deposit (including beryllium and a 70% heavy rare earth concentration) with outstanding infrastructure. TRER’s deposit presents a clear mineralogical pattern which lends itself to heap leaching. As a result, TRER is working on a special metallurgical process to deliver looking for a strategic partner in its next phase of development. TRER’s focus on lowering CAPEX aims at maximizing profitability, boosted by the fact that it can offer products based on at least 25 elements, 15 of which rare earths along with thorium and uranium. TRER can also capitalize on its beryllium (298,000 ton historical resource estimate) and niobium resources.

Holmium: Key element In the future of warfare?

A key component of any analysis of critical and strategic metals is assessing the non-commercial uses of rare metals in defense weapons platforms. These specialized uses – often gleaned by inference due to the sensitive nature of the systems involved – are an important factor in global demand, even if the overall volume is small.

Case-in-point: At the Sunday morning session of this year's TMS 2013 Conference in Toronto, Byron King's shotgun start to the day's session grabbed the audience as he detailed DEW research – Directed-Energy Weapons – and the metals that make it possible. The sector is an acronym-soup of EMP (Electro-Magnetic Pulse), HEL (High-Energy Lasers), the aptly-named PEP (Pulsed Energy Projectile) and Electro-lasers, a kind of synthetic lightning. Then there's DEWs' close cousin, the Rail Gun, under development at the U.S. Navy's Sea Systems Command. At the time, King warned attendees that if he told us more, "he'd have to kill us." We assumed he was kidding.

There is no question that Rare Earths are critical to DEWs, to be sure. But which Rares, in which amounts and in what systems

– that’s a question where open-source sleuthing can only provide tantalizing clues.

Take Holmium (REEHandbook), for instance, No. 67 on the periodic table, a Heavy REE in the Lanthanide family. Holmium wins the Elemental Olympics, with “the strongest magnetic force of any element,” according to the Royal Society of Chemistry.

One published use for the metal in the national security sphere is its role in nuclear control rods, where it absorbs stray neutrons thrown off in the nuclear fission process. Closer to home, Holmium is used in microwave technologies in advanced medical and dental lasers.

In the defense domain, Holmium figures in laser range finders, and target designators. Now, we’re getting *warm* – quite literally.

And we’re getting into the Black Budget world as well, where, for understandable reasons, public source defense sector documents aren’t about to placard critical metal applications.

Even so, a few interesting hints are visible. Take this glimpse, from a report on U.S. Army Applied Research’s 2012 plans: “FY 2012 Plans: Investigate scalability and efficiency potential of resonantly-pumped, eye-safe, lasers in a 2-2.1 micrometer atmospherically transparent spectral domain based on Holmium (Ho)-doped crystals and ceramics.”

With such compelling applications and unusual properties, what’s holding Holmium back?

Supply, for one: Industry estimates peg global annual supply at around 10 tons (that’s equal to the weight of about four Land Rover SUVs). Compare that to annual Cerium production of about 24,000 tons. At a price of $1,000/kg, the market makes it clear that Holmium is hard to come by.

If you're outside of China, that is. One of the leading Holium laser centers is the South China Normal University – not so surprising, since most of the world's Holmium at present is mined in South China, at the ionic clay operations that often include gray market, non-sanctioned affairs. According to Chinese national government edicts, the PRC is now focused on closing down China's rogue REE mines, a move tied to their uncontrolled environmental impacts. Whether the Chinese government is closing down these operations, or consolidating them under tighter controls from Beijing central, is something the ROW – Rest of World – won't know with certainty.

However much Holmium is being produced in China, the right amounts of it are likely reaching researchers working on what the Chinese call "new concept weapons." A seminal research report by futurist Mark Stokes, now more than a decade old, relied on Chinese sources to project that: "…an estimated 10,000 people, including approximately 3,000 engineers, in 300 organizations are involved in China's laser program. Almost 40 percent of China's laser R&D is for military purposes."

China, of course, built nearly two dozen ZM-87 Portable Laser Disturbers – "primarily intended to blind humans" – until the advent of the 1995 United Nations Protocol on Blinding Laser Weapons. Periodic reports point to advanced lasers used by China in tank-mounted applications, and in the still-disputed blinding of a U.S. surveillance satellite. Do Holmium-doped lasers play a part in these systems? That's an open question. But in U.S. and allied defense R&D labs, inquiring minds want to know.

Search the Web, and many metals sites will state that, today, there are "no commercial uses for Holmium." Niche usage is nice, but breakout applications – industrial, technological or military – will be hampered by lack of supply.

As for Holmium produced outside of China, it's a safe bet that, Field-of-Dreams style, if you mine it, they will come. And at least some of the motivated buyers will have interests in the Directed-Energy Weapons research that defense technologists predict will define the future of warfare.