Samples show that US Rare Earths has potential for high-value Europium rich critical rare earths

The term “Europe” has its roots in ancient Greece and it referred to the land west of Athens or the ‘West’. It is ironic that these days, Greece is once again considering dropping the ‘Euro’ currency. As it happens, that very same Greek word has lent its name to europium (Eu), one of the most reactive among the rare earth elements. It oxidizes rapidly when exposed to ‘air and reacts in a manner similar to calcium in the presence of water. Like other rare earths (REE) it spontaneously explodes in air at temperatures between 150 and 180 degrees Celsius. It is rather soft and, like lead, quite ductile. But above all, has fluorescent characteristics that make it suitable, along with all its other properties, to have been used to make the very watermark of Euro banknotes – and speaking of banknotes, europium prices have been less volatile than those of other, even critical rare earths. Of course, europium has other sophisticated industrial applications: it is used to enhance glassy materials for the manufacturing of lasers by which it is added to a semiconductor in order to modify the electronic properties of the material and increase the capacity of electric conductivity.The US and the European Union have classified Eu as a critical material and there is great concern for potential shortages because of its widespread, and growing, use by the lighting and display systems side of the electronics industry.

U.S. Rare Earths, Inc. (‘USRE’, OTCBB: UREED), a US based rare earths exploration company, will focus its efforts on developing a europium-rich rare earth deposit based on ‘dark monazite’. Europium represents a major aspect of USRE’s

value. Europium is used in the phosphors (light emitting materials that gives color TV its red hue; they are also used in fluorescent bulbs, lamps, TV and computer monitors and has also been used to mark the 'trim' of Euro denominated bills in Europe. One of the growth areas will be in commercial lighting applications from developing countries and, in fact, the price of europium is high compared to other REE. USRE has already received permit to start mining and producing rare earths at its 'Last Chance' Project in the Lemhi Pass region of Idaho and Montana. USRE announced that it has received approval to re-open historic adits (tunnels extending underground more than 400 meters, which present proven mineralized veins of critical rare earths), allowing the Company to move almost directly into the processing phase and speed up the production process. The horizontal adits, tunnels, lead underground and giving access to subsurface mineral deposits, intersecting the Last Chance Vein.

The historical record shows that these have known and high rare earth mineralization occurrences. USRE should be able to start production by late 2017 and thanks to its ability to 'skip' the mining phase, it will save some USD$ 6 million in CAPEX. Therefore, USRE has the potential to be the first company to proceed with rare earth underground exploration and sampling in the continental United States and at a much lower cost than expected. USRE has already sampled two short tons of material from the stockpile at the Last Chance Mine project, sampling it for advancing metallurgical test work as conducted by Hazen Research. The findings suggest that the main high-value rare earth minerals are dark-monazite and xenotime, enriched in Europium while also featuring aluminum, iron, titanium, calcium and magnesium. One of the unique feature of the samples is that assays have shown a remarkable europium content (5.25% of total rare earths). Moreover, early liberation and magnetic separation tests indicate that the cost of grinding (comminution) the mineral will be lower than expected because less than 0.1% of total rare earths plus

Yttrium feature fractions larger than +14 mesh, altogether allowing for the possibility of skipping the grinding to fractions less than 14 mesh for beneficiation. This will enable further production cost cuts.

USRE's stockpile was first extracted by Idaho Energy and Resources Co. (IERCO) as part of rare earths exploration and its published data suggests that the stockpile presents a high percentage of heavy and critical rare earth elements. Rare earths and other minerals are essential to the American defense industry and their supply, most of which comes from China, is wrought with uncertainties die to opaque political regulations and an ongoing reform of the mining industry system. The Armed Services Committee of the House of Representatives has warned of the risks of rare earth shortages and how China has the power to place an embargo on exports of key rare earth elements, causing a paralysis for the military industrial sector. Possible sources include India and Australia; however, it can now consider the United States as well, given USRE's accelerated development.

Wind turbines, electric vehicles or lasers are unthinkable without these high-tech materials but europium has become even more important for the defense sector, given its use in lasers. The US Navy's new laser cannon (known as Laser Weapon System or LaWS) might sound like something out of a 'Star Wars' movie but it was actually tested, by humans, last December in the waters of the Persian Gulf aboard the USS Ponce. The results were so encouraging that the commander is now authorized to use it, should his ship face a possible threat. Laser weapons are powerful, economical and will have a vital role in the future of naval combat operations; they also need europium. The US Navy hopes to deploy a number of different types of LaWS on its fleet by 2020. A reliable europium supply is necessary given that LaWS could lead a whole revolution on how the armed forces will operate. Japan, fearing economic and defense supply problems, has already

decided to secure a minimum of 60% of its rare earths supply from countries other than China within the next four years.

Rare earths recycling has been proposed as an alternative to Chinese dependence and new REE mining, regaining the coveted metals from scrap. However, this is not practicable as there are still many obstacles to overcome in order to address growing world demand. For countries such as Europe and the US, this could be a huge advantage, but despite all the research done to date, less than one percent of all rare earths come from recycling. The recycling of rare earths is in its infancy and the technological challenge it faces is even greater than that encountered to extract and process rare metals. In order to re-absorb highly engineered products such as mobile phones require much work and additional chemical steps to be able to isolate the rare earths, obviously with increased costs. In addition, almost every rare-earth element needs a different recycling technology; separating terbium from a light bulb is not the same thing as recovering neodymium from a hard drive and europium cannot yet be recycled.