Canada’s entry point to a domestic North American rare earths products production center

written by Jack Lifton | August 31, 2021

Why is Appia Energy Corp.‘s (CSE: API | OTCQB: APAAF) Alces Lake discovery of an accessible extensive hard rock deposit of the rare earth bearing mineral, monazite, so very important to the non-Chinese world’s demand for magnet rare earths? It is because Appia’s monazite is, in fact, the neodymium rich variant, which is the most desirable for the production of rare earth permanent magnets. it is not only rich in neodymium (Nd) and praseodymium (Pr), but also contains 1% of xenotime, the best heavy rare earth bearing hard rock mineral.

Monazites are typically up to 50% higher in contained Nd and Pr than bastnaesite, the ore mined at Mountain Pass by MP Materials Corp. (NYSE: MP) and the residual mineral from China’s Baotou region iron mining, which up until recently was the world’s most-produced source mineral for light rare earths. Lynas Rare Earths Limited (ASX: LYC) is currently the world’s largest producer of rare earths derived from monazite deposits at Mt. Weld in a remote area of northern Australia.

Monazites are produced today as a byproduct of the processing of heavy mineral sands to recover zircon and ilmenite, respectively the ores of zirconium and titanium. Until recently processing monazite for rare earths was inhibited by the fact that monazites always contain radioactive thorium and sometimes uranium. The monazites were thus returned to the tailings from these operations and in the USA the environmental regulations

required that they be returned to the worked-out deposits and distributed so that the residual background radiation was equal to or less than it was before the deposit was worked.

In the last five years as Chinese bastnaesite deposit grades have declined and mining created pollution has become a big problem in China the Chinese rare earth industry has begun to import very large quantities of monazites from the USA, Madagascar, South Africa, Brazil, and Australia. All of this material was produced as a byproduct of heavy mineral sands processing for zircon and ilmenite.

In order to solve the thorium/uranium problem, China requires that all imports of monazite go first to China Nuclear Corporation, which removes the thorium and uranium, and then ships a clean mixed rare earth carbonate to the Chinese refiner that ordered the material. China nuclear is licensed to process up to 50,000 tons of monazite containing up to 30,000 tons of total rare earths a year.

In the USA the only licensed uranium mill, Energy Fuels Inc.'s (NYSE American: UUUU | TSX: EFR) White Mesa Utah facility, has replaced China as the destination for monazite produced from its heavy mineral sands operations in Georgia by US Chemical Group, Chemours. Energy Fuels removes the uranium, which is a payable for Energy Fuels, and is storing, legally, the thorium, which has been committed to a medical radioisotope group. The first clean mixed rare earth carbonate produced by Energy Fuels from the Chemours' monazite has already been sold to and shipped to Neo Performance Materials Inc.'s (TSX: NEO) European solvent extraction rare earth separation facility.

Appia is working with Canada's and the world's most attractive (Report's the Fraser Institute) mining investment jurisdiction, the Province of Saskatchewan. The Province's Saskatchewan

(Mining and Refining) Research Center, the SRC, has agreed to develop a hydrometallurgy for Appia’s monazite and the SRC has already designed and begun the construction of a 3000 ton per annum rare earth solvent extraction separation facility, where the separation and purification of Appia’s monazite will be proven and piloted in what will be Canada’s anchor for a total rare earth permanent magnet supply chain. Saskatchewan is the home of Canada’s uranium mining industry and so the sale of any recovered uranium and the storage (or use) of any recovered thorium is not a problem.

North America is well on its way to becoming a world center of monazite processing, and Appia is Canada’s entry point to a domestic North American rare earth products production center.