

The Chinese Rare Earths Monopoly Saga Continues

written by Jack Lifton | September 12, 2023

The blather in the media suggesting that China could or already be weaponizing the export of their “rare earths” to the rest of the world is so one-sided that it must make the Chinese wonder if non-Chinese “analysts” and “experts” ever bother to see the world from the perspective of “others.” For more than a decade China has been aggressively acquiring outright or buying the output of non-Chinese rare earth sources. At this point in time, China is the overwhelming buyer, worldwide, for example of the mineral monazite, which is produced primarily as a byproduct of the processing of heavy mineral sands, which are the source of zircon and ilmenite, source minerals for, respectively, zirconium and titanium.

Iluka Resources is building Australia's first fully integrated rare earths refinery

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Iluka Resources Limited (ASX: ILU) (“Iluka”) is an Australian critical metals producer, specializing in mineral sand mining and processing. Iluka is the world's largest producer of zircon,

a major producer of high grade titanium feedstocks rutile and synthetic rutile, and is set to become a significant global supplier of refined rare earths from 2025.

Christopher Ecclestone on the “eye-popping collection of metals” in Auxico Resources’ portfolio of monazite rich deposits

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In this InvestorIntel interview, host Tracy Weslosky interviews [Hallgarten & Company](#)’s Principal and Mining Strategist Christopher Ecclestone about his recent [Initiation Research Report](#) on [Auxico Resources Canada Inc.](#) (CSE: AUAG) that he published on November 9, 2022. Titled **Amassing Critical Mass in Strategic Metals** Christopher stresses how Auxico has emerged as “a real player in the monazite market”.

Over the course of this interview, Christopher comments on some of the positive highlights contained in this research report, which includes the following examples:

- + Auxico Resources is morphing from a rank-and-file explorer into a specialty metals trader and developer diversified across metals and continents
- + Through an accord with an unlisted sister corporation

(Central America Nickel), the company has access to Rare Earth Elements (REE) and other critical metals for sale into global markets

- + Rare Earth prices have held firm at levels substantially above the average levels of the last ten years

He then goes on to provide an update on Auxico's portfolio of monazite rich deposits that include an "eye-popping collection of metals" such as rare earths, titanium, hafnium and zircon.

To access the full InvestorIntel interview, [click here](#)

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About Auxico Resources Canada Inc.

Auxico Resources Canada Inc. ("Auxico") is a Canadian company that was founded in 2014 and based in Montreal, trading on the Canadian Stock Exchange (CSE) under symbol AUAG. Auxico is engaged in the acquisition, exploration and development of mineral properties in Colombia, Brazil, Mexico, Bolivia and the Democratic Republic of the Congo.

To learn more about Auxico Resources Canada Inc., [click here](#)

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If you have any questions surrounding the content of this interview, please contact us at +1 416 792 8228 and/or email us direct at info@investorintel.com.

Iluka Resources looks to join

exclusive club of rare earths producers

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[Iluka Resources Limited](#), (ASX: ILU) an Australian mineral sands company, is poised to add rare earth elements to its portfolio of products. The company's main products are zircon, titanium, plus iron and carbon materials from its processing plants in Australia. It also has recently announced the de-merger of its Sierra Leone company, Sierra Rutile Holdings Limited, to end up with two ASX listed companies.

The plan announced by Iluka is to start concentrating monazite and xenotime in the second half of this year from its mineral sands operation in Western Australia. Cracking and leaching will begin next year followed by separation to produce rare earth oxides in 2024 at Eneabba, Western Australia, which is a 3 hour's drive north of Perth. According to public company information, the planned output is 17,500 tons per year of Total Rare Earth Oxides (TREO). They note the plant will have a full capacity of 23,000 TPY of TREO with all circuits fully utilized. It is reasonable to assume that they are looking for additional monazite to fill their plant as the capacity is more than they can produce themselves.

Based on the feed rate of 17,500 TPY TREO Iluka expects to produce 4,000 TPY of Nd/Pr plus 500 TPY of Dy/Tb. Typically, Dy:Tb ratio varies from 2:1 to 5:1. At today's pricing of \$135/kg USD for Nd/Pr oxide, Dy oxide at \$362/kg USD, and Tb407 at \$2.056/kg USD, Iluka's annual revenue could be in the range of US\$1 billion.

The projected capital costs are AU\$170-200 million for the cracking and leaching, and AU\$320-390 million for the separation

and finishing. Additional costs include plant and infrastructure AU\$110-140 million plus indirect costs, contingency, commissioning and miscellaneous costs of AU\$400-470 million for a total of AU\$1-1.2 billion. [According to the company](#), there will be support from the Australian government in the form of a loan from the government's Critical Minerals Facility fund and a risk-sharing agreement that would include non-recourse debt, royalty payments to Iluka, and flexibility in repayment schedules. This is what is necessary to get these projects off the ground – government support and vision to see that risk sharing is very important.

Raising this amount of capital in the markets today is a challenge and also very dilutive as their current market cap is AU\$3.8 billion. An advantage Iluka has over many other planned entrants into the rare earth space is their existing cash flow from current operations, as it will take time to generate revenues from this operation after construction begins this year and until the first output is expected to be seen in 2025.



Source: Iluka Company presentation, April 4, 2022

Based on using their existing stockpile at Eneabba, Iluka could produce 12,400 TPY TREO with an operating cost of AU\$13/kg or about US\$10/kg which is competitive with Chinese costs. I am assuming they put no value on the feed material as it is in a stockpile. They have not included any transfer costs from other sources in their expanded production estimates with other sources of feed. The stockpile feed would produce 2,700 TPY of Nd/Pr or about half of the capacity of 5,500 TPY of Nd/Pr. This stockpile would be exhausted in 9 years, so they are actively looking for other sources to fill the plant.

One question that is not clear is whether they will take a

Molycorp plant design approach or the Lynas approach. Molycorp originally designed a single train 20,000 TPY TREO capacity. Lynas built four 5,500 TPY TREO trains so that if supply or demand changed, or there was a problem in one train, they did not lose all their production. This came to light over the COVID era when demand dropped. This is a major consideration of any new plant design as economies of scale are limited or offset by potential operational problems.

Overall this may well be one of the players to cross the finish line in the race for more production of rare earths outside China.

In-house production key to making Energy Fuels the world's lowest cost producer of rare earth metals

written by Jack Lifton | September 12, 2023

Energy Fuels takes giant step towards complete, in-house, vertical integration in the production of rare earth permanent magnet alloys

[Energy Fuels Inc.](#) (NYSE American: UUUU | TSX: EFR) has just this week [announced](#) that it will buy, subject to due diligence, a

huge Brazilian deposit of heavy mineral sands, which it will mine to produce a concentrated mineral mix that will contain zircon, ilmenite (titanium), and monazite. This concentrate is expected to be sold to partner companies, which will extract the zircon and ilmenite as payables, and the residual monazite, a waste product in zircon/ilmenite processing, will be conveyed at a nominal cost (as part of the arrangement to supply the heavy mineral sands to partners) to Energy Fuels' White Mesa, Utah, where the monazite will be cracked and leached to extract a clean rare earth content as a mixed carbonate and to extract and sell or legally dispose of its uranium and thorium content.

Energy Fuels is already buying, and processing monazite produced in the above way from the zircon/ilmenite operations of Chemours in Georgia, but the Brazilian purchase will allow Energy Fuels to diversify and lower its cost of monazite concentrates.

The in-house production of monazite rich heavy mineral sands by Energy Fuels will be the foundation of its program for the vertically integrated (in-house) production of rare earth metals and alloys from (in-house) separated and purified individual and blended rare earth salts.

Energy Fuels operates the only operating uranium processing "mill" in the United States and the only facility in the United States in the U.S. capable of processing monazite for the recovery of uranium for sale to nuclear power plants, and the recovery or legal disposal of the thorium and other radionuclides associated with monazite.

The company has already begun processing purchased monazite into a mixed rare earth carbonate, and currently has the capacity to produce thousands of tons of such mixed rare earth carbonates per year. Energy Fuels' mixed carbonate is the most advanced rare earth product being produced at a commercial scale in the

U.S. today. The company is also making major strides in producing separated and refined individual and blended rare earth products at its mill.

Comparatively, monazite contains up to 50% more of the recoverable core magnet metals, neodymium and praseodymium than the bastnaesite mined at Mountain Pass, California.

Energy Fuels is finalizing a scoping study for a dedicated, rare earths, solvent extraction separation system and is finalizing the commercialization of a new rare earth metals and alloys production process demonstration.

Within 24-36 months Energy Fuels has the potential to be the world's lowest-cost producer of separated individual rare earths and will therefore the lowest cost producer of rare earth metals and alloys. No government subsidies have been needed. Just managerial knowledge, experience, and skill.

Energy Fuels already is a major domestic supplier of uranium and vanadium. In fact, the company announced at its AGM, earlier this week, that it has signed a decade long supply deal with two American utilities to provide them with more than 4,000,000 lbs of uranium. This contract will bring in more than USD\$200,000,000 over its life.

Energy Fuels is a producing and growing domestic American critical metals processing hub.

Disclosure: Jack Lifton is a member of the Advisory Board for Energy Fuels Inc., and may hold securities or options in some of the companies mentioned in the above article.

Search Minerals expands their rare earths discovery with critical materials' zirconium and hafnium

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As the West looks to establish a non-Chinese [source of supply](#) of critical rare earth elements, one Canadian company has been successfully expanding its rare earths project, as well as discovering some additional valuable metals like zirconium (Zr) and hafnium (Hf).

[Zirconium dioxide](#) (ZrO_2) is used in laboratory crucibles, metallurgical furnaces, as a refractory material, and in ceramics (including use in dental ceramics); because it is mechanically strong and flexible. Zircon (ZrSiO_4) and the cubic zirconia (ZrO_2) are cut into gemstones for use in jewelry. Ceria-zirconia is widely used as a component in current three-way [catalytic converters](#).

Zirconium is used in ceramics, jewelry, dentistry, and catalytic converters



[Hafnium](#) is a good absorber of neutrons and is used to make control rods, such as those found in nuclear power plants and submarines.

Hafnium is used in some superalloys for special applications such as jet engine turbines in combination with niobium, titanium, or tungsten. Hafnium oxide is used as an electrical

insulator in microchips, filaments and electrodes.

Hafnium is used in superalloys, nuclear rods in nuclear submarines, microchips, and jet engine turbines



Search Minerals discovers zirconium and hafnium

[Search Minerals Inc.](#) (TSXV: SMY) recently [announced](#) that they have discovered zirconium and hafnium, in addition to their existing valuable rare earths dysprosium (Dy), neodymium (Nd), praseodymium (Pr), terbium (Tb) and yttrium (Y). The discovery was made at their Silver Fox Deposit.

With regards to the Silver Fox discovery Search Minerals [stated](#): “This surface expression is significantly longer, but thinner, than the surface expressions of the nearby and related **FOXTROT** and **DEEP FOX** Resources. The mineralization is similarly hosted by peralkaline volcanic rocks and contains slightly lower grades of the REE magnet materials (Nd, Pr, Tb and Dy) but significantly higher grades of Zr and Hf.”

Dr. David Dreisinger [commented](#): “The objective of metallurgical testing of the **SILVER FOX** (and other deposits) will be to recover a high grade zirconium by-product for sale with minimal processing cost and complexity. Search is engaged with our technology advisor, SGS Canada, to identify process flowsheet options.”

Search Minerals expands the mineralized zone at Fox Meadow

Search Minerals also recently [announced](#) that they have successfully expanded the critical rare earth element mineralized zone at Fox Meadow. The Company [stated](#): “The trenching/channelling programs at **FOX MEADOW** have outlined a mineralized zone of up to 123.6 m wide and at least 500m in

strike length; mapping and airborne magnetic anomalies suggest that the zone is up to 650m long. In contrast, both the **DEEP FOX** and **FOXTROT** mineralized resources are about 350-450m long and up to 40m thick.”

About Search Minerals

Search is focused on finding and developing critical rare earth element mineral assets in Labrador, Canada. The Company controls properties in three distinct areas of this region; the Port Hope Simpson (PHS) Critical Rare Earth Element District in SE Labrador; the Henley Harbour Area in Southern Labrador; and the Red Wine Complex located in Central Labrador.

Within the Port Hope Simpson District, Search’s main discoveries are the [Foxtrot Resource](#), [Deep Fox](#), [Fox Meadow](#), and Silver Fox deposits which contain rare earths including dysprosium (Dy), neodymium (Nd), praseodymium (Pr), terbium (Tb) and yttrium (Y).

The flagship Foxtrot Resource covers a 70 km long and 8 km wide belt. At Foxtrot the Total Indicated Resource is [7.392 million tonnes](#) with grades of neodymium oxide (1,732ppm), neodymium (1,485ppm), praseodymium (397ppm), and dysprosium (191ppm).

The 14 year LOM Foxtrot Project offers an IRR of 16.7% on an after tax NPV10% of [\\$48 million](#), with a CapEx of \$152 million.

Investors should note the NPV quoted above is only for the Foxtrot Project, so once the other projects are combined into a bigger project the NPV should improve materially.

Closing remarks

Search Minerals is both expanding their existing very promising rare earths project as well as finding other valuable metals zirconium and hafnium. Investors will need some patience, as more exploration work needs to be done to further grow the

resource and improve on the economics.

Combined with an excellent management team, and strong Government and local support, the Company continues to advance their Port Hope Simpson District project at a steady pace. Rare earths expert Jack Lifton recently [stated](#) about Search Minerals: "I think it may well be Canada's first commercial rare earth producer."

With a market cap of just C\$9 million there is plenty of potential upside ahead for investors if Jack is right.