

June 2022 start for Vital Metals to produce mixed rare earth carbonates with feed from its own mines

The rare earths sector has been doing very well lately, especially the highly valued magnet rare earths for which prices have doubled over the past year. Neodymium (Nd) and praseodymium (Pr) are the key magnet rare earths used commonly in electric motors. They also fall into the category of the 'light rare earths'. Another group of rare earths, known as the 'heavy rare earths', also have value. They include europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium. Dysprosium (Dy) in particular is very valuable and is critically necessary for and used in alloys for neodymium based magnets subject to high temperature swings in operation.

Today's company is working towards becoming a North American producer of both light and heavy rare earths.

Vital Metals Limited (ASX: VML | OTCQB: VTMXF) (Vital) is a rare earths ore producer from their Nechalacho Rare Earths Mine in the Northwest Territories (NWT), Canada. Nechalacho has a measured, indicated and inferred resource of 94.7Mt at 1.46% REO for 1.3Mt contained TREO. The focus to date has been on the high-grade, light rare earths, found in the bastnaesite mineralization there.

Vital has off-take agreements with REEtec in Norway and with Ucore Rare Metals Inc. (TSXV: UCU | OTCQX: UURAF) in the USA. In both cases, Vital is working with them to develop a qualified feed stock for them end at commercial scale. In some good recent news, offtake buyer, REEtec, signed a supply

agreement with Germany's large OEM automotive supplier, Schaeffler, thereby potentially securing Vital's revenue from the sale of its product to REEtec.

Vital is currently constructing a Saskatoon, Saskatchewan, based cracking and leaching facility, with first feed to the facility expected in June 2022. An additional C\$5 million of funding/reimbursement was recently achieved to help support the commissioning and ramp-up stage. Vital aims to produce a minimum of 5,000 tons annually of contained REO by 2025 at the Nechalacho Mine.

Vital Metals' Managing Director Geoff Atkins stated: "With production forecast to commence in June 2022, this will make Vital North America's only producer of high purity rare earth carbonate with feed from its own mines providing security of supply for the global rare earths supply chain."

Expansion into heavy rare earths

As announced on April 29, 2022, Vital is now planning to expand their existing light rare earths mine operation to also include heavy rare earths. Vital plans to investigate developing a zone of xenotime mineralization, the principle heavy rare earth hard-rock mineral, at Nechalacho's North T pit, targeting a 10-year operation from the zone. Xenotime, is an yttrium phosphate mineral, and is the only known commercially feasible hard-rock source of dysprosium and terbium, which are the critical magnet rare earth additives for high temperature operations. As Vital stated: "Tardiff contains elevated heavy rare earths mineralization which may complement North T's xenotime deposit as part of Vital's strategy to produce heavy and light rare earths."

Next steps

In 2022, in addition to commencing production at the Saskatoon facility and working on expanding into heavy rare earths, Vital plans further drilling at the Tardiff zone to define a

maiden Ore Reserve.

Vital Metals 3 stage strategy to become a North American producer of both light & heavy rare earths

Stage 1: Foundations

Nechalacho North T

- Demonstrate the ability to supply rare earth feedstock at specification critical for rare earth customer acceptance protocols.
- Generate positive cashflow to fund expansion.
- Operations at North T are continuing with approximately 5,000t of product to be transported to Saskatoon this year.

Stage 2: Expansion and Growth

Nechalacho Tardiff

- Large-scale operation to provide long-term security to the rare earth supply chain capitalising off a 1 million contained ton rare earth resource.

Wigu Hill

- Expansion capability through an additional project.
- Large carbonatite (6km+ strike) with limited drilling.
- Multiple projects enable the flexibility to react quickly to changes in market demand and customer requirements.

Stage 3: Heavy Rare Earth Production – North T Xenotime

North T Xenotime/Kipawa

- Enable Vital to be a 'one stop shop' for the supply of the full suite of rare earths.
- Only HREO project in the world able to meet US requirement for non Chinese heavy rare earths.
- Enables Vital to become the first producer of commercial quantities of both light and heavy rare earths.

Source: Vital Metals March 2022 quarterly report

Closing remarks

Vital Metals continues to march forward at a rapid pace. In late June 2021 the Nechalacho mine came into production, notably being Canada's first-ever producing rare earths mine. Then only a year later in June 2022, the Saskatoon cracking and leaching facility's first production of a mixed rare earth carbonate is set to commence.

If that wasn't good enough the Company is now planning to also

produce heavy rare earths, also from the Nechalacho Mine. Once achieved Vital announced that they would become the “the world’s first producer of both heavy and light rare earth oxides.”

Vital Metals trades on a market cap of A\$204 million. Exciting times ahead.

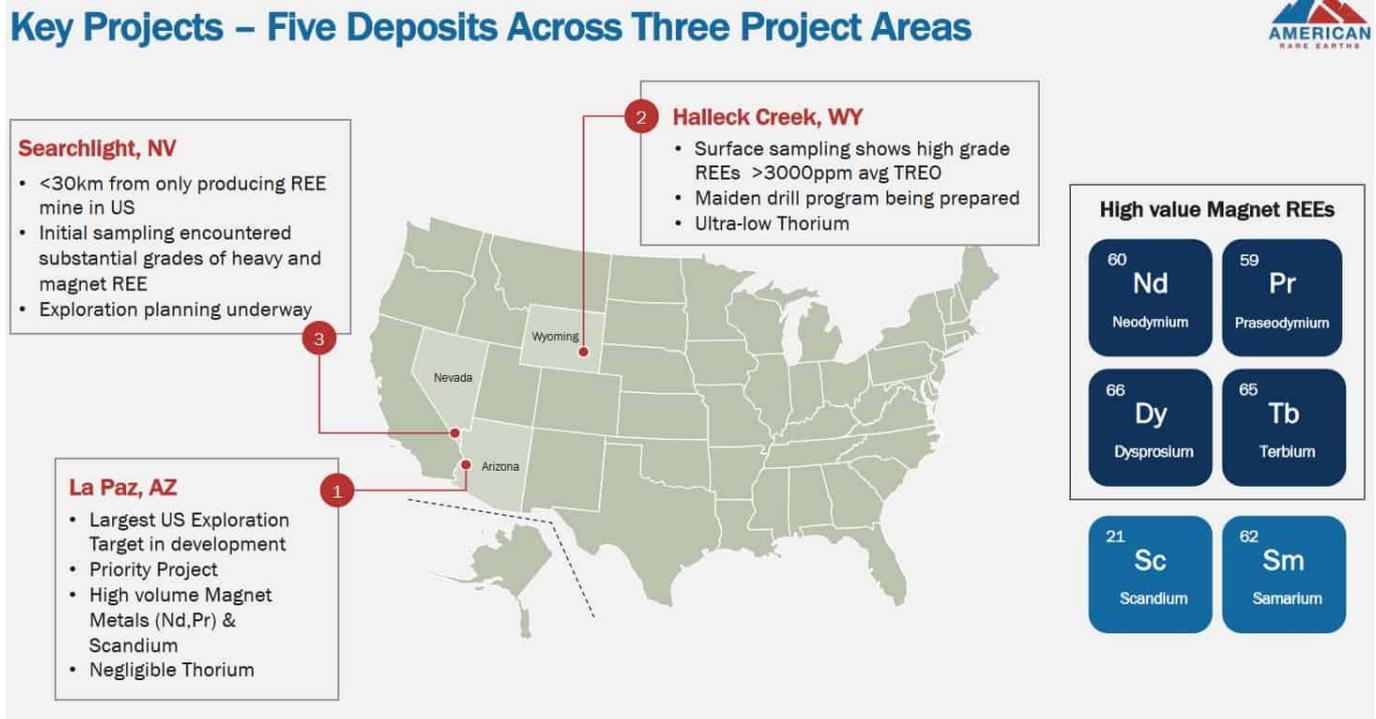
Spotlight on American Rare Earths as new Bill forces defense contractors to stop buying rare earth enabled products from China

On January 15, 2022 it was reported by Reuters that a new bill was introduced in the US Senate that would force defense contractors to stop buying rare earth enabled products from China by 2026 and use the Pentagon’s Defense Logistics Agency, DLA, to create a permanent stockpile of rare earth minerals. The U.S has only one producing rare earths mine at Mountain Pass, California, run by MP Materials, and currently has no capability to process rare earth minerals downstream of the mine. If passed, the new bill would help support the U.S goal of developing a more local and secure supply of rare earths, in the USA.

Today’s company has not one, not two, but three USA located rare earth projects. Its flagship Arizona rare earths project contains light rare earths. Light rare earths include the valuable magnet metals praseodymium and neodymium, as well as

scandium.

American Rare Earths Limited 3 USA rare earths projects – location map



Source: Company presentation

American Rare Earths Limited (ASX: ARR | OTCQB: ARRF) is focused on developing its 100% owned La Paz Scandium and Rare Earths Project in Arizona, USA. The Project was acquired in August 2019 with an existing NI 43-101 Resource. The Project lies about 170km northwest of Phoenix.

The Company states: “La Paz is a large tonnage, bulk deposit comprising high value, light rare earth (LREE) assemblage with the potential to be the largest rare earth project in North America...contains very low penalty elements such as radioactive thorium and uranium.” They further comment: “The results show an increase in grades of certain high-value Rare Earth elements, including magnetic and heavy Rare Earths used in numerous technologies such as Electric Vehicles (EVs), wind turbines, air conditioners/refrigeration, phones, and critical national defense industry tech.”

The La Paz Scandium and Rare Earths Project

La Paz covers over 890 hectares with mining claims on federally controlled land and a prospecting permit over one section of Arizona State Trust land (259 hectares). The claims are unencumbered and 100% controlled by La Paz Rare Earth LLC (100% owned subsidiary of American Rare Earths Limited). The Project benefits from excellent local infrastructure including electricity, water, and gas; and is in a mining friendly jurisdiction.

The JORC 2012 classified Resource Estimate as announced in August 2021 at La Paz is **170.6 million tons of Total Rare Earth Elements (TREE) at an average grade of 391ppm**. The Indicated Resource Estimate is 35.2 million tonnes. The Resource estimation report demonstrates approximately 66.6 million kilograms TREE, approximately 80.0 million kilograms TREO, plus 4.4 million kilograms of Scandium Oxide (Sc₂O₃).

The Resource displays relatively uniform distribution of total rare earth elements (TRRE) across and along strike, covering a resource area of 2.5km by 1.5km (La Paz Resource only). The entire deposit is exposed at surface, or lightly concealed by alluvial cover.

The Company recently stated (re La Paz): “What is also exciting are the higher grades intersected in the La Paz resource area of up to four times the depth of the previous maiden resource, with mineralization remaining open at depth and along the strike, indicating the potential for a much larger deposit.”

The Company also reported a new potential resource in the Southwest area of the La Paz Project where one diamond core hole terminated in mineralization material below 75 metres. New claims are being staked in the area.

La Paz Project highlights and showing the La Paz Resource area and the new discovery Southwest Resource area <4km away

La Paz REE + Scandium Project



- La Paz is ARR's priority REE project and was acquired in 2019
- Exploration Target of 742-928 million tonnes added to the JORC Compliant Resource of 170.6 million tonnes
- Developing scoping and economic studies for IRR and NPV estimates due in 2022



Bulk tonnage
170Mt



Near surface resource & upside



High volumes of Magnet Metals:
Nd, Pr, Dy, Tb



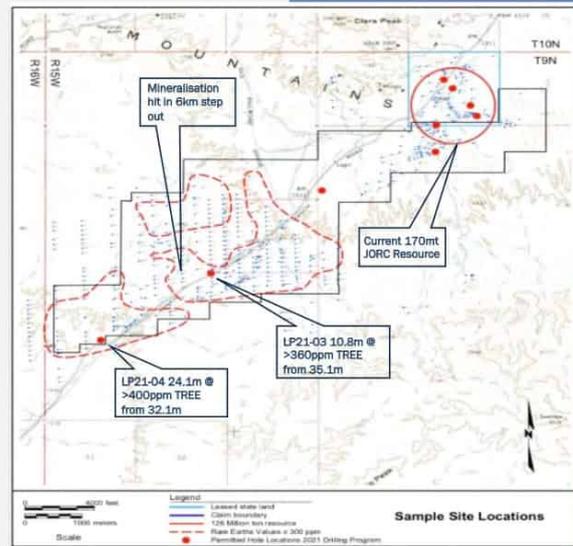
Extremely low in thorium



High volume of Scandium



Proximity to key infrastructure



Source: Company presentation

Other projects

American Rare Earths Limited has also recently acquired two other USA rare earth projects – The Searchlight Rare Earths Project in Nevada and the Halleck Creek Project in Wyoming. The Company also has exposure to cobalt via its strategic investment in Cobalt Blue Holdings (ASX: COB), which owns the Broken Hill Cobalt Project in Australia.

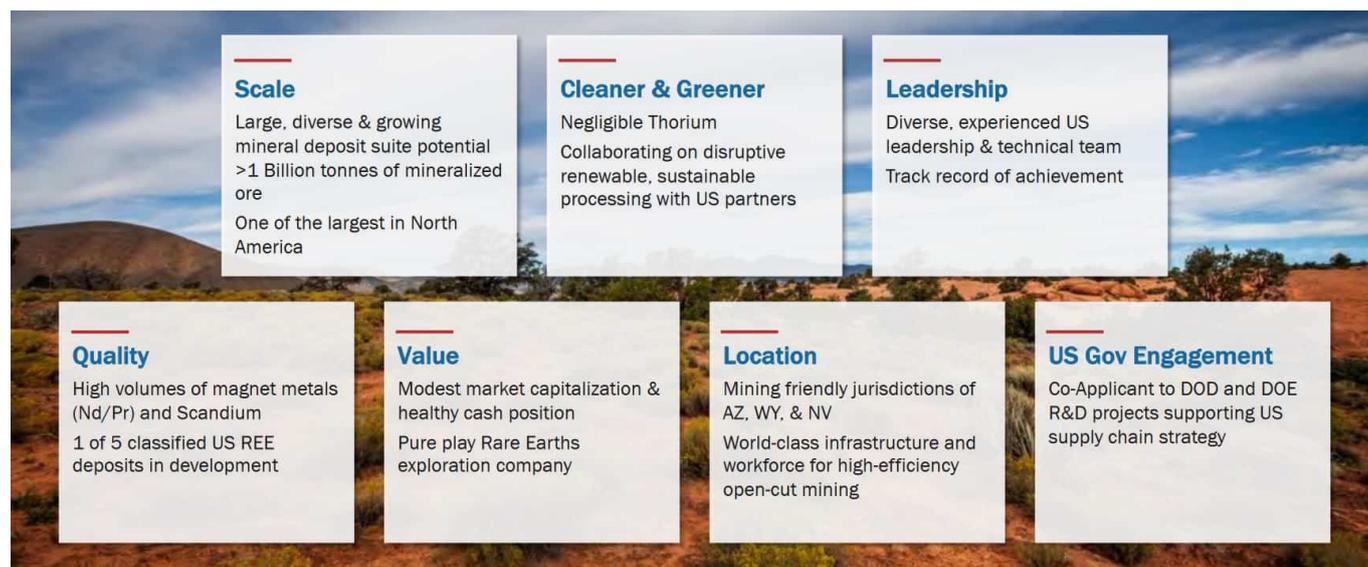
Catalysts in 2022

- La Paz drilling contractor appointed and to commence work in January 2022.
- Field exploration work continues at Halleck Creek with the Maiden Drill program planned for Q1 2022.
- Results from working with USA research institutions with La Paz's mineral profile incorporated into emerging US advanced rare earth processing technologies.
- Preliminary Economic Assessment (PEA) for La Paz by the end of 2022.

American Rare Earths Managing Director and Chief Executive

Officer, Chris Gibbs, stated in December 2021: “Timing could not be better with the recent Capital raising efforts and obtaining the permits to commence drilling at our key projects. The opportunity to bring Fidelity onto the register means we can accelerate the planned scope of works and unlock value sooner.”

American Rare Earths Limited highlights



Source: Company presentation

Closing remarks

American Rare Earths Limited offers investors exposure to three USA rare earths projects, including the flagship La Paz Scandium and Rare Earths Project in Arizona.

With rare earths demand set to surge this decade as we switch to green energy and transportation, it is worthwhile looking at what companies can be the next suppliers of rare earths, especially in the USA.

American Rare Earths Limited has recently raised A\$5.7 million after fees with Fidelity International initially taking an equity interest of approximately 9.9%. The current market cap is A\$110 million. One to follow in 2022, especially with the current drilling at La Paz and Q1 2022 drilling at Halleck

Creek. Stay tuned.

Jack Lifton with Vital Metals' Geoff Atkinson on the commencement of rare earths production in NA

In a recent InvestorIntel interview, Jack Lifton speaks with Geoff Atkins, Managing Director of Vital Metals Limited (ASX: VML) about Vital's recent milestones including the commencement of rare earths production and acquisition of two heavy rare earths projects in Canada.

In this InvestorIntel interview, which may also be viewed on YouTube (click here to subscribe to the InvestorIntel Channel), Geoff went on to say that the heavy rare earths projects will complement Vital's light rare earths operations at Nechalacho making them "one-stop-shop for rare earths." As Canada's first producer of rare earths, Geoff told InvestorIntel that Vital Metals is fully funded and discussed how it is well-positioned to be a strategic player in the North American rare earths supply chain at a time when demand continues to grow.

To watch the full interview, click here

About Vital Metals Limited

Vital Metals Limited is an explorer and developer focussing on rare earths, technology metals, and gold projects. Their projects are located across a range of jurisdictions in

Canada, Africa and Germany.

Nechalacho Rare Earth Project – Canada

The Nechalacho project is a high-grade, light rare earth (bastnaesite) project located at Nechalacho in the Northwest Territories of Canada and has potential for a start-up operation exploiting high-grade, easily accessible near-surface mineralization. The Nechalacho Rare Earth Project hosts within the Upper Zone, a measured, indicated, and inferred JORC Resource of 94MT at 1.46% TREO.

To learn more about Vital Metals Limited, [click here](#)

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How to evaluate a rare earths opportunity

The race is on for rare earths investment, but what should you look for?

So where do we go from here? That is, what are the criteria investors should consider when they are looking for rare earth/zirconium investment opportunities?

At this early stage of developing a domestic critical minerals supply chain, and as mentioned previously, one of the most important criteria for investors to consider with rare earths is whether the resource offers potential to recover other commonly associated critical minerals such as zirconium/hafnium and scandium, that are also largely controlled by China. These may offer better opportunities than rare earths for quickly finding domestic market outlets for the processed forms of these elements.

The rare earth elements neodymium, praseodymium and dysprosium

are well known for application in high strength permanent magnets, now in increasing demand for electronics, wind turbines and electric vehicle motors. There are also opportunities in aircraft construction, where aluminum and titanium have been the traditional metals of choice.

Zirconium and hafnium can be used in various combinations to make certain titanium and aluminum alloys that are perfectly suited for the high-temperature regions of jet engines. Similarly, scandium is in increasing demand as an additive to aluminum alloys to increase their strength and reduce their weight. When all of these elements are recoverable from the same resource, it becomes a much more attractive investment opportunity.

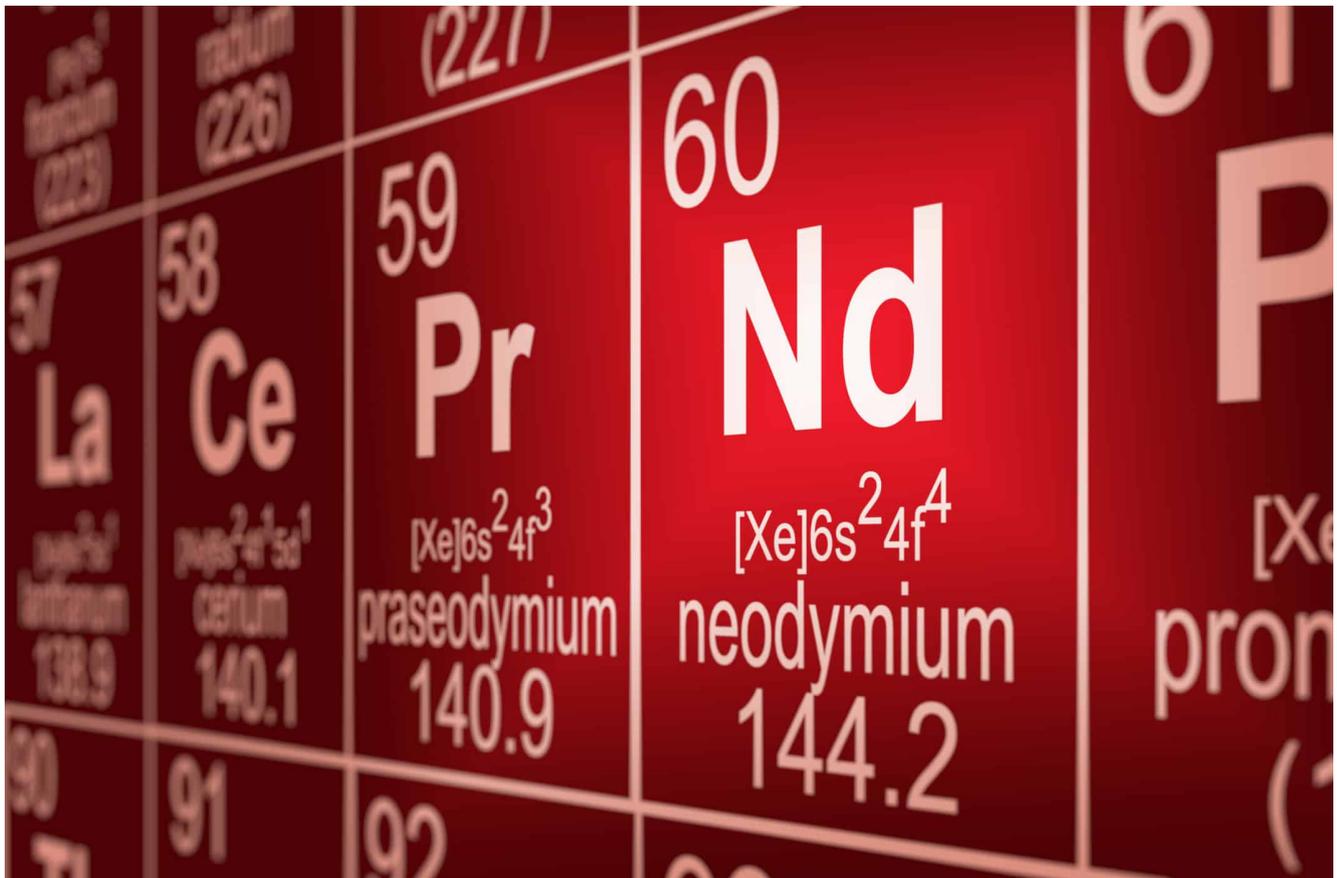
A couple of North American rare earth projects that meet most of these criteria, are Avalon Advanced Materials' Nechalacho Basal Zone Heavy Rare Earth project in the Northwest Territories and Imperial Mining's Crater Lake Scandium project in northern Quebec. The Nechalacho resource contains the critical elements zirconium/hafnium as well as both the light and heavy rare earth elements. The Crater Lake Project is a rare earth resource with exceptional scandium enrichment and is now being looked at mainly as a scandium project. It also contains concentrations of zircon as well as the rare earths.

Another factor to keep in mind is the balance between the Light Rare Earths (Lanthanum through Samarium) and the Heavy Rare Earths (Gadolinium through Lutetium), plus Yttrium. Most rare earth resources are dominated by the light rare earths, but having recoverable heavy rare earths as well can further enhance the overall value proposition as demand for these will grow as new supply becomes available.

Once the investor has identified a rare earth project that also contains other critical elements like zirconium and scandium, the next step is to assess whether they occur in minerals that are amenable to economic processing and recovery. The feasibility study (FS), Pre-feasibility Study

(PFS) or Preliminary Economic Assessment (PEA) are the best sources of this type of information. Many early stage projects are focused on defining the largest potential size and grade of resource without focusing on whether the elements of interest occur in minerals that are amenable to economic recovery. These projects should not be considered as attractive investment opportunities until an appropriate economic extraction process has been identified. The next step is to be certain that the recovered products will meet the specifications required by the consumer.

Other important points to consider when considering new rare earth project investment opportunities is the content of radioactive elements uranium and thorium which often occur with rare earths. High levels of uranium and thorium can be problematic from an environmental regulatory standpoint. Some jurisdictions are more challenging than others. Personal experience has shown that regulations in Canada are better than in the U.S. by providing an appropriate level of environmental regulation while not causing any unnecessary burden on industry.



Rare Earths

Finally, regardless of the balance of critical elements contained in a rare earth resource, the operation will need a well-qualified team to perform the development and product marketing work. So, the most important requirement at this early stage of creating a new supply chain is finding the people with both the appropriate skill sets and experience. Companies with these assets will have a greater chance of success.

In summary, an investor looking for a rare earth project with the best prospects of success should be one that has the following attributes:

- 1) a resource that also contains significant recoverable quantities of zirconium/hafnium, scandium or heavy rare earth;
- 2) contains low level of radioactive elements or is located in a region that has less-burdensome environmental regulations;
- 3) has a defined a viable extraction process flowsheet; and,

4) has the appropriate, key people available for the early stage of development.

Now the trick is to find them.

Jack Lifton on the biggest move by the US Federal Government in the rare earths space

“What has happened finally with the US government is that they have recognized the supply chain problem and that we have been too dependent on China for too many things. The two things that are mentioned the most inside the Federal government are pharmaceuticals and rare earths... Rare earths are very much on the radar of the US federal government. In fact, one of our senators, Senator Rubio of Florida is a champion in the US to revive the rare earth supply chain. It is very exciting and it is the biggest move in this commodity that I have seen from the US government.” States critical materials expert Jack Lifton, in an interview with InvestorIntel’s Tracy Weslosky.

Jack went on to say that we should look at the total rare earths supply chain and then try to make that domestic in North America (The US and Canada) or with closest allies like Australia. Jack continued, “The anchor of any supply chain is the mine, the source of the minerals. We have got several in North America and we have 2 or 3 close to production. In Australia, we have two in operation – Lynas and Northern Minerals. The next step is separating these materials. The mixed rare earths into individual rare earths that can be

further processed into products that we actually use.”

Jack also said that there is no heavy rare earth separation operation outside of China and if we consider health and safety requirements of North America then Chinese materials will be unacceptable.

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

Jack Lifton on scandium, yttrium, rare earths and the US-China trade agreement

Jack Lifton, InvestorIntel’s Sr. Editor, Host and a well-known Rare Earths Advisor and Tracy Weslosky, InvestorIntel’s Sr. Editor, Publisher and Rare Earths Consultant came together to discuss the US-China Phase 1 trade agreement and its effect on the rare earths industry in the United States.

Jack said that the US has never produced scandium or yttrium yet they have been included in the trade agreement. He added that the Chinese are no longer mining heavy rare earths in their country and they have production quotas on light rare earths but they can import as much as they want in the way of rare earth raw materials. Jack further added that the US-China trade agreement gives impetus to the United States to re-implement a total supply chain in the country.

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

Don Bubar on the renewed concern about the security of supply of rare earths in the global markets

“There is a lot of renewed concern about the security of supply of rare earths in the global markets. The supply chain was not well established outside of China ten years ago. Never really did get established in a meaningful way except for Lynas Corporation of Australia. Now with growing demand from both inside and outside of China, there is a real concern about the security of supply. That concern is legitimate. There simply is not enough supply to meet forecast demand for rare earth magnets for all the new applications and clean technology.” States Don Bubar, President, CEO and Director of Avalon Advanced Materials Inc. (TSX: AVL | OTCQB: AVLNF), in an interview with InvestorIntel’s Tracy Weslosky.

Don went on to discuss Avalon’s collaborative development agreement with Cheetah Resources on the Nechalacho Rare Earth Elements Project with focus on magnet rare earths. He said the Avalon is trying to get operations established at a small scale, without large capital requirements. Prove that we can make a product that is acceptable at the market and has outlets for refining. Once we have done that, then look at how to scale up the business. Don also said that 10 years ago there was a lot of emphasis on heavy rare earths but right now almost all the emphasis is on the magnet rare earths which is principally two light rare earths, neodymium and praseodymium.

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

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