CANADA RARE EARTH CORP.
GROWTH REPORT

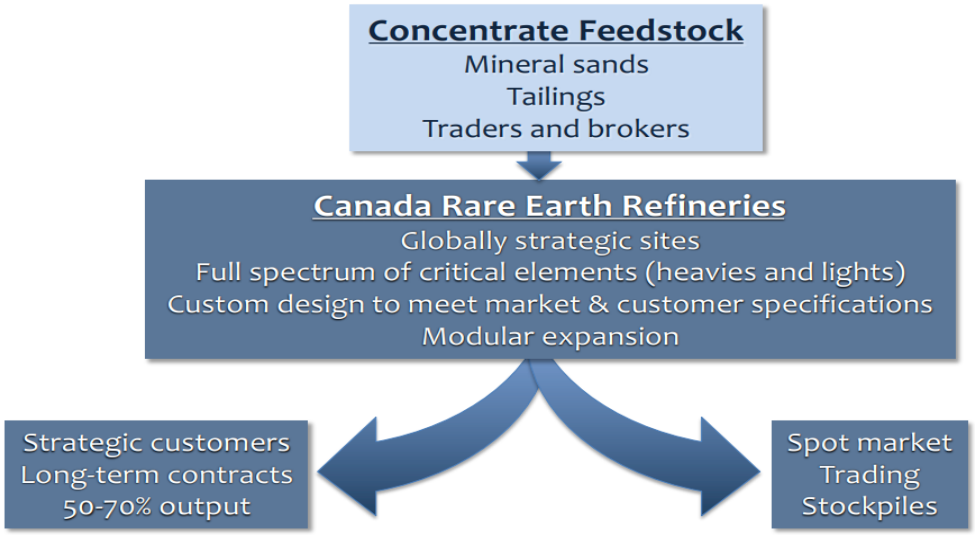
TSX.V: LL C$0.045
April 2, 2020
Market Capitalization: C$8.7 Million

COMPANY DESCRIPTION

Micro-cap Canada Rare Earth Corp. (TSX: LL.V) is a unique play on the most valuable aspect of rare earth elements, their refining into valuable rare earth oxides and metals. These oxides and metals have wide applications in many industries, particularly the high-tech sector. Annual global sales are US$3 Billion to US$5 Billion and expanding to a growing customer base (see page 6). In short order, Canada Rare Earth, with a total enterprise value of less than C$9 million, could become a key player in rare earth refining (see page 9).

The company's strategy is to primarily source rare earth raw materials from mineral sands and the tailings of past metals mining operations and then to concentrate and refine those materials to produce a complete range of commercially traded rare earth oxides and metals. The advantage of such a sourcing strategy is that Canada Rare Earth is not captive to a particular source of raw materials. See Figure 1. Canada Rare Earth's strategy differs from that of the well-known rare earth refiner Lynas Corporation Limited (LYC.AX), which mines its own materials and then refines them into a limited number of oxide products. Tailings are generally both easier and cheaper to process than mined material and can be more quickly converted to coveted rare earth oxides. Moreover, the processing of tailings is more environmentally friendly than mined material, as the refining of tailings entails the processing of materials that have already been disturbed.

Figure 1: Canada Rare Earth's Business Strategy



Source: Canada Rare Earth.

The capability to process and convert rare earth minerals into oxides, compounds and alloys is the linchpin to the global rare earth industry. Moreover, the capability to do so outside of China, where the lion's share of the processing facilities is located and which has from time to time withheld these valuable materials from the rest of the world, has tremendous implications for the western world.

GLOBAL REFINERY CAPACITY

In Table 1, we list details about global refinery capacity, including the two main operating refineries located outside of China, which are owned by Lynas and Solvay SA (SOLB.BR).

Table 1: Global Rare Earth Refinery Capacity and Global Demand Data

REFINERY	Oxide CAPACITY Production (mt/year)	Build Cost	Estimated CONSTRUCTION COST PER TONNE OF OXIDE PROCESSED (USD)	ENTERPRISE VALUE (USD)	COMMENTS
Lynas Malaysia	18 - 20,000	A$7–800 million	$25,263	$663,000,000	• Can process only La, Ce, Nd, and Pr. • Permit for Malaysian refinery to expire in 2023. • Concentrate comes from Lynas' Mt. Weld mine in Australia. • Lynas plans to build a new refinery in Australia at a cost of A$400-A$500 million and to begin operations in 2023.
Solvay La Rochelle France	4,500				• Can process both light & heavy REEs, including critical elements. • Facility is about 40 years old. • High-cost facility, located in a resort town in France.
Two small privately owned refineries in Vietnam					
31 Refineries in China					• Can process both light & heavy REEs, including critical elements.
Total Global Market Demand	**150,000**				• **Source for Global Demand Data is Cambridge Care.**
CRE's Potential Facility in Laos	**3,000**				• **Awaiting government approval of final permit.** • **Could be expanded to 6,000 mt of oxides per year.** • **Can process both light & heavy REEs, including critical elements and produce metals.**

We highlight the following key points from Table 1:

- China controls fully 85% of the refining capacity on a worldwide basis.

- Lynas has about a 12.5% market share, but its output is limited to four light rare earth oxides (REOs). Two, lanthanum (La) and cerium (Ce), are the most common and garner the lowest selling prices of all REOs. We do note, however, that Lynas' output does include the two REOs in most demand and with the highest profile demand – Neodymium (Nd) and Praseodymium (Pr). Canada Rare Earth's

refineries will be capable of producing Nd and Pr, as well as the entire spectrum of commercially traded REOs, some of which have selling prices at least five times higher than Nd and Pr.

- Solvay is another important player, but its refinery is 40 years old and is located in a high-cost region.

- Refineries generally process only commercially traded rare earth elements (REEs). Furthermore, even if a refinery is capable of processing both light and heavy REEs, certain concentrates that have a composition tilted toward less valuable REEs (such as La and Ce) may be uneconomic to refine. Such concentrates may be sold to other refineries better suited to refine that concentrate.

- Light REEs are generally easier to process and require fewer refinery stages to do so but garner relatively low selling prices. Lynas's refinery is not capable of refining heavy REEs.

- The purity of the REOs that a refinery produces is a key factor in the value of those oxides.

- For illustrative purposes, Canada Rare Earth's potential Laos refinery opportunity (see page 12) is listed at the bottom on Table 1.

CANADA RARE EARTH TO BENEFIT FROM EXISTING KNOW-HOW

An important attribute of Canada Rare Earth is the experience of some of its key consultants, advisors, affiliates, and investors, many of whom have played key operational roles in the design, construction operation, and management of rare earth refiners. In turn, this experience will allow Canada Rare Earth to configure its refineries to process critical elements, including both light and heavy REEs. In other words, Canada Rare Earth is intending to create an alternate rare earth supply chain independent of China, based on extensive knowledge and practical experience.

RARE EARTH PRODUCTION PROCESS

Rare earth elements are strong reducing agents, a chemical characteristic which allows them to be separated into oxides. Indeed, rare earth oxides, metals or compounds have wide applications in industry, particularly in the digital age. Figure 2 shows some of the key industrial applications of the REOs.

Figure 2: Rare Earth Elements Uses and Geographic Sources

Rare-Earth Elements

Originally produced for the October 2011 issue of *Scientific American*

What Are They Used For?

Scandium	Aerospace components, aluminum alloys
Yttrium	Lasers, TV and computer displays, microwave filters
Lanthanum	Oil refining, hybrid-car batteries, camera lenses
Cerium	Catalytic converters, oil refining, glass-lens production
Praseodymium	Aircraft engines, carbon arc lights
Neodymium	Computer hard drives, cell phones, high-power magnets
Promethium	Portable x-ray machines, nuclear batteries
Samarium	High-power magnets, ethanol, PCB cleansers
Europium	TV and computer displays, lasers, optical electronics
Gadolinium	Cancer therapy, MRI contrast agent
Terbium	Solid-state electronics, sonar systems
Dysprosium	Lasers, nuclear-reactor control rods, high-power magnets
Holmium	High-power magnets, lasers
Erbium	Fiber optics, nuclear-reactor control rods
Thulium	X-ray machines, superconductors
Ytterbium	Portable x-ray machines, lasers
Lutetium	Chemical processing, LED lightbulbs

Who Has Them?

Percent of World Production and Known Reserves (2010)

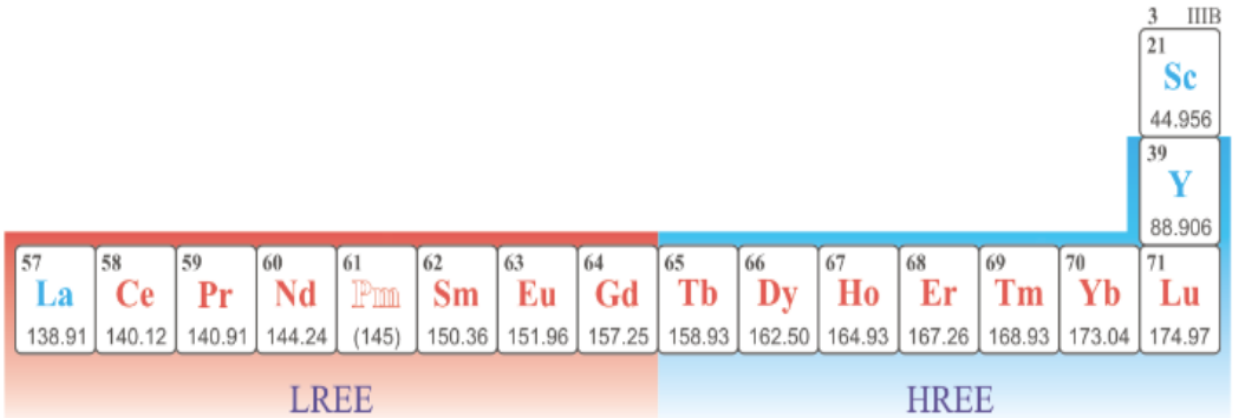
Source:* *Scientific American.

In broad terms, rare earth production entails exploring for and the mining of rare earth elements, followed by the key beneficiation and refining or separation processes. The refining process produces valuable rare earth oxides. Rare earth metals can be produced through a smelting process that utilizes rare earth oxides and other forms of the rare earths. We believe that the refining process, which is the focus of Canada Rare Earth's strategy, is the key chokepoint in and the most valuable part of rare earth production.

Rare earth elements are relatively plentiful in the earth's crust but are typically widely dispersed, rendering their mining in a single location prohibitively expensive and usually impractical. The molecular structure of REEs is such that REEs frequently occur together in minerals, perhaps even in multiple mineral structures. Not surprisingly, these characteristics generally make their separation and extraction difficult.

The 17 total rare earth elements are generally categorized as light or heavy elements. See Figure 3 below. (The 17 rare earth elements are frequently referred to as the 15 lanthanides plus yttrium and scandium. Two of the 17, including scandium, cannot be refined into rare earth oxides by standard configured refineries.)

Figure 3: The 17 Rare Earth Elements



Source: Lynas Corp.

Each source of rare earth material will generally contain the entire spectrum of REEs, however, in varying percentages. The heavy elements are generally rarer and sell for greatly higher prices, as they are less common and much more costly to separate. In contrast, LREEs are produced in larger quantities because they occur naturally in greater quantities. Producers strive to meet the high demand for Nd and Pr which necessitates the over-production of all associated LREEs, like low-priced cerium and lanthanum. For example, a typical rare earth concentrate from a mining operation may contain 70% of low-priced lanthanum and cerium, perhaps 20% Nd and Pr, and about 10% other heavy REEs like dysprosium (Dy) and terbium (Tb). Dy and Tb oxides sell for around US$250,000 per tonne and US$600,000 per tonne, respectively. Lanthanum oxide, on the other hand, transacts at prices of less than US$2,000 per tonne. See Table 2 for approximate current pricing data for various rare earth oxides. Hence, the ability to produce HREEs, as well as Nd and Pr, is a significant competitive advantage.

Table 2: RARE EARTH OXIDE PRICING DATA

Rare Earth Oxide	Approximate Price Expressed in USD Per mt 3/18/20 Prices
Lanthanum	$1,625
Neodymium	$41,750
Praseodymium	$45,500
Samarium	$1,780
Europium	$30,600
Yttrium	$2,700
Gadolinium	$26,300
Terbium	$610,700
Dysprosium	$270,000
Holmium	$52,250
Erbium	$22,000
Ytterbium	$16,350
Lutetium	$607,800
Scandium	$1,050,000

Source: BAIINFO.

BENEFICIATION

Through beneficiation processing, including the processes of gravity and magnetic separation, REEs are aggregated into a mineral concentrate rich in rare earth content. Such a concentrate typically has a purity level of 50-65%. MP Materials, a private company which owns the only rare-earth mining facility in the U.S., ships the approximately 55,000 tonnes of rare earth mineral concentrate it produces each year to Chinese facilities for refining. It is unable to refine the concentrate itself into rare earth oxides (see below) or to identify an available refinery situated outside China.

REFINING

Refining, or separation, involves the further separation of an element from its ore, thereby removing almost all impurities. Depending on the efficiency and detailed steps of the refining process, the final purity level may be 97% up to perhaps 99.9995%. This process is labor-intensive, requires enormous factory space and costs increase significantly with the level of purity. (An operational processing facility requires hundreds of thousands of square feet of factory space.)

In detail, the refining process consists of front-end and back-end processes. Canada Rare Earth's proposed refineries include both sequences. The front-end process produces a rare earth chemical concentrate and generally includes the following steps:

- Alkaline Cracking: The mineral concentrate from beneficiation undergoes alkaline boiling. This procedure creates a rare earth hydroxide. The by-product of this reaction is trisodium phosphate, a cleaning agent or lubricant. After a few more steps, the trisodium phosphate is packaged and sold to customers.

- Acid Dissolving: The rare earth hydroxide is dissolved by hydrochloric acid, creating a rare earth chloride filtrate. During this step, thorium is removed from the rare earth liquid. As in the prior step, the thorium by-product is packaged for future sale. Thorium has many uses, including as a catalyst for industrial chemical reactions such as the oxidation of ammonia to nitric acid.

In the back end of the refining process, the rare earth elements in the chemical concentrate are precipitated as solid carbonates or calcined (cooked) to an oxide state.

- Solvent Extraction: The rare earth chloride solution is next placed into contact with another insoluble liquid. In turn, rare earth compounds are separated based on their different solubilities in different liquids. The rare earth materials are thereby transferred from their original solution to the other liquid solution.

- Separation: The rare earth chloride extracts from the solvent extraction process are separated into single rare earth chloride products and then put through the solvent extraction process again. These steps may have to be repeated hundreds of times.

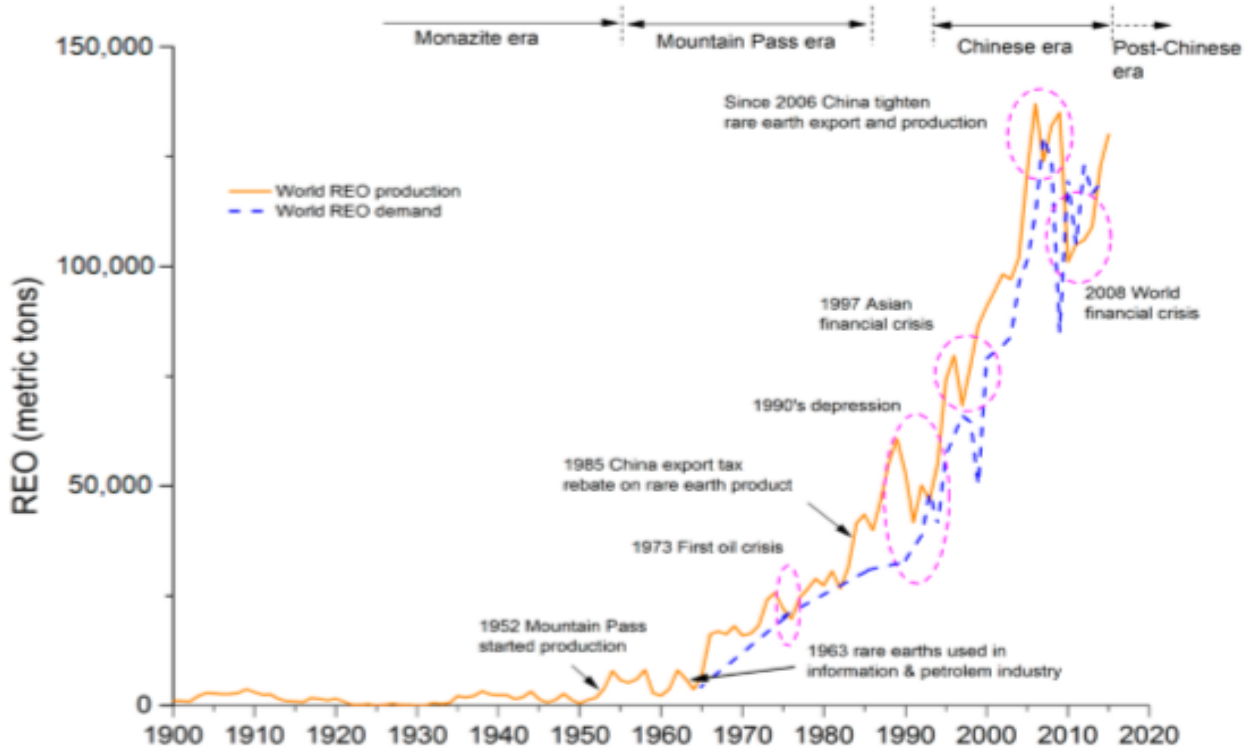
GLOBAL MARKET FOR RARE EARTH MATERIALS

In some cases, there really are no substitutes for rare earth materials in critical industry niches. For example, neodymium (Nd), praseodymium (Pr) and dysprosium (Dy) are critical to the motors used in electric vehicles (see page 13). Similarly, europium (Eu) is required to create the luminescence in liquid crystal displays in TV monitors and computers. According to Thomas Lograsso, a well-known rare earth research scientist, the substitution risk for REEs is considered very small for many other applications, namely for neodymium (Nd) in lasers; terbium (Tb) in fiber optics; and lanthanum (La), yttrium (Y)and cerium (Ce) in glass polishing.

As noted in Table 1, about 150,000 tonnes of rare earth oxides (REO) are consumed annually on a global basis, equivalent to a global market of around US$3-5 billion. Even more interesting, rare earths are important elements to finished goods worth about US$1 trillion on a worldwide basis.

REO utilization began to accelerate in the mid-1960's, coinciding with the infancy of the information technology industry. REO demand has continued to show dramatic growth despite various financial crises over the past 50 years. See Figure 4.

Figure 4: Global Rare Earth Oxide Production and Demand Grow Irrespective of Crises



Source: MDPI Minerals.

SOURCES OF RARE EARTH MINERALS

Monazite, a phosphate mineral that contains, among other things, the rare earth elements cerium, lanthanum, neodymium, and yttrium; and bastnaesite, a carbonate mineral that contains, also among other things, cerium, lanthanum or yttrium (but in different proportions than monazite), are the most commonly mined mineral sources of rare earths worldwide. Rare earth elements and hosting minerals can be found in a variety of forms, including hard rock, sand materials and tailings from mining operations focusing on other minerals. Typically, mining and processing sand materials is less complicated and cheaper than for hard rocks. One example: the monazite beach sands in Odisha, India have an REE content of about 57%.

There exist only a handful of miners worldwide which are dedicated to rare earth mining, as the costs of such a targeted strategy are quite high and virtually all customers are situated in China. Many polymetallic mining companies explore for rare earth materials in addition to exploring for metals like gold, silver and copper. Canada Rare Earth, through its initiatives, plans to give these miners much desired and economically positive world-class refinery options outside of China.

CANADA RARE EARTH'S LAOS REFINERY OPPORTUNITY

A completed rare earth refinery in Laos with the capacity to produce 3,000 tonnes (expandable to 6,000 tonnes) of rare earth oxides annually is awaiting final government approval. All other required approvals have already been obtained. The facility can produce oxides of the entire spectrum of commercially traded rare earth elements and rare earth metals from oxides.

When the permit is received, Canada Rare Earth intends to acquire a 60+% interest in the facility, which is located near Vientiane, the capital of Laos. We believe the price per tonne of refinery capacity that would be paid by Canada Rare Earth is a fraction of the price paid by Lynas for its Malaysian refinery and operating costs

ought to be very competitive, if not significantly better. Of course, Canada Rare Earth's investment decision will be dependent on some further due diligence and the receipt of suitable financing terms.

CANADA RARE EARTH'S OTHER REFINERY OPPORTUNITIES

We understand that Canada Rare Earth is investigating one or more refinery opportunities either to purchase or develop. We believe that one refinery in particular is further advanced and could have a larger production capacity than the Laos refinery, around 5,000-6,000 tonnes per year.

SOUTH AMERICAN TAILINGS

In December 2019, Canada Rare Earth, together with two partners, purchased mineral sands tailings from a mine in South America. At one time, the mine produced 3% of the world's annual tin supply. The tailings contain rare earth materials plus other valuable metals. Under the terms of the agreement, Canada Rare Earth (20%) and its partners (80%) will pay a total of US$11 million over ten years for the tailings, which are situated on 590 hectares, plus the cost of a 26-year lease for a 9,960-hectare property (which includes the 590-hectare parcel). Canada Rare Earth and its partners paid the first installment of US$600,000 in January 2020. The remaining required payments are monthly payments of US$100,000 per month beginning in September 2020.

Canada Rare Earth and its partners expect to engage one or more operators who will acquire, finance and operate concentration equipment that will create a mixed concentrate from the tailings sometime within 12 months. The resultant concentrate will then be sold to existing refineries for the final separation steps. Canada Rare Earth has already identified customers for 48,000 tonnes per year of such sales. These sales are likely to commence in the first quarter of 2021. The initial shipping rate is expected to be 2,000-3,000 tonnes per month, and, in our opinion, the sales will create a very substantial and predictable cash flow stream for Canada Rare Earth.

FINANCING NEEDS

If Canada Rare Earth succeeds in closing one or more of the refinery transactions described on page 12, the company will have significant financing needs. We understand that, as opposed to raising these funds with conventional financings, the company will set up special purpose vehicles (SPVs) to accomplish its goals. Such structures would keep the new debt off Canada Rare Earth's balance sheet; minimize, if not avoid, dilution to its shareholder base; and provide control of the SPVs and the refineries to Canada Rare Earth. (The Brazilian tailings project entails only minimal future cash requirements; Canada Rare will contribute US$20,000 per month beginning in September 2020, plus miscellaneous expenses, until positive cash flow from the tailings operation is achieved.)

RARE EARTHS – GROWING DEMAND IN THE ELECTRIC VEHICLE INDUSTRY

The use of rare earth elements allows auto manufacturers to significantly increase the range of electric vehicles. Most notably, a neodymium magnet, which is made of neodymium, iron and boron and is the strongest type of commercially available magnet, can boost a vehicle's range by around 10%, according to Tesla, when used in the motor of an electric vehicle. (Electric motors utilize the force produced when two magnets with opposing poles repel each other to propel an axle.) The neodymium magnet is also widely used in iPhones and hard drives, as well as in military equipment
like the F-35 fighter and in the guidance systems of the Tomahawk and Javelin missiles.

RISKS FROM RARE EARTH PROCESSING

The presence of some radiation is commonly associated with rare earths. For example, tailings derived from Lynas' refining facility in Malaysia contain a limited amount of radioactive materials which continue to be an issue in that country and elsewhere. The Lynas concentrate which is refined in Malaysia comes from Lynas' Mount Weld deposit in Australia and is considered low-level radioactive. There are proper means of handling, storing and dealing with the tailings to mitigate associated issues.

INVESTMENT SUMMARY

Despite its small size, Canada Rare Earth has a unique opportunity to become a major player in the REE industry. The key bottleneck in the industry is the refining function, specifically the lack of refining facilities outside of China. Many Western companies would welcome another reliable rare earth oxide and metal supplier — aside from Lynas and in some ways potentially superior to Lynas — located in a more stable region or regions. Canada Rare Earth could fill that void. If it does, we would expect a dramatic revaluation of Canada Rare Earth's stock price

Lynas has an enterprise value of about US$660 million. Its principal asset is a rare earth material refining facility in Malaysia with an annual processing capacity of 18,000-20,000 tonnes. Lynas plans to build another refinery in Australia that would be operational in 2023 and would at the same time close its Malaysian facility. These actions are expected to be dilutive to existing Lynas shareholders. Canada Rare Earth's prospective refineries would be smaller than Lynas' but would be able to process the entire spectrum of REEs and would also be able to accept third party materials. If at least one of Canada Rare Earth's refinery transactions reach fruition, the ratio of Lynas' enterprise value to Canada Rare Earth's enterprise value should normalize to a far smaller figure than the current ratio of more than 100:1.

***Forward-Looking Statement Cautions**: This report may contain certain "forward-looking statements" within the meaning of Canadian securities legislation, relating to, among other things, the Company's plans for constructing, permitting or otherwise acquiring and operating rare earth refinery capabilities. Although the Company believes that such statements are reasonable based on current circumstances, it can give no assurance that such expectations will prove to be correct. Forward-looking statements are statements that are not historical facts; they are generally, but not always, identified by the words "expects", "plans", "anticipates "believes", "intends", "estimates", "projects", "aims", "potential", "goal", "objective", "prospective", and similar expressions, or that events or conditions "will", "would", "may", "can", "could" or "should" occur, or are those statements, which, by their nature, refer to future events. The Company cautions that forward-looking statements are based on the beliefs, estimates and opinions of the Company's management on the date the statements are made and they involve a number of risks and uncertainties, including the possibility of issues surrounding permitting, the lack of sufficient future financing to carry out its plans to, and unanticipated changes in the legal, regulatory and permitting requirements for the Company's proposed initiatives. There can be no assurance that such statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. Accordingly, readers should not place undue reliance on forward-looking statements. The Company disclaims any intention or obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law or the policies of the TSX Venture Exchange. Readers are encouraged to review the Company's complete public disclosure record on SEDAR at www.sedar.com.*

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