Technology Metals Report (03.15.2024): U.S. Makes a $2.6B Lithium Loan while Australia Invests $840M into Rare Earths

written by Tracy Weslosky | March 15, 2024

Welcome to the latest issue of the Technology Metals Report (TMR), brought to you by the Critical Minerals Institute (CMI). In this edition, we compile the most impactful stories shared by our CMI Directors over the past week, reflecting the dynamic and evolving nature of the critical minerals and technology metals industry. Among the key stories featured in this report are the Biden administration's massive $2.26 billion loan to Lithium Americas Corp. for the Thacker Pass mine in Nevada, aiming to boost domestic lithium production for electric vehicles; the Australian government's significant A$840 million investment in Arafura Rare Earths Limited to secure a sovereign supply of rare earth elements; and the Canadian federal government's investment in Saskatoon's Saskatchewan Research Council to enhance its Rare Earth Processing Facility. These developments underscore a global effort to secure critical mineral supplies, reduce dependence on foreign sources, and advance the transition towards cleaner energy and technology.

This week's TMR Report also highlights several other important developments in the critical minerals sector. Notable stories include the criticism from the Canadian Automobile Dealers Association regarding Quebec's decision to phase out electric vehicle purchase incentives, adjustments in electric vehicle

strategies by major automakers amid shifting market dynamics, and the UK's trade pact with Texas aimed at boosting the green industry. Additionally, the report covers POSCO International's significant deals to supply rare earth permanent magnets to North American and European automakers, signs of recovery in the global lithium market after a massive downturn, geopolitical competition for the Democratic Republic of the Congo's mineral wealth, Greece's emergence as a significant source of critical minerals, the U.S. Department of Defense's initiative to establish a "mine-to-magnet" supply chain, challenges and opportunities in Canada's mining industry, and the call by global miners for the London Metal Exchange to introduce a green premium for nickel. These stories provide a comprehensive overview of the current state and future prospects of the critical minerals and technology metals industry, reflecting its importance to technological advancement, national security, and the global transition to green energy. To become a CMI member, click here (https://criticalmineralsinstitute.com/join)

Biden Jump-Starts Electric-Vehicle Push With Massive Lithium Loan (March 14, 2024, Source) – The Biden administration is energizing the U.S. electric vehicle (EV) sector with a $2.26 billion loan to Lithium Americas Corp. (TSX: LAC | NYSE: LAC) for its Thacker Pass mine in Nevada, aiming to fortify domestic lithium production for EV batteries. This investment, part of a broader initiative to secure half of new vehicle sales as EVs by 2030, will fund a refining plant critical for producing battery-grade lithium. Despite a recent slowdown in EV sales and a plunge in lithium prices, the project seeks to reduce U.S. dependence on foreign battery minerals, notably from China. Expected to start in 2027, the Thacker Pass mine will significantly contribute to the domestic EV industry, promising to supply lithium for up to 800,000 EVs annually. This move aligns with efforts to transition towards cleaner energy and

reduce reliance on international sources.

The Australian Government Steps into the Critical Minerals Supply Chain Ring (March 14, 2024, Source) – The Australian government's backing of Arafura Rare Earths Limited (ASX: ARU) with A$840 million underscores a strategic push to lessen reliance on Chinese critical mineral sources, aiming to secure a sovereign supply of rare earth elements vital for electric vehicles and renewable technologies. This investment signals Australia's intent to lead in the global rare earth market, enhancing private sector confidence as evidenced by rising values in related investments, including those by Gina Rinehart's Hancock Prospecting. The move highlights Australia's ambition to not only overcome immediate financial challenges in the mining sector but also to establish itself as a crucial player in renewable energy technology, fostering global supply chain resilience and advancing the green energy transition.

Ottawa invests $6M in Saskatoon rare earth processing facility (March 14, 2024, Source) – The Canadian federal government is investing $6 million in Saskatoon's Saskatchewan Research Council to boost its Rare Earth Processing Facility, marking a significant step in processing critical minerals for high-tech uses like electric vehicle batteries and wind turbines. This funding will commercialize a process for extracting rare earth oxides from waste and develop an automated smelting process for commercial-quality metals, aiming to enhance sustainable and efficient production. The investment reflects a collaboration between federal and provincial governments, highlighting the national importance of establishing a domestic rare earth supply chain. It promises economic growth and job creation, positioning Saskatoon as a key player in meeting global demand for critical minerals and supporting the transition towards a greener economy.

A Step Backwards for Quebec's Automotive Electric Transition (March 13, 2024, Source) – The Canadian Automobile Dealers Association (CADA) criticizes the Quebec government's 2024 Budget decision to phase out electric vehicle (EV) purchase incentives amid an affordability crisis. This move is seen as detrimental to Quebec's leading position in EV adoption, fueled by an effective incentive program. CADA refutes the government's claim of a narrowing price gap between EVs and traditional vehicles, highlighting that price parity is not expected until 2033. The association warns that removing incentives could slow EV adoption, contrasting with the successful examples of Quebec and British Columbia, which offer substantial financial incentives. CADA urges the government to reconsider, emphasizing the importance of incentives in achieving environmental goals and maintaining affordability for Quebecers.

EV euphoria is dead. Automakers are scaling back or delaying their electric vehicle plans (March 13, 2024, Source) – Automakers are adjusting their electric vehicle (EV) strategies amid fading EV euphoria, scaling back or delaying plans despite initial optimism. Industry giants like Ford, General Motors, Mercedes-Benz, Volkswagen, Jaguar Land Rover, and Aston Martin are shifting towards a more balanced vehicle offering, incorporating gas-powered, hybrid, and electric vehicles. This approach reflects a slower transition to an all-electric future, diverging from previous ambitious EV growth targets. Despite a reduction in growth expectations, the demand for EVs continues to rise, albeit at a slower pace, with sales still predicted to increase significantly. The industry acknowledges the necessity of hybrid models to bridge the transition to electrification and meet emission standards. This recalibration underscores the automotive sector's response to less-than-expected consumer uptake of EVs and the reality of current market conditions, suggesting a more gradual shift towards electrification.

UK Signs Trade Pact With Texas in Effort to Boost Green Industry (March 12, 2024, Source) – The UK has signed a trade pact with Texas to enhance cooperation in green energy, aerospace, and advanced technologies, marking the eighth non-binding memorandum of understanding (MoU) with a US state since Brexit. This agreement aims to boost the collective GDP of these states to $6.8 trillion, a quarter of the US economy. It includes mutual recognition of engineering qualifications to facilitate talent exchange for infrastructure projects. The pact also focuses on making business easier in sectors like hydrogen and carbon capture. Despite not being the comprehensive Free Trade Agreement that Brexit supporters hoped for, this deal reflects the UK's strategy of forming state-level agreements in the US. Texas, the UK's ninth largest trade partner, exchanged £14.7 billion in goods with the UK in 2023. However, some critics argue these MoUs do little to reduce tariffs and aren't sufficiently promoted.

POSCO International signs deal for permanent magnet supply with US, European automakers (March 12, 2024, Source) – POSCO International has inked deals worth 1.16 trillion won ($885 million) to supply rare earth permanent magnets, essential for electric vehicle (EV) motors, to North American and European automakers. These contracts aim to diversify the supply chain away from China, utilizing materials from the US, Australia, and Vietnam. The company's U.S. subsidiary will supply a North American carmaker with magnets worth 900 billion won from 2026 to 2031, while its German subsidiary will provide a European brand with magnets valued at 260 billion won from 2025 to 2034. Star Group, Korea's exclusive rare earth magnet producer, will handle production. This marks a strategic entry into markets dominated by China, reflecting POSCO's efforts to expand its global footprint and secure additional orders with car and motor manufacturers.

After Massive Bust, Global Lithium Market Shows Signs of Life (March 12, 2024, Source) – The global lithium market, vital for electric vehicle batteries, is witnessing a cautious revival after a drastic downturn. Prices for lithium carbonate in China have surged to a post-December high following an over 80% fall in 2023, with futures contracts also seeing significant gains. This rebound is amidst a global supply glut that previously tanked prices. Leading producers remain hopeful, with giants like Albemarle Corporation (NYSE: ALB) and Sociedad Química y Minera de Chile S.A. ("SQM") (NYSE: SQM) continuing expansions despite the market's volatility. Efforts to rebalance include production cutbacks by some firms. However, analysts warn that the recovery could be fragile, with environmental regulations in China and a persistent supply surplus posing challenges to a sustained rally. Skepticism remains regarding the end of the bear market amidst these tentative gains.

The (Bidding?) War For the DRC (March 12, 2024, Source) – The Democratic Republic of the Congo (DRC) is a focal point for global powers due to its rich deposits of critical minerals essential for modern technologies and green economies. China, Saudi Arabia, the United Arab Emirates, and Russia are the main players, each with distinct strategies and impacts. China has a controversial history in DRC's mining sector, while Saudi Arabia's investment approach fosters a positive development model. The UAE's agreement aims to enhance artisanal mining, and Russia's involvement hints at a Cold War-style influence game. In contrast, US and European engagement in securing these vital resources has been relatively minimal. These dynamics underscore the geopolitical competition over the DRC's mineral wealth, pivotal for technological advancement and climate change mitigation.

Critically important metals are found (March 11, 2024, Source) – Greece is emerging as a significant potential source of critical

minerals essential for the clean energy transition, attracting investor interest. The Ministry of Environment and Energy, bolstered by Rockfire Resources PLC's positive findings in Molaoi, southern Greece, indicates substantial deposits of germanium, gallium, lead, silver, and zinc. Germanium's uses span fiber-optics to solar panels, while gallium, extractable from Greece's abundant bauxite, is vital for electronics. The EU has noted Mytilineos' pilot project for gallium extraction from bauxite, potentially satisfying European demand. Additionally, Mytilineos explores scandium production, beneficial in aerospace and electric vehicles, forecasting a significant demand increase. Rockfire Resources plans further exploration and a viability study post-summer. Greece's untapped resources, including antimonite in Chios and bismuth near Xanthi, underscore its strategic position in supporting Europe's energy transition and reducing reliance on imports, especially from China.

DOD Looks to Establish 'Mine-to-Magnet' Supply Chain for Rare Earth Materials (March 11, 2024, Source) – The Defense Department is actively pursuing the establishment of a domestic "mine-to-magnet" supply chain for rare earth materials, crucial for manufacturing permanent magnets used in significant U.S. military systems and commercial applications. Recognizing the vulnerability of relying on foreign sources, notably China, for these materials, the DOD aims to enhance national security through self-reliance. It has allocated over $439 million since 2020 to develop this supply chain, covering mining, separation, refining, and manufacturing processes within the U.S. This initiative is guided by the National Defense Industrial Strategy and seeks to achieve a resilient, domestic supply chain capable of meeting all U.S. defense requirements by 2027. Critical defense systems, such as the F-35 Lightning II aircraft, Virginia and Columbia class submarines, and various missile and

radar systems, depend heavily on these rare earth materials. The DOD's strategy includes significant investments in U.S.-based companies and technologies to ensure the country's self-sufficiency in rare earth element production and magnet manufacturing, aiming to eliminate dependency on foreign sources and secure the future needs of both defense and commercial sectors.

Critical minerals mining industry requires more of everything if Canada to be a global player (March 11, 2024, Source) – The KPMG in Canada survey reveals optimism among Canadian mining leaders regarding the potential for Canada to be a global leader in critical minerals. However, they acknowledge significant obstacles, including the need for more investment, government support, and favorable tax policies. Challenges like decarbonization, lack of domestic refining capacity, raising capital, environmental, social, and governance risks, cost reduction, and regulatory hurdles are highlighted. The survey indicates that only a minority of companies have committed to comprehensive carbon emission reductions by 2050, with many still planning or not having a strategy for emission reduction. Furthermore, the Critical Mineral Exploration Tax Credit (CMETC) has boosted exploration activities but is seen as complex and limited in scope. Respondents call for broader and more innovative tax policies to encourage investment and development in the sector.

Global miners call on LME to introduce green premium for nickel (March 5, 2024, Source) – Global mining giants, including BHP Group (ASX: BHP | NYSE: BHP) and Wyloo Metals, have urged the London Metal Exchange (LME) to create a green premium for sustainably produced nickel amidst concerns over environmental damage caused by "dirty" nickel, particularly from Indonesia. Indonesia, a major player in the nickel industry, has been criticized for deforestation, pollution, and high carbon

emissions due to its reliance on coal-fired power. The LME, however, responded that the market for green nickel isn't yet large enough to support a dedicated futures contract. BHP and others argue for differentiating between green and dirty nickel, highlighting the environmental impact differences. The LME supports trading low carbon nickel but cites the need for more development in identifying a credible green premium. Meanwhile, Indonesia's low-cost nickel production is poised to dominate the global market, raising concerns over environmental standards and the need for responsible sourcing guidelines that include emissions metrics.

Investor.News Critical Minerals Media Coverage:

- March 14, 2024 – The Australian Government Steps into the Critical Minerals Supply Chain Ring https://bit.ly/3Vm9NDR
- March 12, 2024 – The (Bidding?) War For the DRC https://bit.ly/4aaKMzO

Investor.News Critical Minerals Videos:

- March 14, 2024 – Neo Performance's Rahim Suleman on being 'the most vertically integrated rare earth magnetics company in the world.' https://bit.ly/3PkS8IY
- March 14, 2024 – Darren Hazelwood on Panther Metals' VMS Project Scale and the Graphite Potential Near Thunder Bay https://bit.ly/492OzOM
- March 14, 2024 – Codemge's CEO on Leveraging Minas Gerais' Position as Brazil's Niobium Mining Powerhouse https://bit.ly/48Pfo8U
- March 13, 2024 – Chris Berlet on the benefit of MineralPrices' real-time pricing information https://bit.ly/3TA1i6Q
- March 11, 2024 – Power Nickel's Terry Lynch on "the least

expensive high-grade nickel sulfide exploration play in the world" https://bit.ly/3VgWdBF

- March 11, 2024 – Tom Drivas Explores the Initial Rare Earth Mineral Resource Estimate from Appia's PCH Ionic Adsorption Clay Project in Brazil https://bit.ly/3VdU9KL
- March 11, 2024 – Chad Clovis on Real Environmental Benefits through the Karbon-X Carbon Credit App https://bit.ly/3Tt6jy6
- March 11, 2024 – Stephen Burega on Romios Gold's Recent Strides Forward in High-Grade Copper Exploration in Nevada https://bit.ly/4a9HA7E
- March 11, 2024 – Sean Cleary on Strategic's plans to revitalize former producer of 10% of the world's vanadium https://bit.ly/3IwVZP9

Critical Minerals IN8.Pro Member News Releases:

- March 14, 2024 – Technology Advancement: NEO Battery Expands Production Yield and Capacity with Manufacturing Innovation https://bit.ly/43f7Efj
- March 13, 2024 – Voyageur Achieves Milestone with Rain Cage Royalty Agreement for Sustainable Carbon Drug Development https://bit.ly/3TzarN0
- March 13, 2024 – First Phosphate and Groupe Goyette Sign MOU for Logistics Footprint at the Hebertville-Station Intermodal Facility in the Saguenay-Lac-St-Jean Region of Quebec, Canada https://bit.ly/3PlqXxL
- March 13, 2024 – Fathom Announces Completion of Drilling at Albert Lake Project and Commencement of Drilling at the Gochager Lake Project https://bit.ly/3wPQFnA
- March 12, 2024 – American Clean Resources Group Enters Well Water Purchase Agreement with Road and Highway Builders LLC https://bit.ly/3wOX2aT
- March 11, 2024 – Critical Metals PLC Appointment of Non-

Executive Director https://bit.ly/43cATiI

Tom Drivas on how Appia is unlocking the dual potential of rare earths and uranium

written by InvestorNews | March 15, 2024

In a recent InvestorNews interview, host Brandon Colwell sat down with Appia Rare Earths & Uranium Corp.'s (CSE: API | OTCQX: APAAF) CEO and Director Tom Drivas, to discuss the exceptional drilling results from Appia's PCH Ionic Clay Project in Brazil. Discussing the consistency and high-grade rare earths mineralization at the project, Tom highlights that the average grades of Total Rare Earth Oxides (TREO) is comparable to, or surpasses, other well-known international deposits.

The Critical Minerals Institute's Jack Lifton on Vital Metals, the SRC and

Ionic Clays and Rare Earths

written by InvestorNews | March 15, 2024

In this InvestorIntel interview, Tracy Weslosky talks with Critical Minerals Institute's (CMI) Co-Chairman Jack Lifton attempts to explain what Vital Metals Limited's recent announcement about "pausing all construction-related activities at the Saskatoon processing facility" means. Clarifying and reinforcing what the Saskatoon Research Council (SRC) has stated online, we would like to redirect our audience to the SRC website where they state: "SRC wants to clarify that its Rare Earth Processing Facility currently under construction is on schedule and on budget and will be fully operational by the end of 2024."

Tom Drivas of Appia Rare Earths & Uranium Discusses Alces Lake and "Exciting" Brazilian Acquisition

written by InvestorNews | March 15, 2024

In this InvestorIntel interview, Tracy Weslosky talks to Appia Rare Earths & Uranium Corp.'s (CSE: API | OTCQX: APAAF) CEO and Director Tom Drivas about signing a letter agreement to acquire up to 70% interest in a prospective rare earths ionic clay project in Brazil. Currently doing its due diligence, Tom discusses how the new Brazilian project, if finalized, would not

interfere with their main focus on the Alces Lake project. Tom goes on to say that the Brazilian project will have a new team with direct ionic clay expertise.

With an extensive exploration program planned for this year at the Alces Lake project in northern Saskatchewan, Tom discusses the company's focus on delineating high-grade critical rare earth elements and gallium. Tom also provides an update on Appia's ongoing relationship with the Saskatchewan Research Council ("SRC") which is developing a rare earths processing facility in Saskatoon and the plans for the SRC to process monazite from the Alces Lake project as early as next year.

To access the full InvestorIntel interview, click here

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About Appia Rare Earths & Uranium Corp.

Appia is a publicly traded Canadian company in the rare earth element and uranium sectors. The Company is currently focusing on delineating high-grade critical rare earth elements and gallium on the Alces Lake property, as well as exploring for high-grade uranium in the prolific Athabasca Basin on its Loranger, North Wollaston, Eastside, and Otherside properties. The Company holds the surface rights to exploration for 113,837.15 hectares (281,297.72 acres) in Saskatchewan. The Company also has a 100% interest in approximately 12,545 hectares (31,000 acres), with rare earth element and uranium deposits over five mineralized zones in the Elliot Lake Camp, Ontario.

To learn more about Appia Rare Earths & Uranium Corp., click

here.

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Any projections given are principally intended for use as objectives and are not intended, and should not be taken, as assurances that the projected results will be obtained by the Company. The assumptions used may not prove to be accurate and a potential decline in the Company's financial condition or results of operations may negatively impact the value of its securities. Prospective investors are urged to review the Company's profile on Sedar.com and to carry out independent investigations in order to determine their interest in investing in the Company.

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.

The Saskatchewan Rare Earths industry has the Prime Minister's attention

written by InvestorNews | March 15, 2024

Canadian Prime Minister Justin Trudeau recently toured Vital Metals Limited's (ASX: VML l OTCQB: VTMXF) rare earths processing plant in Saskatoon's northern industrial area. Vital Metals' site is next door to another rare earths processing facility built and operated by the Saskatchewan Research Council (SRC) which, in a test run back in August, created the first rare earth element ingots produced in Canada. The fact that the Prime Minister was in Saskatoon and stated that there is a support system for rare earth element mining in Saskatchewan is very encouraging. Readers may recall the Critical Minerals series we ran in July, 2022 where one of my greatest concerns was how effective our Federal Government would be in doing anything useful to advance the cause of critical materials. However, I suggested that as long as the topic remained at the forefront and politically in vogue, my hope was that they would stay out of the way and let smart, innovative people get on with doing what's best for Canada and its allies.

It appears the Government is heeding my concerns (for now) and that the rare earth industry should be able to continue to progress without too much interference. That is certainly good

news if you are developing a rare earth prospect in Saskatchewan. One company that falls into that category is Appia Rare Earths & Uranium Corp. (CSE: API | OTCQX: APAAF), a Canadian publicly listed company in the rare earth element and uranium sectors. The Company is currently focusing on delineating high-grade critical rare earth elements and gallium on the Alces Lake property, as well as exploring for high-grade uranium in the prolific Athabasca Basin on its Otherside, Loranger, North Wollaston, and Eastside properties. The Company holds the surface rights to exploration for 110,997 hectares (274,280 acres) in Saskatchewan.

Appia's Alces Lake project encompasses some of the highest-grade total and critical REEs and gallium mineralization in the world, hosted within several surface and near-surface monazite occurrences that remain open at depth and along strike. In early December, the Company announced results from the 2022 prospecting program that included:

- 36.11 wt.% TREO returned from samples of massive to semi-massive monazite in outcrop at the West Limb anomaly, first discovered in 2022.
- 3.34 wt.% TREO returned from a mineralized biotite shear zone at the West Limb anomaly
- 4.34 wt.% TREO returned from visible monazite in a shear zone at a previously unexplored and un-named radiometric prospect south of the Magnet Ridge zone
- 2.03 wt.% TREO returned from visible monazite discovered in the Western Anomaly

Still to come are assays from the record 2022 drilling program at Alces Lake where the Company completed 17,481 m over 100 drill holes. Appia's 2022 drilling program at Alces was designed to drill significantly deeper holes compared to the 100 holes

(approximately 8,076 m) drilled in 2021 to allow Appia to determine continuity at depth and along the identified REE mineralization trends as the company works towards a maiden resource estimate to be prepared in accordance with NI 43-101 for the area. With high-grade REE mineralization now identified in many locations within an area covering approximately 27 km2 of the Alces Lake block, the Company believes the project has the potential to be a world-class source of high-grade critical rare earth bearing monazite.

Momentum is certainly there for critical minerals comprising the battery supply chain. Being relatively close to Canada's first rare earth processing facility is an added bonus for Appia Rare Earths. The Company's newly appointed President, Mr. Stephen Burega, is stepping in at a pretty exciting time, with drill results pending and a resource estimate looming. Additionally, Appia added C$3.7 million to it's treasure in December with a non-brokered private placement that provides the Company with plenty of dry powder to pursue its 2023 exploration program at Alces Lake, as well as it's various uranium properties. At a market cap of C$39 million, Appia is currently trading near its lowest levels in over two years. A decent NI 43-101 resource estimate for Alces Lake could go a long way towards changing the look of this stock chart.

Rare earths expert Alastair Neill on Vital Metals

written by | March 15, 2024

"Overall Vital appears well on the way to producing commercial

quantities of rare earth concentrate, a first in Canada." – Alastair Neill, President, Critical Minerals Institute

Vital Metals Limited (ASX: VML | OTCQB: VTMXF) is an Australian listed company whose subsidiary, Cheetah Resources, is developing the Nechalacho project in the Northwest Territories of Canada. The deposit was previously owned by Avalon Advanced Materials Inc. (TSX: AVL | OTCQB: AVLNF), and they sold the rights in 2019 to Cheetah for the material 150 meters above sea level. Avalon retained the rights to the basal zone deposit which is underground. The deposit is reported to have 94.7 million tonnes at 1.46% REO (0.1% Nd/Pr cutoff). The mineral hosting the rare earths is bastnaesite, which is good as this mineral has been processing successfully for many years.

Vital raised A$45 million recently through a targeted share placement at A$0.04 per share. According to their press release the funds will be used for:

- Finalisation of construction activities and undertake commissioning, ramp-up and operations at its Rare Earth Extraction Facility in Saskatoon, which will produce a rare earth carbonate product
- Accelerated development of Tardiff deposit at Nechalacho, Canada, including mining studies

A strong balance sheet for ongoing working capital requirements

This project is the most advanced rare earth project currently in Canada. The initial focus is the North T zone which has a resource of 101,000 metric tonnes at 9.01% contained Total Rare Earth Oxides (TREO). Based on tests run at their Saskatoon rare earth extraction plant they can get a 75% recovery to produce a 43.7% concentrate. Based on this, the deposit would produce 6,825 metric tonnes of TREO which would contain 1,600 tonnes of Neodymium (Nd) and Praseodymium (Pr). Tests have been done

using X-ray Transmission (XRT) to sort the ore as the ore is hosted in quartz, which is white, and the rare earth mineral which is red. This is a simple way to upgrade the TREO content at site.

There is an offtake agreement with REEtec, a Norwegian company that is developing a new rare earth separation process. The agreement is for Vital to deliver 1,000 tonnes per year (TPY) of TREO (excluding Cerium (Ce)). Based on that Ce will be eliminated before shipping the concentrate to Norway. This is a step that has been done before by Molycorp in the 1980s. It reduces the material handling by 50% and obviously the size of downstream processing equipment. The North T zone will provide 3,400 of the 5,000 tonnes which means Cheetah will have to open the Basal zone to meet the balance of the supply contract.

Looking at today's prices on Shanghai Metal Market (SMM) the separated value of this contract is over US$286 million. Assuming Vital gets 1/3 of the value for the concentrate this would produce revenues of over US$95 million of which US$92 million would come from Nd/Pr. Details of the agreement are not revealed so REEtec may be a toll arrangement which could produce more revenue for Vital though I expect the initial target would be to sell La, Nd and Pr in Europe as there are customers in Europe.

Interestingly the extraction plant is located beside the Saskatchewan Research Council (SRC) which has announced that they will be building a rare earth separation facility to process monazite by 2024. SRC has two rare earth experts from China on staff. SRC is also putting in an Nd/Pr metal facility which takes the oxide to the next level in the supply chain.

In addition to the Nechalacho project, Vital has a project in Tanzania called Wigu Hill. Vital has signed a project

development and option agreement with Montero Mining & Exploration Ltd. (TSXV: MON), to acquire and develop the Wigu Hill project. The Wigu Hill project is a light rare earth element deposit and consists of a large carbonite complex with bastnaesite mineralization with a NI 43-101 Inferred resource estimate of 3.3Mt at 2.6% light REOs. This is also a bastnaesite mineral.

Overall Vital appears well on the way to producing commercial quantities of rare earth concentrate, a first in Canada. Questions that do need to be answered are what are the costs of operating an open pit mine in Northern Canada and the costs to transport material to Saskatoon.

Appia Rare Earths & Uranium by the numbers

written by | March 15, 2024

Appia Rare Earths & Uranium Corp. (CSE: API | OTCQX: APAAF) recently reported results from its 2021 drilling program and work completed this year on its Alces Lake property in Northern Saskatchewan. While results are still pending from the 34 holes drilled at the recently renamed site Magnet Ridge (formerly Augier), other areas returned values as high as 14.95% TREO over 0.66 metres. This is high compared to most deposits. As of early July Appia has drilled over 14,000 metres in 2022 and plans to drill up to 20,000 metres this year, which should provide them with valuable information on the Alces Lake deposit. Magnet ridge is interesting as Appia has reported it outcrops at surface with a strike length of about 300 metres and a width of

175 metres, and has been penetrated to over 100 metres deep.

The mineral hosting the rare earths at Alces Lake is monazite. Monazite is regularly processed in China to produce rare earths, so making a concentrate and separating the rare earths is an established technology. In several jurisdictions, this could be a problem as monazite is typically associated with the radioactive elements Thorium (Th) and Uranium(U). However, it comes down to the old paradigm, location, location, location. Being situated in Saskatchewan, Appia is in a jurisdiction that understands radioactive materials and that they can be properly handled and stored, and in the case of uranium can be a valuable resource. The other advantage for Appia being in Saskatchewan is that the Saskatchewan Research Council is building a pilot plant for rare earth separation over the next 2 years. This will give Appia the ability to test their material locally, which is a significant advantage.

A 2020 Appia presentation indicates Neodymium (Nd) oxide levels of 17.4% and Praseodymium (Pr) oxide of 5.4% which gives a combined total of just under 23%. This is close to the Lynas levels from its Mt. Weld deposit, which Roskill's Market Outlook 2015 indicates to be 23.8%. The Mountain Pass Mine, the deposit in California owned by MP Materials, has Nd+Pr levels at 16.3%. so they would have to process up to 50% more material to get the same revenue levels as Appia or Lynas. In addition, Appia's report shows added value in Terbium (Tb) and Dysprosium (Dy). Looking at recent pricing in Shanghai Metal Markets (SMM), the Nd/Pr holds 87.8% of the total value. Terbium and Dysprosium add another 0.3%. This assumes that all the elements are sold, which typically is impossible, especially the Cerium, which is over 49% of the total volume. However, there may be markets in North America and possibly Europe for Cerium and Lanthanum. Their current price in China is $1.22 and $1.15 per kg respectively and freight can be a high proportion of the total cost of the

product outside of Asia.

One way to look at the value of the deposit is to see what potential revenue can be generated from the four main magnetic elements (Neodymium, Praseodymium, Terbium and Dysprosium). Assuming the long range plans would be to build a 20,000 TPY plant, which is similar to the previous Molycorp output and just below the Lynas present output of around 22,000 TPY, their projected revenues would be around US$500 million per year. This assumes 90% recoveries and revenues only from Nd+Pr. Any sales of Cerium and Lanthanum would be minimal but an added bonus.

In addition, Appia has properties in the Elliot Lake area in Ontario. This is in the right area code as from the mid-late 1950s to 1990 there were 10 mines producing Uranium. Again location, location, location. Given the push for electric vehicles and the corresponding increase in electrical demand, countries are going to review their long term needs including Germany and China, and possibly India, and given alternative producing options nuclear is a cleaner way than coal or gas to produce electricity. Also given the current Russian situation more focus will come on nuclear and correspondingly Uranium. Thorium may also come into demand as it can reduce the operating temperature and thereby improve safety.

All things considered, Appia has an interesting opportunity and with the grades shown so far, and is poised to take the next steps to becoming a potential domestic producer of rare earths.

Leading rare earths junior Appia adds a new uranium claim block to their expanding asset portfolio

written by InvestorNews | March 15, 2024

Two of the best-performing commodities in the past year have been the key rare earth magnet material blend, neodymium, praseodymium (NdPr), and the energy metal, uranium. Today's company has established itself as a leading rare earths junior in Canada, but recently changed its name and expanded its uranium portfolio. This means investors get exposure to both the key magnet rare earths and also uranium. Even better, it controls 3 projects/properties.

The Company is Appia Rare Earths & Uranium Corp. (CSE: API | OTCQB: APAAF) (Appia) formerly known as Appia Energy, with its Alces Lake rare earths project and its newly acquired uranium mineral claim block (Otherside), as well as other uranium properties located in Northern Saskatchewan, Canada, and its Elliot Lake uranium and rare earths property in Ontario, Canada.

Appia's very high-grade rare earths project at Alces Lake

For background on Appia's rare earths projects you can read some past articles here which focus on Appia's tremendous asset at Alces Lake, Canada which has the 2nd highest average rare earth's grade in the world, at 16.65 wt% TREO. High-grade zones are up to 49 wt% TREO. The rare earths are hosted in favorable 'monazite' ore at or near surface spread over 27sq km of tenements. There is a 23-25% Critical Rare Earth Oxide (CREO) component, including neodymium (Nd), praseodymium (Pr),

dysprosium (Dy), and terbium (Tb).

Appia's 100% owned Alces Lake Project has the world's second highest average grade of TREO

Source: Company presentation

Appia has access to use the Government funded Saskatchewan Research Council (SRC) processing facility in Saskatoon, Canada. Existing pilot facilities there(1,000 tpa capacity) have already optimized a monazite processing flow sheet for Appia. The SRC production-scale processing facility is expected to be partially operational in early 2023.

Appia plans a smaller surface and near-surface operation to start production with an open-pit scenario which is easier to permit and manage and should have a low CapEx/Opex.

Appia's latest results include:

- Drill results at Wilson North (Alces Lake) with average 17.5 wt% TREO over 9.38 metres with up to 37.9 wt% TREO.
- High grade REE mineralization identified over an estimated 27 square kilometre area. Channel sample of 14.71 wt % TREO from Sweet Chili Heat and 11.94 wt % TREO from Diablo. 10.35 wt % TREO returned from grab sample at Zesty. 7.86 wt % TREO returned from grab sample along the Oldman River trend. New discovery of REEs with 2.27 wt % TREO grab sample from "Train Domain". Elevated critical electronics metal, Gallium, values have also been returned for all samples enriched in TREO.
- Promising Results from Initial Metallurgical Tests on a Composite Sample from Alces Lake. Laboratory heavy liquid separation tests recovered 95% of the total rare earth

> oxide (TREO). Appia President Frederick Kozak stated: "TREO recoveries and the percentage of TREO in concentrate are comparable to other producing global rare earths projects, supporting the potential for Alces Lake as a future monazite rare earths supply."

Appia is waiting on further drilling core and channel sample assay results from the 2021 program. In terms of major near-term catalysts, Appia states: "Analysis of 2021 drilling and assays may lead to NI 43-101 report early 2022."

Saskatchewan Uranium Properties

Appia recently announced that they significantly increased their uranium claims by acquiring the Otherside claim block of 27,291 contiguous hectares. Appia states: "The claims were staked on the basis of similar geological and geophysical signatures to the Company's Loranger property as well as other known high-grade, large-tonnage uranium deposits in the Athabasca Basin including Fission Uranium Corp's Triple R deposit, NexGen Energy's Arrow deposits and others."

Appia now owns 4 uranium properties/claims over a total of 69,344 hectares – Loranger, North Wollaston, Eastside, and Otherside. The properties are well located with proximity to infrastructure such as roads, highway, powerline, an airstrip as well as two uranium mills. The properties are ready to explore, with at or near-surface high-grade uranium, no sandstone cover, and negligible overburden.

Saskatchewan Uranium Properties – Loranger, North Wollaston, Eastside, and Otherside

Source: Company news January 10, 2022

Appia stated on January 10, 2022 that the next steps are: “Appia has commenced the permitting process for a winter drilling program on the Loranger property and anticipates commencement of drilling in approximately one month, depending on weather and permits. The Company is fully funded for this program.”

Elliot Lake (Ontario, Canada)

Appia also has a 100% interest in 12,545 hectares (31,000 acres), with rare earth element and uranium deposits over five mineralized zones in the Elliot Lake Camp, Ontario. The Resource details are shown in the table below.

Source: Company presentation

Closing remarks

Appia is becoming a significant rare earths and uranium junior. Appia now owns three very promising projects – Alces Lake (very high grade and critical rare earths), Saskatchewan Uranium Properties (Loranger, North Wollaston, Eastside, and Otherside), and Elliot Lake (rare earths & uranium).

Appia trades on a market cap of C$54 million.

North American Rare Earth Juniors Consolidate

Capabilities to Advance Towards a Total Domestic Supply Chain

written by Jack Lifton | March 15, 2024

There were otherwise unrelated announcements last week, but, with a common purpose, by separate pairs of rare earth juniors: The common purpose was **the advancing of the creation of a domestic American rare earth enabled product(s) total supply chain.**

In one case the Canadian rare earth Junior miner, **Search Minerals Inc. (TSXV: SMY | OTCQB: SHCMF)**, entered into a non-binding MOU for the future delivery of a rare earth mineral concentrate supply, containing 500 tpa of Neodymium/Praseodymium, with one of its investors, privately owned, **USA Rare Earth LLC** , which has committed itself to producing commercial tonnages of rare earth permanent magnets in the United States as early as 2022-23. Another announcement was made by the Canadian rare earth junior critical metals' processor, **Ucore Rare Metals Inc.** (**TSXV: UCU | OTCQX: UURAF | FSE: U9U**), which announced that it had entered into an MOU with Australia's **Vital Metals Ltd. (ASX: VML | OTCMKTS: VTMXF)**: for a supply of rare earth ore concentrates from Vitals' already underway mining operations in Canada's Northwest Territory, to be first processed into a mixed rare earth carbonate in a facility funded by Canada's Saskatchewan Research Council in Saskatoon, Saskatchewan, and then shipped to Ucore's proposed Strategic Metals (processing) Center in Ketchikan, Alaska, USA, for separation into individual rare earths.

These announcements are indicative of a sea-change in the thinking of an increasing number of non-Chinese junior rare

earth companies. In the last rare earth boom from 2007-2012 hundreds of juniors had the same goal, the production and sale of a “mixed con” of rare earths, in other words, of an ore concentrate or a concentrate of mixed rare earth solids prepared by hydrometallurgical treatment of ore concentrates. It was commonly believed at that time that Chinese rare earth separation companies, then the only customers, would pay 65% of the ”basket value,” defined as the market price of separated versions of the rare earths contained in the mixed concentrate. This was magical thinking based on a complete misunderstanding of the value of, and the markets for, either ore concentrates or mixed rare earth concentrates. Even today some juniors still insist that their ore concentrates have a basket value based on the values of finished goods. Chinese separators typically have offered 40% of the basket value, delivered into China for high grade ore concentrates free of elements that interfere with solvent extraction separation of mixed rare earths.

The ”supply chain crisis” has clarified the thinking of many juniors. They realize that their product must have an immediate determinable-price demand and that this demand must be by processors who add enough value, so that they can afford to buy the junior’s product at a price that allows the junior to make a profit. This may seem trivially obvious, but it was blithely overlooked in the 2007-12 rare earth boom.

A new factor has entered the calculus for determining the price of mixed rare earth ore concentrates or of mixed rare earth solids free of both radioactive and of SX interfering contaminants. That factor is any added value governments and industries are willing to pay for non-Chinese, or domestic, materials of these descriptions.

So far, only one non-Chinese vendor has entered the market with mixed rare earth carbonate (solids) free of radioactive and SX

interferents. That is America's **Energy Fuels Inc. (NYSE American: UUUU | TSX: EFR),** which is processing non-Chinese monazite ore at its White Mesa, Utah, uranium processing mill. The mixed rare earth carbonate solids are being sold, at a profit to Energy Fuels, to Canada's **Neo Performance Materials Inc. (TSX: NEO | OTCMKTS: NOPMF),** which has them delivered to its rare earth separation facility in Estonia, where the material is separated into individual rare earths for further processing by Neo or its customers into rare earth permanent magnets, phosphors, ceramic additives, and other fine chemicals. The European Union is already well ahead of the USA in organizing a financial facility to underwrite the creation of a European domestic rare earth enabled products total supply chain without Chinese participation at any level.

In the United States and Canada the supply chain issue is downstream of mining, and is manifested in the total lack of commercial facilities for rare earth separation, metal and alloy making, magnet making, and end use manufacturing.

Europe has existing facilities for up to 12,000 tpa of rare earths separation, a thousand tpa of rare earth metals and alloys, and substantial capacity and existing expertise to make rare earth permanent magnets of the most widely used, sintered, type. Further, both the UK and the EU governments have already begun to support the expansion of existing rare earth processors financially.

The United States and Canada should take a lesson from the UK and the EU: Get industrial end users involved from the very beginning. The UK and the EU speak with industrial experts as well as academics and bureaucrats. The difference is really beginning to show.

As Market Focus on Rare Earths Intensifies, Search Minerals Proceeds on Path to Production

written by InvestorNews | March 15, 2024

Rare earth's producing miners in the West are very rare as China dominates most of the rare earths production. Two exceptions are both trading with US billion-dollar market caps – They are MP Materials Corp. (NYSE: MP) (US$6.24 billion) and Lynas Rare Earths Limited (ASX: LYC) (US$3.92 billion), with Today's company trades on a market cap of just US$55 million.

[Note from the Publisher: The breaking news yesterday Energy Fuels and Neo Performance Materials Announce Contract Signing and Launch of Commercial Shipments of Rare Earth Product to Europe in Emerging U.S.-Based Rare Earth Supply Chain confirms these 2 companies as players in the rare earths supply chain. And Energy Fuels Inc. (NYSE American: UUUU | TSX: EFR) market cap is roughly CAD$1B and Neo Performance Materials Inc. (TSX: NEO) is CAD$615M according to Yahoo Finance at 945 AM EST.)

The Company has a plan to be ready to build their full-scale rare earths processing plant by the end of 2023 and once complete become a North American rare earths producer (potentially by about 2025 provided all goes well). Prior to reaching full scale production, the Company plans to operate a demonstration plant in 2022.

The Company is Search Minerals Inc. (TSXV: SMY | OTCQB: SHCMF) ("Search"). Search controls properties with rare earths in three

areas of Labrador, Canada. These are:

- The Port Hope Simpson (PHS) property (flagship)
- The Henley Harbour Area in Southern Labrador
- The Red Wine Complex located in Central Labrador, plus some recently agreed acquisitions

Search Minerals flagship Port Hope Simpson (PHS) property includes Foxtrot, Deep Fox, Silver Fox, Awesome Fox, and Fox Meadow

Next steps (2021) at Port Hope Simpson – Foxtrot/Deep Fox updated PEA by Dec. 2021

The Preliminary Economic Assessment (PEA) of the Foxtrot Resource showed an estimated after-tax NPV10% of C$48 million and an after-tax IRR of 16.7% over a 14-year mine life. Start-up CapEx was estimated at C$152 million representing an after-tax payback of 4.4 years.

Search plans to do an updated PEA by December 2021 to include both Foxtrot and Deep Fox. Deep Fox will add to the existing PEA due to increasing the resource size and it has up to 15% higher grades than Foxtrot. The updated Foxtrot/Deep Fox PEA will double the past PEA production rate (increase production rate to 2,000 tonnes per day), increase recoveries from the optimized pilot plant process, increase revenue from higher grades at Deep Fox, extend mine life with material from Deep Fox and Foxtrot to a central processing facility, and decrease costs with reduced re–agents. The impact of all of this is expected to potentially improve the PHS (Foxtrot/Deep Fox) Project economics significantly.

Beyond this, there is plenty of potential to further grow the Resource estimate and economics in the Feasibility Study, as

Search also has 3 more advanced prospects (Silver Fox, Awesome Fox, and Fox Meadow) and 20+ potential prospects at PHS. Silver Fox has had some exciting "very high occurrence of zirconium and hafnium". Project CapEx and OpEx should also be attractive as there is existing infrastructure, a scalable processing plan, technical simplicity, and open pit mining. A local workforce and Search's patented mining process (lowers environmental and reagents costs) should also help reduce costs.

Search has already achieved a dedicated pilot plant, proving an ability to generate high purity, refinement-ready product at a low scale. Added to this there are MOUs signed with Saskatchewan Research Council and USA Rare Earth for further refining collaboration.

Next steps (2022, 2023) – Demonstration plant in 2022 and full-scale production plant construction ready to begin in late 2023

Search's master plan includes building a demonstration plant in St Lewis in 2022 as well as an Environmental Impact Statement (EIS) for Foxtrot/Deep Fox.

In 2023 Search intends to complete their permitting, a BFS, and commence raising capital to build a full-scale processing plant commencing by the end of 2023. All going very well that can potentially lead to Search commencing rare earth production in 2025 or shortly thereafter.

It should be noted that in the mining industry, unless governments act to support and speed up the process, permitting and funding can drag on for some years. The good news here is the Canadian and US governments finally appear motivated to support (perhaps via faster permitting and low rate loans) a local rare earths supply chain.

In news announced on June 24, 2021, Search was selected to

participate in the Government of Canada Accelerated Growth Service Initiative. This provides Search with “coordinated access to Government of Canada resources” as Search continues to move quickly to production.

Search Minerals Strategic Plan – 2021 to 2023

Source: Company presentation

Closing remarks

Search Minerals has big plans in the rare earths sector. The road to production for junior miners carries plenty of risks and usually involves stock dilution increasing the market cap, especially when raising initial project CapEx. One plus for Search Minerals is their Canadian location, as US and Canadian governments are showing increasing interest to help support rare earth projects.

If successful Search Minerals (US$55 million market cap) can begin to follow in the giant footsteps of Western rare earth majors MP Materials (US$6.24 billion) and Lynas Rare Earths (US$3.92 billion). As you can see successful Western rare earths miners command very significant size market caps.

Investors will need to ‘search’ for their patience cap and be prepared for a long ride, but the potential rewards for success can be excellent. Stay tuned.