

Appia Energy Corp. – SPECULATIVE BUY

An Exciting, High-Grade Rare Earth Exploration Play

ACTION: Initiating Coverage with SPECULATIVE BUY

We are initiating coverage of Appia Energy Corp. (Appia) with a SPECULATIVE BUY and NO TARGET PRICE. We believe Appia’s Alces Lake rare earth mineral project in northern Saskatchewan has many of the hallmarks of a significant discovery based on the exploration work carried out to date and the large number of rare earth anomalies identified on the company’s land package. **We have not ascribed a target price at this time as we do not believe there is sufficient information available to calculate one that is both defensible and reasonable;** however, we believe the current market valuation and exploration potential merit a SPECULATIVE BUY rating.

DETAILS: It’s All About Grade and the Right Rare Earth Minerals

There are many rare earth deposits that have been identified, globally. However, many of these are not currently economic to develop, primarily due to their grades and distribution of rare earth elements. There are 15 rare earth elements, but only four of these are valuable enough, and with sufficient abundance, to materially drive the value of a project (neodymium, praseodymium, terbium, and dysprosium) – based on exploration to date, Appia appears to have these minerals with grades that make its monazite quite valuable. When comparing the grades and rare earth element distribution of Alces Lake to other projects, it is clear – in our view – that Alces Lake has significant exploration potential.

We caution investors that the Alces Lake project is at a very early stage and, as such, brings with it significant risk. Exploration at Alces Lake has barely scratched the surface: most of the results come from outcrop channel sampling and very shallow drilling. The on-strike and depth potential are, for the most part, unknown. If the deposits are limited to what is known today, we would expect Appia’s share price to perform poorly. However, we believe that if Appia is successful in extending the strike and depth of the currently defined mineralization, there is significant upside potential for investors. **At this time, we believe the risks are, for the most part, to the upside.**

IMPACT: Rare Earth Minerals’ Strategic Importance and Alces Lake Grades

It is increasingly clear that the strategic importance of rare earth minerals is incredibly high and that many governments around the world are uncomfortable with the market dominance that China currently enjoys. We have seen China use its rare earth production as a political tool and we believe that many governments will actively support the development of domestic rare earth production. It is with this backdrop that we believe Appia’s Alces Lake may become an important, strategic asset.

For those seeking early-stage, high risk, rare earth exploration exposure, we believe Appia is an appealing investment opportunity and we reiterate our SPECULATIVE BUY rating.

ANALYST INFORMATION

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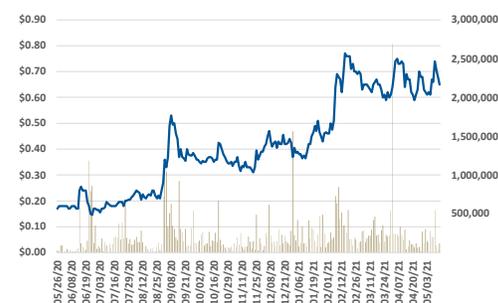
MARKET DATA

API - CSE	\$0.72
TARGET:	n/a
PROJ. RETURN	n/a
VALUATION	n/a

Share Data

Basic Shares O/S (M)	97.6
Fully Diluted (M)	109.6
Avg. Volume (K)	223
Basic Market Cap (\$M)	70
Net Cash (\$M)	11
Enterprise Value (\$M)	59
Dividend (\$/sh)	0
Yield (%)	0
Next Reporting Date	May

THOMSON CHART – ONE YEAR



COMPANY PROFILE

Appia Energy is a Toronto-based exploration company focused on its Alces Lake rare earth project in northern Saskatchewan.

UPCOMING EVENTS/CATALYSTS

- Exploration results in summer/fall 2021
- Construction of year-round camp to allow for continuous exploration throughout the year

MINING

APPIA ENERGY CORP.

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Note: All financial figures in this report are in Canadian dollars, unless stated otherwise. Report pricing date: 18-May-2021

Appia Energy Corp. (Appia) is a rare earth element (REE) exploration company with a focus project called Alces Lake located in northern Saskatchewan. Exploration is at a very early stage with only shallow drilling and channel sampling having been carried out. Regional, geological reconnaissance has identified 74 REE occurrences over 45 km of the system as currently identified. We are initiating coverage of Appia with a **SPECULATIVE BUY**, but we feel it is too early to carry out a reasonable and defensible valuation of the company – therefore, **we will not be ascribing a target price until the company advances the Alces Lake project to a point where a valuation can be carried out responsibly.**

In our view, the outstanding aspect of Appia’s Alces Lake project is the grade of REEs found in the host rock, monazite. Based on the results to date, the Alces Lake deposits may be some of the highest-grade REE deposits in the world.

Figure 1. Selected Drill Results Highlighting the Grade Potential of Alces Lake

Date	Zone	Drill Hole	From (meters)	To (meters)	Interval (meters)	La2O3 (%)	CeO2 (%)	Pr6O11 (%)	Nd2O3 (%)	Tb4O7 (%)	Dy2O3 (%)	TREO GRADE
11/19/18	WRCB	CH-18-003	0.00	1.25	1.25	2.013%	4.361%	0.434%	1.417%	0.007%	0.023%	8.66%
11/19/18	WRCB	CH-18-008	9.00	12.55	3.55	2.400%	4.886%	0.545%	1.685%	0.001%	0.025%	10.02%
11/19/18	IDD	IV-18-001	6.20	7.40	1.20	3.727%	7.547%	0.874%	2.685%	0.010%	0.003%	15.56%
7/16/19	IDD	IV-19-003	10.25	21.90	11.65	3.550%	7.850%	0.860%	3.080%	0.020%	0.040%	16.10%
9/03/19	IDD	IV-19-008	12.80	13.50	0.70	3.518%	7.690%	0.859%	2.962%	0.014%	0.038%	15.81%
9/03/19	IDD	IV-19-009	12.60	13.80	1.20	5.340%	11.583%	1.278%	4.361%	0.021%	0.055%	23.72%
9/03/19	IDD	IV-19-011	7.90	14.40	6.50	1.399%	2.984%	0.331%	1.147%	0.005%	0.014%	6.16%
9/03/19	IDD	IV-19-012	8.70	24.25	15.55	3.653%	7.789%	0.889%	2.946%	0.014%	0.036%	16.06%
9/03/19	IDD	IV-19-013	9.90	11.95	2.05	2.753%	6.121%	0.685%	2.360%	0.011%	0.031%	12.56%
9/03/19	IDD	IV-19-013	22.60	24.40	1.80	5.031%	10.985%	1.203%	4.148%	0.020%	0.051%	22.46%
11/05/19	WRCB	CH-19-010	7.60	8.80	1.20	1.809%	3.954%	0.434%	1.500%	0.007%	0.002%	8.09%
11/05/19	WRCB	CH-19-014	0.00	1.30	1.30	2.692%	5.844%	0.648%	2.223%	0.011%	0.028%	11.98%
11/05/19	WRCB	IV-19-022	15.20	17.80	2.60	1.486%	3.147%	0.337%	1.191%	0.006%	0.016%	6.45%
11/05/19	WRCB	IV-19-023	15.75	17.45	1.70	4.140%	8.857%	0.958%	3.309%	0.016%	0.041%	18.11%
11/05/19	WRCB	RI-19-001	9.80	18.70	8.90	1.701%	3.667%	0.408%	1.405%	0.008%	0.022%	7.58%
1/25/21	WRCB	RI-20-004	7.60	13.40	5.80	1.514%	3.244%	0.353%	1.137%	0.005%	0.015%	6.55%
1/25/21	WRCB	RI-20-005	9.80	10.90	1.10	1.201%	2.543%	0.281%	0.967%	0.001%	0.002%	5.27%

Note: Only the highest value REEs are noted – for full assays see press releases from Appia

Source: Company filings, RCC estimates

VALUATION – INSUFFICIENT INFORMATION TO DETERMINE A VALUE FOR APPIA’S EQUITY

While we find the exploration potential at Alces Lake very promising, there is not enough information available, in our view, to develop any kind of defensible valuation at this time. However, we believe that the current market capitalization, when viewed in comparison with other REE-focused companies, is relatively low, and we see the potential for higher share prices as the project becomes known by a broader base of investors and exploration better defines the project – especially if the high grade zones already identified can be extended along strike and at depth, or new similar zones are identified. **We would require significant drilling or a resource estimate to be prepared before a formal valuation can be carried out.**

Figure 2. Companies in the REE Space

Company	Ticker	Recent Price	Shares Outstanding (M)	Market Capitalization (US\$ M)
Companies with REE Deposits Only				
Search Minerals Inc.	TSXV:SMY	\$0.15	326	\$40
Appia Energy Corp.	CNSX:API	\$0.72	98	\$58
Vital Metals Limited	ASX:VML	A\$0.05	4,154	\$174
Australian Strategic Materials Ltd	ASX:ASM	A\$4.60	140	\$497
Defense Metals Corp.	TSXV:DEFN	\$0.27	80	\$18
Companies that Purchase REE Feedstock				
Energy Fuels Inc.	TSX:EFR	\$7.73	143	\$915
Companies that Mine and Process to Finished Product				
MP Materials Corp.	NYSE:MP	US\$27.34	171	\$4,668
Lynas Rare Earths Limited	ASX:LYC	A\$5.52	901	\$3,850
Companies that Purchase Intermediate Products and Make Finished Product				
Neo Performance Materials Inc.	TSX:NEO	\$17.50	38	\$547

Source: S&P Capital IQ, RCC estimates

WHAT WOULD MAKE US CHANGE OUR SPECULATIVE BUY RECOMMENDATION

Without a target price, it is challenging to determine an appropriate recommendation in the context of the market. As we have initiated coverage with a Speculative Buy, the only option to change our recommendation going forward is a downgrade – so we turn our attention to what would cause us to downgrade the recommendation to a hold or sell rating.

As noted above, the Alces Lake project is at a very early stage, but so far has shown potential to host high-grade REE deposits. However, the results have been from surface channel samples (cuts across the outcrop) and very shallow drilling. As far as we can discern, the basic geological model and potential structural and lithological controls are only partially defined. Therefore, future exploration at Alces Lake is, without a doubt, very high risk. Given the high REE grades that have been discovered to date, a large tonnage resource would not necessarily be required to make the Alces Lake project economic; however, if future exploration determines that there is little potential beyond what has been discovered so far, we would downgrade our recommendation at that time. **That said, based on the geological model, significant number of REE showings on the property, and shallow drilling, we believe the upside potential outweighs the downside at this time which leads us to our SPECULATIVE BUY recommendation.**

AN OUTLOOK FOR APPIA IN 2021

Appia has recently hired Nicolas Guest as Project Manager of Alces Lake. Mr. Guest has extensive exploration experience having worked as a geologist for Goldcorp/Newmont Goldcorp for more than nine years at the Musselwhite Mine in Ontario, as well as, other roles as a geologist. Additionally, Appia has hired a new President, Frederick Kozak, who has extensive capital markets experience in the resource sector. We believe these two additions to the Appia team will help move the project forward and increase investor awareness of the company and the Alces Lake project.

Exploration at Alces Lake is still at a fairly nascent stage. Drilling, outcrop sampling and channel sampling appear to have been the main exploration tools used, historically. We expect that Mr. Guest will carry out a very detailed, methodic exploration program in 2021 to better understand the local geology including: rock types, regional and local structural features, the relative emplacement of the monazite, and other activities. Using the information collected through this program, we expect Appia will be in a much better position to carry out a larger drill program in the future to identify and delineate monazite targets.

Depending on timing, Appia may also begin drilling again relatively early in the exploration season, expanding on the already defined monazite deposits. Given their somewhat irregular shape and distribution, we expect that an early drill program will be focused on small, incremental step out holes to expand the known mineralization without taking unnecessary risks by stepping out too far. However, the timing of the drill program is not yet determined.

Appia is well financed with approximately \$11 million of cash and options and warrants that are in the money to provide additional funding (if exercised). That said, given the market's appetite for REE names, we would not be surprised if Appia raised additional funds to ensure that it has sufficient financial resources to carry out at least two exploration campaigns and for general working capital purposes.

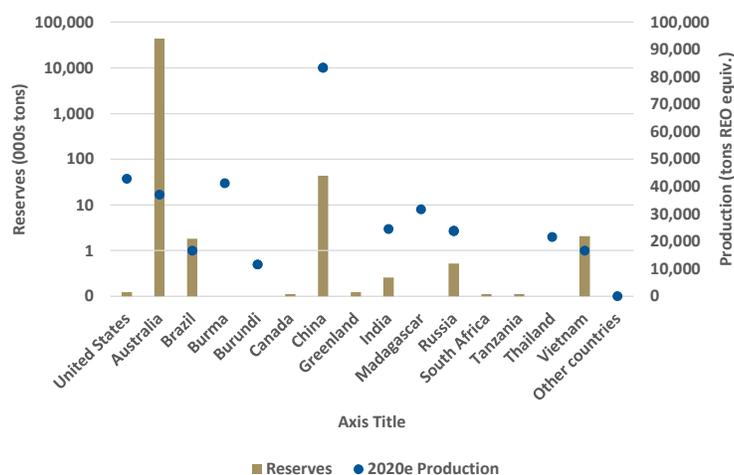
In 2021, Appia plans to upgrade its camp to allow for year-round activities. This should help ensure that there is a relatively consistent flow of news and help accelerate the efforts to develop a resource at Alces Lake.

A QUICK REE PRIMER

Rare Earth Elements comprise 15 elements that are critical materials for the modern age. Without them, the world would be without cell phones, electrically powered vehicles (used in batteries and motors), specialized glass, x-ray machines, lasers, computer memory, and other critical applications. REEs are also critical for the defense industry as they are used in GPS equipment, precision guidance for weapons, night vision goggles, armour plating and other applications. There are very few substitutes available to replace REEs in critical applications and they are generally considered less effective.

Globally, approximately 60% of REEs are produced in China with the USA and Burma at a distant second and third place with 16% and 13%, respectively, according to the US Geological Survey (as shown in Figure 3).

Figure 3. Global REE Reserves and 2020e Production



Source: US Geological Survey, RCC estimates

REEs are divided into two general groups: light REEs (lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium and scandium) which are considered relatively abundant; and, heavy REEs (terbium, dysprosium, holmium, erbium, thulium, yttrium, lutetium and yttrium) which are produced mainly in China and are in limited supply.

Among the REEs is a sub-group known as the Critical Rare Earth Oxides (CREO) that comprise both heavy and light REEs and include: Ytterbium, Dysprosium, Yttrium, Neodymium, Terbium and Praseodymium. For the most part, the heavy rare earth oxides (REOs) are less abundant and more expensive (under current market conditions). Deposits that are rich in terbium, dysprosium, holmium, praseodymium and neodymium are typically the most valuable on a per tonne in the ground basis.

Figure 4. Rare Earth Elements, REO Prices, Crustal Concentration and Uses

Element Abbreviation	Atomic Number	Element Name	Classification	Recent Price (US\$/kg, oxide)	Average Crust Concentration (ppm)	Usages
La	57	Lanthanum	Light	\$1.53	31.0	Optics, batteries, catalysis, hydrogen storage
Ce	58	Cerium	Light	\$1.48	63.0	Chemical applications, coloring, polishing glass, catalysis, hybrid vehicles
Pr	59	Praseodymium	Light	\$82.09	7.1	Magnets, lighting, optics
Nd	60	Neodymium	Light	\$81.32	27.0	(SmCo) magnets, lighting, lasers, optics, hybrid vehicle batteries
Pm	61	Promethium	Light	n/a	n/a	Limited use due to radioactivity, used in luminous paint and atomic batteries; very rare in nature
Sm	62	Samarium	Light	\$2.33	4.7	Magnets, lasers, masers, lightweight magnets
Eu	63	Europium	Light	\$29.96	1.0	Lasers, lighting, medical applications
Gd	64	Gadolinium	Light	\$29.73	4.0	Magnets, glassware, lasers, X-ray contrast agent, computer applications, medical applications
Tb	65	Terbium	Heavy	\$1,035.72	0.7	Lasers, lighting, lightweight magnets
Dy	66	Dysprosium	Heavy	\$367.29	3.9	Magnets, lasers, hybrid vehicle batteries
Ho	67	Holmium	Heavy	\$116.72	0.8	Lasers
Er	68	Erbium	Heavy	\$30.81	2.3	Lasers, medical applications, neutron-absorbing control rods in nuclear industry
Tm	69	Thulium	Heavy	n/a	0.3	X-ray generation
Yb	70	Ytterbium	Heavy	na	2.0	Lasers, chemical industry applications
Lu	71	Lutetium	Heavy	n/a	0.3	Medical applications, chemical industry applications
Sc	21	Scandium	N/A	n/a	14.0	Alloys in aerospace engineering, lighting, fuel cells
Y	39	Yttrium	Heavy	\$5.52	21.0	Lasers, superconductors, microwave filters, lighting, ceramic

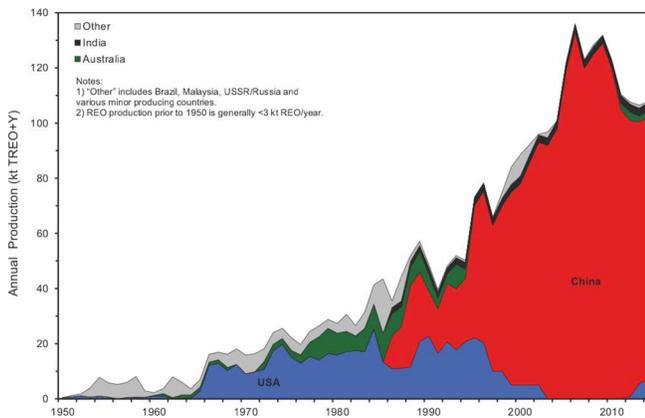
Source: A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges, Zhehan Weng, Simon M. Jowitt, Gavin M. Mudd, and Nawshad Haque, Economic Geology, v. 110 pp 1925-1952, <https://giti.sg/products/rare-earth/> (as of May 19, 2021), RCC estimates

POLITICS BEGINNING TO PLAY A BIGGER ROLE

China currently dominates the global rare earth industry. China’s rise to dominance started in the mid-1980s, taking over from the USA which was previously the largest producer (as illustrated in Figure 5). Given its prominence in the rare earth industry,

China has taken to flexing its muscles by reducing exports and imposing export controls. In 2011, China announced a two-month export ban of rare earth materials to Japan. These trade restrictions have caused volatility in the prices for rare earth minerals which caused other countries to scramble to identify and secure supplies. However, REE shortages failed to materialize and the prices retreated (see Figure 6).

Figure 5. The Rise of Chinese REE Production (1950 to 2005)



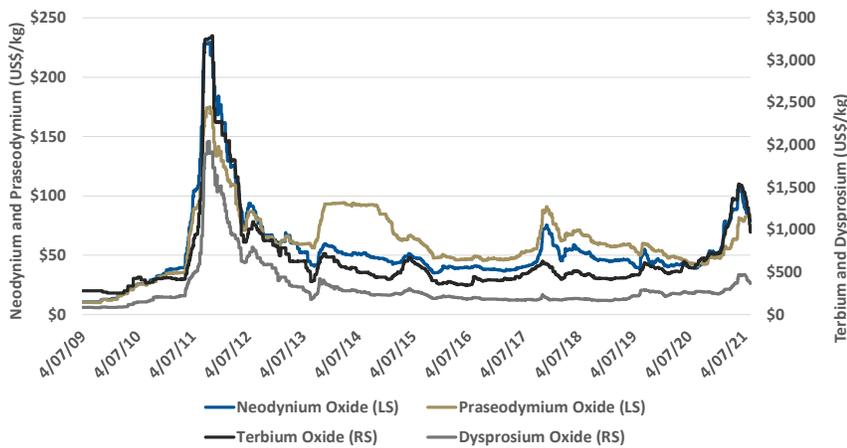
Source: *A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges*, Zhehan Weng, Simon M. Jowitt, Gavin M. Mudd, and Nawshad Haque, *Economic Geology*, v. 110 pp 1925-1952

In 2020, rare earth exports from China fell to a 5-year low and the Chinese government is in the process of formulating new legislation requiring companies to follow control laws for the import and export of rare earth materials. As a result, many governments have begun to seek ways to increase domestic production of rare earth minerals (in addition to other items deemed critical for industry).

In 2018, the US government released a list of minerals deemed critical to US national security. The list comprised 35 minerals and included more commonplace metals like zinc, aluminum, copper, molybdenum, gold, silver, etc. - it also included the rare earth minerals. A good example of the criticality of rare earths is the fact that a new F-35 fighter (the new frontline US-built fighter aircraft) contains 920 pounds of rare earth elements (mostly from China) - this kind of dependence is likely problematic.

Due to the global COVID-19 pandemic, many governments have been forced to more seriously consider their domestic supply sources for critical materials which include personal protective equipment (PPE), high technology inputs (as highlighted by the current shortage of computer chips), and critical minerals. As a result of this new focus on domestic supply security and possibly threatened actions by China, the prices for rare earth minerals have increased markedly from late-2020 to today (see Figure 5).

Figure 6. Selected Rare Earth Prices (April 2009 to Present)



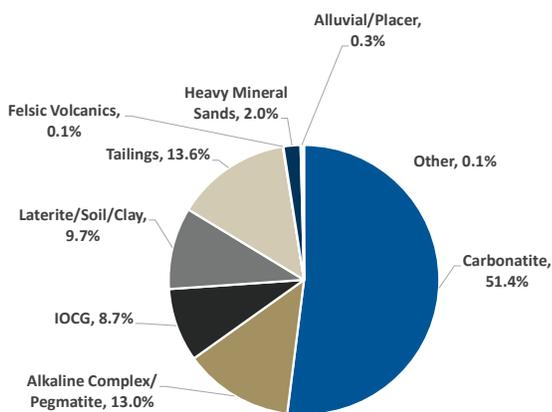
Source: Bloomberg LLC, RCC estimates

With the political backdrop, we anticipate significant focus will be put on the development of rare earth resources outside of China, quite likely without Chinese company or government involvement (it is worth noting that in China: “foreign investments in exploration, mining, and beneficiation of rare earth, radioactive minerals, and tungsten are prohibited”). We also expect that governments around the globe will be supportive of rare earth project development to ensure security of supply for individual countries as well as countries with strong political and/or military ties.

A QUICK OVERVIEW OF REE GEOLOGY

Rare earth minerals occur in a number of different and varied geological settings. The most dominant are carbonatites, alkaline complexes and pegmatites, rare earth rich clays, tailings and iron oxide copper gold (IOCG) deposits as shown in Figure 7.

Figure 7. REE Resources by Deposit Type

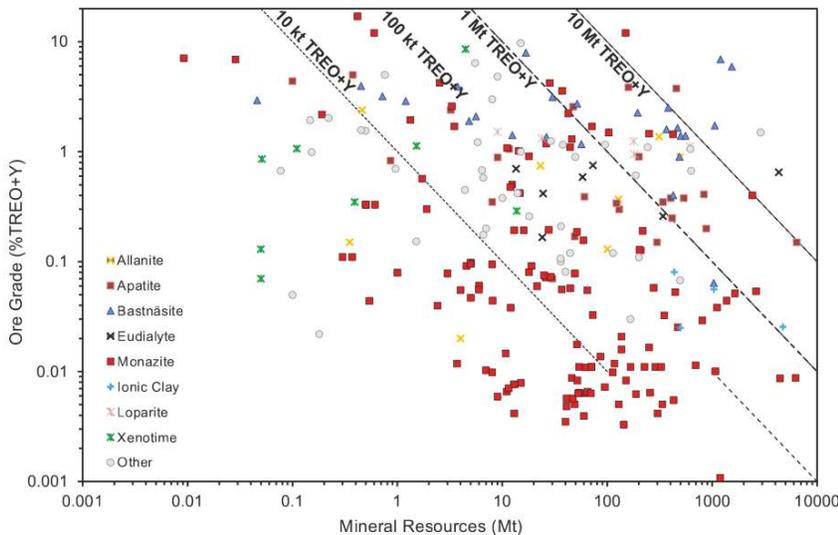


Source: A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges, Zhehan Weng, Simon M. Jowitt, Gavin M. Mudd, and Nawshad Haque, Economic Geology, v. 110 pp 1925-1952, RCC Estimates

Within each of these deposit types there are different minerals that contain the rare earth elements. The major mineral types are: monazite, bastnaesite, xenotime, and eudialyte. There are also several minor REE minerals.

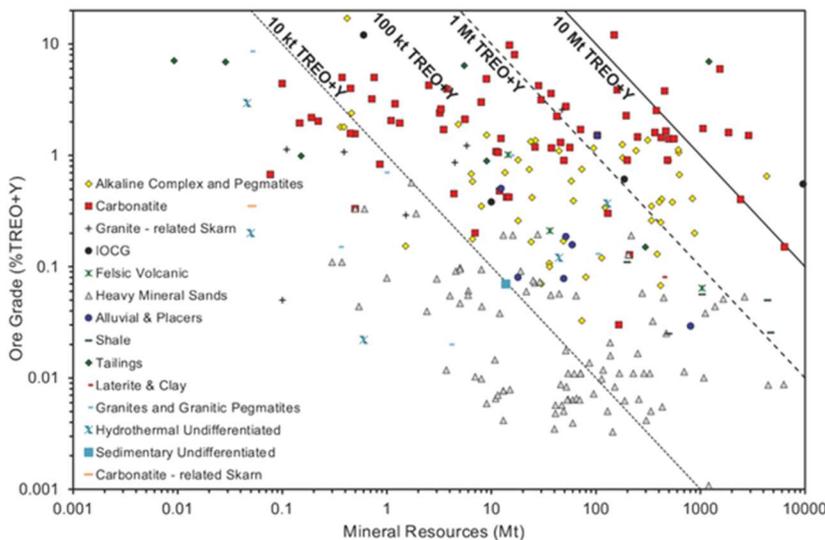
Monazite and bastnaesite are the most common from an economic perspective. REE-bearing monazite is typically associated with granites, granodiorites and pegmatites whereas bastnaesite is most often associated with carbonatites, igneous rocks, vein-hosted deposits, contact metamorphic rocks and pegmatites. The largest and only US hard rock producer of REE minerals is the Mountain Pass mine in California which is a carbonatite with bastnaesite as its primary mineral.

Figure 8. Global REE Mineral Resources by Mineral



Source: *A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges*, Zhehan Weng, Simon M. Jowitt, Gavin M. Mudd, and Nawshad Haque, *Economic Geology*, v. 110 pp 1925-1952

Figure 9. Global REE Mineral Resources by Deposit Type



Source: *A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges*, Zhehan Weng, Simon M. Jowitt, Gavin M. Mudd, and Nawshad Haque, *Economic Geology*, v. 110 pp 1925-1952

The largest REE deposits tend to be carbonatite hosted, while there are some large, high-grade deposits hosted in alkaline complexes and pegmatites (Alces Lake is believed to be pegmatite-related).

Unlike other mineral deposits (such as gold, silver, copper, zinc, nickel, etc.), REE deposits usually contain a variety of different REE minerals and, as such, can significantly vary in contained value as the component minerals have significantly different market prices. This is well illustrated in Figure 10, below, which illustrates the average value per tonne and the percentage of

that value by mineral. Clearly, most deposits' values are dominated by praseodymium and neodymium with terbium and dysprosium also providing modest value. **The value of a REE deposit is determined not only by the total REE grade, but by the distribution of the different REE minerals.**

It is important to note that the Southern Ionics Minerals Monazite Concentrate illustrated in Figures 10 and 11 is derived from the company's mineral sands projects in the US southeast and is a concentrate rather than in-situ rock. We provide it as an example of a feedstock being used to produce REOs, but it should not be directly compared to in the ground resources.

Figure 10. REE Deposits – Distribution of REEs and Average Value per Tonne for Selected Deposits

	Average Value per Tonne (US\$)	Reserves and Resources (Mt)	La2O3	CeO2	Pr6O11	Nd2O3	Sm2O3	Eu2O3	Gd2O3	Tb4O7	Dy2O3	Ho2O3	Er2O3	Yb2O3	Lu2O3	Y2O3
Price of REO per Kg			\$1.53	\$1.48	\$82.09	\$81.32	\$2.33	\$29.96	\$29.73	\$1,035.72	\$367.29	\$116.72	\$30.81	n/a	n/a	\$5.52
Appia Average Value	\$2,386	n/a	1%	3%	19%	66%	0%	0%	2%	4%	4%	0%	0%	0%	0%	0%
Southern Ionics Minerals Monazite Conc.	\$5,574	n/a	1%	2%	14%	51%	0%	0%	2%	10%	18%	1%	1%	0%	0%	0%
Average Steenkampskraal	\$3,072	31	1%	2%	15%	54%	0%	0%	2%	9%	14%	1%	0%	0%	0%	1%
Mount Weld CLD (operating)	\$1,880	15	2%	3%	19%	65%	0%	1%	1%	4%	4%	0%	0%	0%	0%	0%
Mount Weld, Duncan (undeveloped)	\$1,176	9	1%	2%	14%	51%	0%	1%	2%	10%	17%	1%	0%	0%	0%	1%
Mountain Pass, MP Materials	\$1,009	17	4%	5%	25%	65%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%
Bayan Obo, Baogang Group	\$1,050	6	2%	4%	22%	62%	0%	1%	1%	4%	5%	0%	0%	0%	0%	0%
Kangankunde, Lynas Corp.	\$739	4	2%	4%	19%	56%	0%	0%	1%	4%	15%	0%	0%	0%	0%	0%
Araxá, Itafos	\$663	4	2%	4%	20%	61%	0%	1%	1%	4%	6%	0%	0%	0%	0%	0%
Mrima Hill, Coretec Mining Kenya Ltd.	\$768	4	2%	3%	15%	53%	0%	1%	2%	8%	15%	0%	1%	0%	0%	1%

Source: A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges, Zhehan Weng, Simon M. Jowitt, Gavin M. Mudd, and Nawshad Haque, Economic Geology, v. 110 pp 1925-1952, <https://giti.sg/products/rare-earths/> (as of April 7, 2021), RCC estimates

Figure 11. REE Deposits – REE Grades and Average Value per Tonne for Selected Deposits

	Average Value per Tonne (US\$)	Reserves and Resources (Mt)	La2O3	CeO2	Pr6O11	Nd2O3	Sm2O3	Eu2O3	Gd2O3	Tb4O7	Dy2O3	Ho2O3	Er2O3	Yb2O3	Lu2O3	Y2O3	Total REE
Price of REO per Kg			\$1.53	\$1.48	\$82.09	\$81.32	\$2.33	\$29.96	\$29.73	\$1,035.72	\$367.29	\$116.72	\$30.81	n/a	n/a	\$5.52	
Appia Average Value	\$2,386	n/a	2.33%	5.07%	0.56%	1.93%	0.27%	0.00%	0.13%	0.01%	0.02%	0.00%	0.00%	0.00%	0.00%	0.06%	10.40%
Southern Ionics Minerals Monazite Conc.	\$5,574	n/a	3.98%	8.62%	0.93%	3.46%	0.64%	0.03%	0.44%	0.06%	0.27%	0.04%	0.11%	0.09%	0.01%	0.00%	20.03%
Average Steenkampskraal	\$3,072	31	2.37%	4.25%	0.57%	2.06%	0.32%	0.01%	0.23%	0.03%	0.12%	0.02%	0.04%	0.01%	0.00%	0.44%	12.25%
Mount Weld CLD (operating)	\$1,880	15	1.98%	3.95%	0.43%	1.51%	0.20%	0.04%	0.09%	0.01%	0.02%	0.00%	0.01%	0.00%	0.00%	0.06%	9.70%
Mount Weld, Duncan (undeveloped)	\$1,176	9	1.03%	1.63%	0.20%	0.74%	0.12%	0.03%	0.08%	0.01%	0.05%	0.01%	0.02%	0.01%	0.00%	0.20%	4.80%
Mountain Pass, MP Materials	\$1,009	17	2.36%	3.47%	0.30%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	6.95%
Bayan Obo, Baogang Group	\$1,050	6	1.26%	2.60%	0.28%	0.79%	0.07%	0.02%	0.03%	0.00%	0.01%	0.00%	0.00%	0.01%	0.00%	0.02%	5.95%
Kangankunde, Lynas Corp.	\$739	4	1.08%	1.80%	0.17%	0.51%	0.04%	0.01%	0.01%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	4.23%
Araxá, Itafos	\$663	4	1.01%	1.77%	0.16%	0.50%	0.05%	0.01%	0.03%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.04%	4.16%
Mrima Hill, Coretec Mining Kenya Ltd.	\$768	4	0.87%	1.41%	0.14%	0.50%	0.07%	0.02%	0.05%	0.01%	0.03%	0.00%	0.01%	0.00%	0.00%	0.15%	3.82%

Source: A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges, Zhehan Weng, Simon M. Jowitt, Gavin M. Mudd, and Nawshad Haque, Economic Geology, v. 110 pp 1925-1952, <https://giti.sg/products/rare-earths/> (as of April 7, 2021), RCC estimates

COMPARABLE PUBLIC COMPANIES

Missing from the tables in Figures 10 and 11 are the public REE comparables which include: Search Minerals Inc., Vital Metals Ltd., and Australian Strategic Materials Ltd.

First, it is important to define, to a certain extent, the value of a tonne of rock at Alces Lake. Using some of the larger drill intercepts from the various zones, we have determined an average grade of the REOs at Alces Lake. While this is by no means as reliable as a code-compliant resource estimate, we believe it does provide some insight into the potential value of the Alces Lake deposit(s), assuming that future exploration produces results that are much like those already published. **Based on the assumptions used, we estimate that the higher-grade portions of the Alces Lake deposits are worth approximately US\$2,386 per tonne.** There are lower-grade results from Alces Lake, but we are less certain about their economic viability in the future when compared to the higher grade results.

Search Minerals Inc. (Search Minerals, TSXV:SMY, not covered) is a US\$40 million market capitalization company with a REE project in Labrador, Canada. The company has outlined a 43-101 compliant resources totalling approximately 15.6 million tonnes grading 0.2% Dy₂O₃ (dysprosium oxide), 0.17% Nd₂O₃ (neodymium oxide) and 0.05% Pr₆O₁₁ (praseodymium oxide). Total REE content is approximately 1%. At current prices (as of April 1, 2021), we estimate that this equates to an *in-situ* value of **US\$264 per tonne of material.**

Vital Metals Limited (Vital, ASX:VML, not covered) is a US\$183 million market capitalization company based in Australia. The company's focus project is called Nechalacho in the Northwest Territories, Canada. The company has acquired the top 150 m of the deposit from Avalon Advanced Materials Inc. (TSX:AVL, not covered) through its acquisition of Cheetah Resources Pty Ltd. (which paid C\$5 million). The project is divided into two deposits which are significantly different. The total resource is divided into two deposits: Nechalacho and North T zone. The Nechalacho resource is large and relatively low grade comprising 133 million tonnes grading 1.57% rare earth oxides with the most valuable being neodymium and praseodymium which are 0.31% and 0.08%, respectively. **The in-situ value for the Nechalacho deposit is approximately \$246 per tonne.** The breakdown of the other REOs is not provided.

Vital's North T deposit, on the other hand, is quite small but high grade. The current resource (measured, indicated plus inferred) totals 105,000 tonnes and grades 2.3% La₂O₃, 4.5% CeO₂, 0.5% Pr₆O₁₁ and 1.6% Nd₂O₃ which translates to an **in-situ value of approximately \$1,813 per tonne.** Vital has recently commenced mining at the North T zone.

Australian Strategic Materials Ltd. (ASM, ASX:ASM, not covered) is a US\$486 million market capitalization company that owns 100% of the Dubbo project in New South Wales, Australia. The project is quite different from the other REE projects noted above as it contains zirconium, niobium, and hafnium in addition to REOs. Dubbo's reserve contains only 0.735% TREO. Therefore, we do not think it is appropriate to compare it to REE-dominant deposits.

Alces Lake In-Situ Value

Looking at the REE grades at Alces Lake, we can see which REE elements are the most common and most valuable. Based on analysing a subset of the drill results from Alces Lake, the most valuable REE components are praseodymium oxide, neodymium oxide, terbium oxide and dysprosium oxide. Based on current REE prices the average value per tonne of the selected drill results is \$2,386 per tonne (see Figure 12).

Figure 12. Alces Lake In-Situ Value Based on Selected Drill Results

Zone	Hole	From (m)	To (m)	Interval (m)	Light					Heavy									
					La2O3 wt%	CeO2 wt%	Pr6O11 wt%	Nd2O3 wt%	Sm2O3 wt%	Eu2O3 wt%	Gd2O3 wt%	Tb4O7 wt%	Dy2O3 wt%	Ho2O3 wt%	Er2O3 wt%	Yb2O3 wt%	Lu2O3 wt%	Y2O3 wt%	TREO wt%
Richard	RI-20-004	7.60	13.40	5.80	1.514%	3.244%	0.353%	1.137%	0.161%	0.002%	0.066%	0.005%	0.015%	0.002%	0.002%	0.001%	0.000%	0.043%	6.546%
Charles	CH-19-010	7.60	9.80	2.20	1.809%	3.954%	0.434%	1.500%	0.212%	0.003%	0.095%	0.007%	0.018%	0.002%	0.003%	0.001%	0.000%	0.047%	8.085%
Charles	CH-19-011	7.80	8.80	1.00	0.833%	1.865%	0.208%	0.715%	0.101%	0.001%	0.046%	0.004%	0.010%	0.001%	0.002%	0.001%	0.000%	0.027%	3.813%
Ivan	IV-19-003	10.25	21.90	11.65	3.550%	7.820%	0.860%	3.080%	0.410%	0.000%	0.220%	0.020%	0.040%	0.000%	0.000%	0.000%	0.000%	0.090%	16.100%
Ivan	IV-19-012*	8.70	24.25	15.55	3.653%	7.798%	0.889%	2.946%	0.413%	0.005%	0.205%	0.014%	0.036%	0.004%	0.006%	0.001%	0.000%	0.089%	16.059%
Richard	RI-19-001	9.80	18.70	8.90	1.701%	3.667%	0.408%	1.405%	0.198%	0.003%	0.091%	0.008%	0.022%	0.003%	0.004%	0.001%	0.000%	0.065%	7.575%
Dante	DT-19-004B	15.90	17.50	1.60	4.122%	9.092%	0.962%	3.472%	0.487%	0.006%	0.236%	0.017%	0.040%	0.005%	0.005%	0.001%	0.000%	0.104%	18.550%
Ivan	IV-19-022	15.20	17.80	2.60	1.468%	3.147%	0.337%	1.191%	0.165%	0.002%	0.075%	0.006%	0.016%	0.002%	0.003%	0.001%	0.000%	0.042%	6.453%
Average					2.331%	5.073%	0.556%	1.931%	0.268%	0.003%	0.129%	0.010%	0.025%	0.002%	0.003%	0.001%	0.000%	0.063%	10.40%
Average Value per Tonne	US\$2,385.62				US\$35.67	US\$75.09	US\$456.73	US\$1,570.09	US\$6.25	US\$0.82	US\$38.43	US\$104.87	US\$90.45	US\$2.77	US\$0.96	US\$0.00	US\$0.00	US\$3.50	
% of Total Value					1.5%	3.1%	19.1%	65.8%	0.3%	0.0%	1.6%	4.4%	3.8%	0.1%	0.0%	0.0%	0.0%	0.1%	

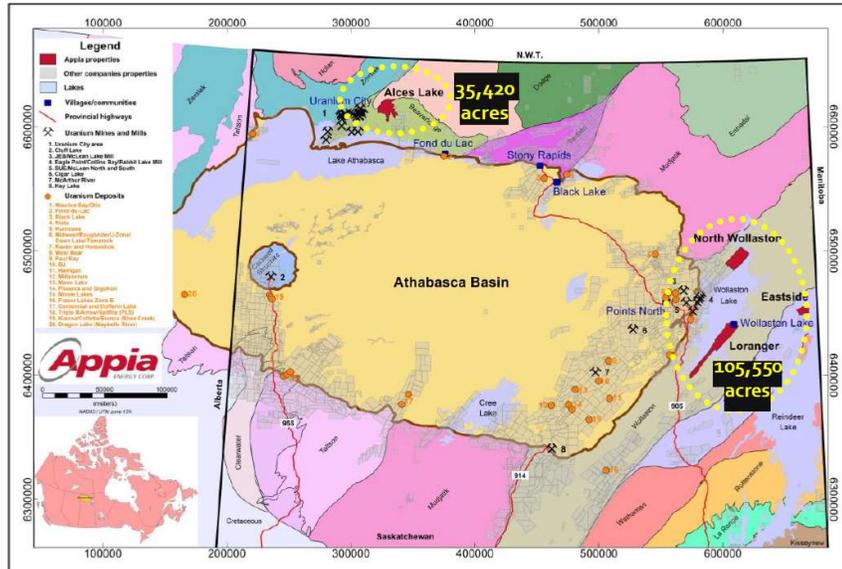
Source: Company filings, <https://giti.sg/products/rare-earths/> (as of April 7, 2021), RCC estimates

The estimates provided above should be considered representative of the Alces Lake deposit and were selected as they appear to have intersected the larger, somewhat defined, deposits of monazite – we have not included any channel sample results in our grade composite, above. The actual size and grades of the deposits at Alces Lake will not be known until much more drilling is carried out and a code-compliant resource estimate is prepared.

ALCES LAKE – GEOLOGY

The Alces Lake deposit is located on the north shore of Lake Athabasca, east of Uranium City (a former uranium producing town). The property is quite large, totalling 35,420 acres (14,334 hectares) with 74 REE occurrences identified to date.

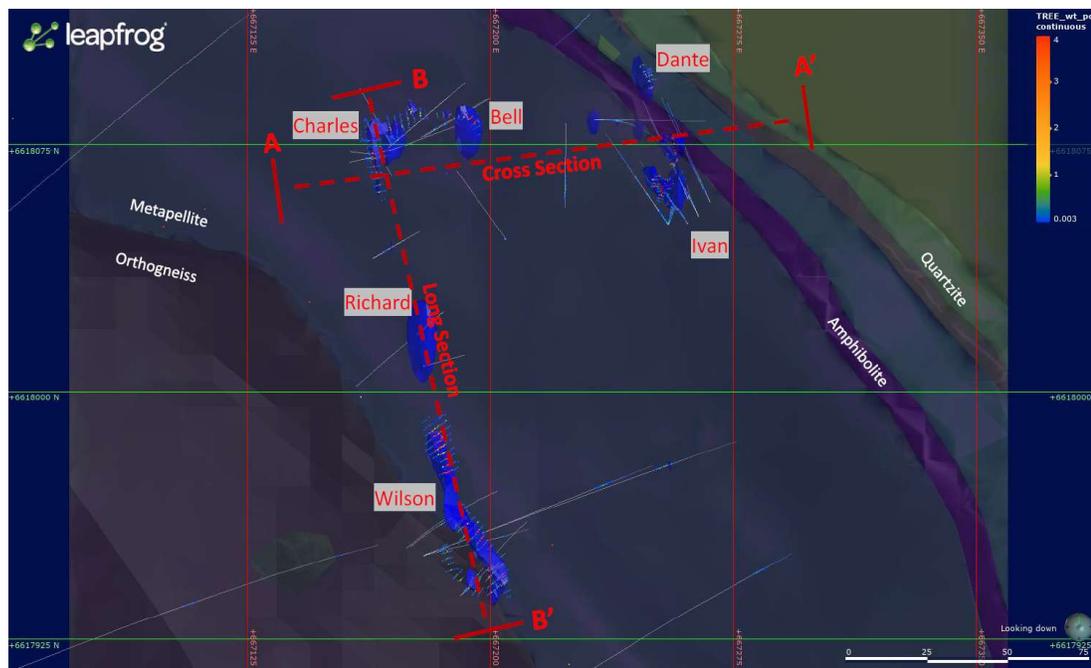
Figure 13. Alces Lake – Regional Map Showing Deposit Location and Surrounding Infrastructure and Mines



Source: Company filings

As the exploration at Alces Lake is at a relatively early stage, there is not a great deal of information available regarding its geology or geological model. There are, however, geological models that are useful in explaining the general deposit type, geology and geological model. This information should provide the Appia geology team with a reasonable foundation from which it can build its understanding of the Alces Lake project and an exploration program. With the limited and very shallow drilling (typically 25 m to 50 m drill holes), Appia has identified two sub-parallel trends approximately 130 m apart, known as Wilson-Richard-Charles-Bell (WRCB) and Ivan-Dylan-Dante (IDD), see Figure 14.

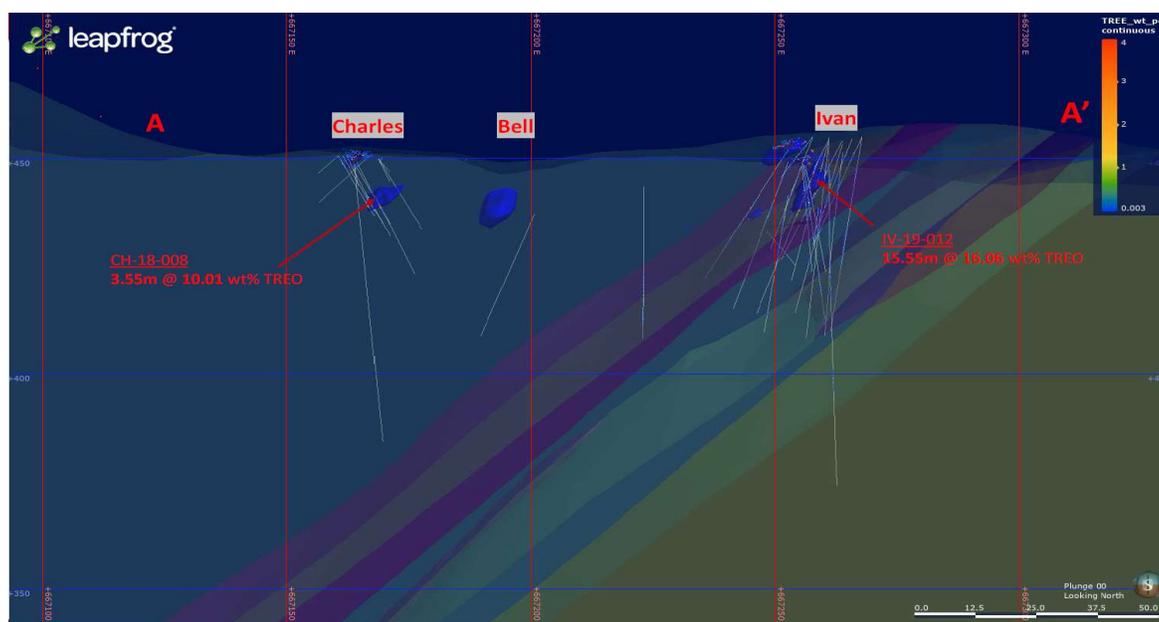
Figure 14. Plan View of Alces Lake Showing Deposits as Identified by Exploration



Source: Company filings

Based on the limited knowledge of the local geology, it is believed that the local lithologies dip at approximately 45 degrees to the west (as illustrated in Figure 15).

Figure 15. A-A' Section of Alces Lake Deposits and Geology



Source: Company filings

The strike of the two zones appears to be almost north-south, but the relationship between the host rocks, local structures, etc. is yet to be determined.

Figure 16. Massive Monazite at Surface at Alces Lake



Source: Company filings

The Alces Lake project is at a very early stage and there is not sufficient information to even guess at the resource potential. However, we believe the project has some very positive characteristics that, in our view, make it worthy of investment, albeit a high-risk investment. These characteristics include:

- **Location/Jurisdiction:** Saskatchewan was rated as the third best jurisdiction for “Overall Investment Attractiveness”, globally, by the Fraser Institute in its 2020 report (behind Nevada and Arizona);
- **High Grades:** the drilling and channel sampling results have shown that there are very high-grade pods of monazite mineralization which may rank among the best in the world (but more exploration is needed to confirm this hypothesis);
- **REE content:** based on exploration results, Alces Lake is rich in some of the most valuable rare earth minerals, namely: praseodymium, neodymium, terbium and dysprosium;
- **Geological Model:** Based on similar deposits and the geological model developed for those types of deposits, there appears to be a good probability that Appia will be able to identify a number of monazite deposits within the Alces Lake property;
- **Mineral Processing:** the processing of monazite is a well known and understood technology;
- **Government Assistance:** at this time, Appia has, to our knowledge, not received any direct government financial assistance (unless one includes the tax benefits of flow-through financing). However, the Saskatchewan Research Council (SRC) has constructed a 2,000 tonne per year pilot processing plant and is in the process of constructing a 3,000 tonne per year REE processing facility. For more information, see the SRC Facility section, below; and,
- **Infrastructure:** while Alces Lake may seem quite remote, there is a fair amount of infrastructure already in place in the surrounding region. The nearest population centre is Uranium City and there is road access to the southeast at Fond du Lac.

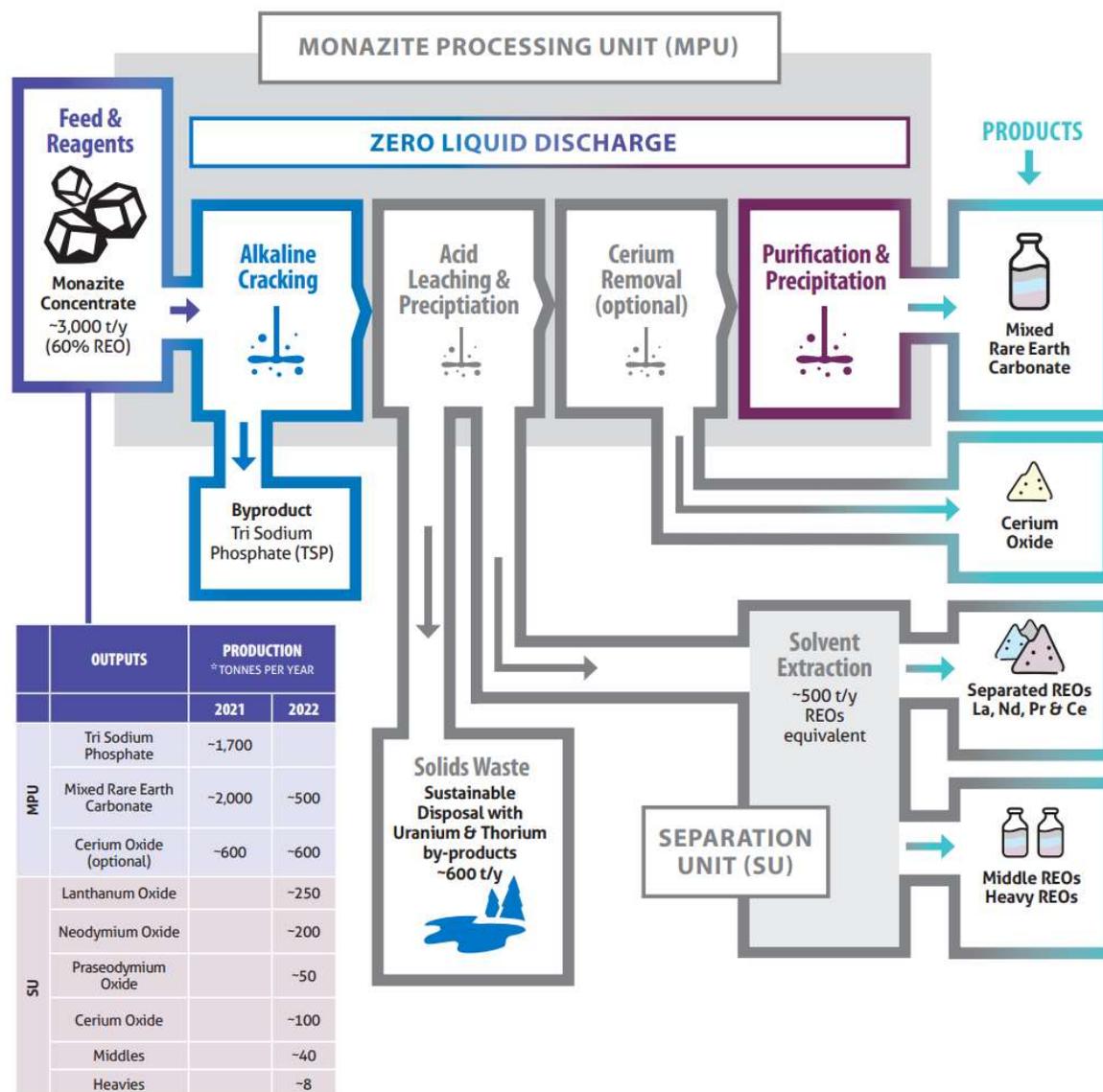
SRC FACILITY

As noted above, the Saskatchewan government is constructing a 3,000 tonne per year REE processing facility north of Saskatoon – the first facility of this kind in Canada. The government intends the facility to act as a catalyst to drive the growth of the REE industry in Canada by “providing the early-stage supply chain needed to generate industry investment and growth”. The new facility is expected to be operating in the fall of 2022.

We expect that the SRC Facility may process early bulk samples from Alces Lake with the goal of generating modest cash flow (potentially), but, more importantly in our view, help the company define a de-risked flow sheet for the beneficiation and concentration of material mined at Alces Lake and eventually the possible production of rare earth carbonates or rare earth oxides. We believe this is a very valuable service for Appia as it should allow it to develop a processing route at a large scale that should not suffer from the typical scaling-up problems associated with complex metallurgy/minerology.

The new facility is being constructed to treat monazite sands (or likely concentrates) grading approximately 60% monazite. We believe that Appia should be able to concentrate its monazite to that level. The monazite concentrate will be converted into a concentrate of mixed rare earth carbonates which will be further processed in a separation plant to produce the rare earth oxides (the final products). The estimated output of the plant is 500 tonnes per year of REE oxides, excluding cerium. The SRC facility expects to be able to offer toll treatment of monazite concentrates.

Figure 17. SRC Rare Earth Processing Facility – Simplified Process Flow



Source: <https://www.src.sk.ca/> (as of April 7, 2021)

MANAGEMENT AND BOARD

Anastasios (Tom) Drivas

CEO, Director

Tom Drivas is a business entrepreneur with over 30 years of experience in various industries, including over 20 years in the mineral resource industry and is also currently the President, CEO and a Director of Romios Gold Resources Inc., a publicly traded company he founded in 1995.

Frederick Kozak P.ENG., MBA

President

Frederick is a highly experienced capital markets and resource executive, having spent the latter part of his career as a senior executive and board member of private and public companies, including as co-founder of a start-up public international oil and gas exploration company. Prior to that he worked as a globally recognized and top-ranked equities analyst, notably at Canaccord Genuity and Haywood Securities.

Frank van de Water B. COM., CPA, CA

CFO, Secretary, Director

Frank van de Water has been involved with international mining, metals and resource companies in North and Latin Americas, Europe and Africa for over 40 years.

James Sykes B.Sc. Geology

VP Exploration and Development

James brings 10 years of Athabasca Basin uranium exploration and discovery experience to the team, most notably from prominent roles for NexGen's Arrow deposit and having provided invaluable work on Hathor's Roughrider deposits. Over the past decade, he has been directly and indirectly involved with the discovery of over 450 M lbs. of U₃O₈ in the Athabasca Basin.

Nicolas Guest MSC P.GEO

Project Manager Alces Lake

Nicolas has over 10 years of experience in mineral exploration. His earliest field seasons were spent in New Brunswick, Labrador and Northwestern Ontario. The bulk of his experience was attained while gaining increased responsibility at Goldcorp/Newmont's Musselwhite Mine, where he led teams responsible for all phases of exploration, achieved record annual reserve replacement and completed his MSc in Mineral Exploration from Laurentian University. His contributions to Musselwhite's geologic model helped elucidate the behaviour of ore trends. Since then, Nicolas began consulting and has worked on feasibility projects in both Newfoundland and Nova Scotia.

Brian Robertson B.Sc., P.ENG., Grad. Dipl. Business Administration

Director

Mr. Robertson is a registered Professional Engineer (Ontario) with over 40 years of experience in the mineral resources industry and has served as an officer and director of a number of exploration and mining companies listed on the TSX and TSX Venture Exchanges. Mr. Robertson has extensive experience in the development and direction of exploration programs, project management, mine permitting, mine construction and development as well as mine operations and the evaluation of corporate acquisitions. He served as president of Victory Nickel Inc., Nuinsco Resources Ltd., and Mexican Gold Mining Corp., and is currently a director of Appia Energy Corp., Romios Gold Resources Inc. and Minnova Corp.

Thomas Skimming B.Sc. Geology, P.GEO, P.ENG.

Director

Thomas Skimming has been instrumental in the discovery and development of several mineral deposits including the world-class Teck-Corona gold deposit at (Hemlo) in Canada. He has over 50 years of experience in the mineral resources industry and he has served as an officer and/or director in a number of public exploration and mining companies.

Douglas H. Underhill Ph.D., MBA, CPG

Director

Dr. Underhill is an economic geologist with more than 45 years of international experience in the uranium industry at the commercial level including nearly 10 years with the International Atomic Energy Agency (IAEA) in Vienna. His specialties range from world uranium geology and resource estimation through supply-demand analysis. He has presented on these topics on five continents and has advised governments on uranium developments in the USA, Australia and China. He has also worked in the exploration and evaluation of Rare Earth Element projects for over 10 years.

William Johnstone L.L.B.

Legal Counsel & Director

Bill Johnstone is a partner at Gardiner Roberts LLP, practicing corporate and securities law and is the Practice Leader of the firm's Securities Law Group. He is also a director and officer of numerous public companies.

Nick Bontis Ph.D., B.A.

Director

Nick Bontis is a tenured professor of strategic management at the DeGroot School of Business, McMaster University. He received both his Bachelor of Arts (Honours Business Administration, 1992) and his Ph.D. (1999) from the Ivey School of Business at The University of Western Ontario. He is also an Executive Board Member and Director at Harvest Portfolios Group.

RISKS

Appia Energy Corporation is exposed to a variety of business risks, but not limited to, unexpected development or operating issues, permitting factors, and commodity and currency fluctuations. External financing requirements are also key risks, owing to the Company's lack of operating cash flow; however, that is offset by a cash balance that we estimate will suffice for the company's exploration, corporate and development activities for up to the next 12 months, depending on the level of exploration activity.

EXPLORATION RISKS | Like all exploration and development companies, Appia must outline sufficient resources and, eventually, reserves, to warrant development of its project. Given the early stage of the exploration at Alces Lake, we believe the exploration risks are high.

COMMODITY RISKS | Like all mining companies, Appia is subject to fluctuations in commodity prices, specifically rare earth oxides. If the price of REOs drops materially, future equity raises may come with higher than anticipated dilution.

CURRENCY RISKS | Appia's functional currency is the Canadian dollar while REOs are priced in US Dollars and Chinese Renminbi. A strengthening Canadian dollar would reduce the value of the Alces Lake project in Canadian dollar terms.

FINANCIAL RISKS | Appia is reasonably well-financed and believed to have sufficient funds for its working capital and exploration needs for up to the 12 months. After that period, there may be risks associated with raising additional capital.

POLITICAL, SOCIAL AND ENVIRONMENTAL RISKS | Appia operates in the province of Saskatchewan, Canada. Although we consider Saskatchewan to be a top-tier mining jurisdiction, there is no guarantee against unforeseeable issues, such as permitting, relations with First Nations, and changes to applicable mining or environmental laws and/or regulations.

RELEVANT DISCLOSURES APPLICABLE TO COMPANIES UNDER COVERAGE

1. Relevant disclosures required under IIROC Rule 3400 applicable to companies under coverage discussed in this research report are available on our web site at www.researchcapital.ca

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