A feasibility stage funded lithium deposit ranks “very high” on analyst list “likely to make it”

Putting together a mining operation is a long and complex endeavour, the success of which rests on a multitude of key factors including decent geology, edgy technology and that most ethereal of beasts, favorable market conditions. But regardless of industry specifics, business remains business, and the strength of your handshakes still holds great sway over the outcome of your chosen play. Looking at junior lithium explorer, Critical Elements Corp. (TSXV: CRE | OTCQX: CRECF) (“Critical Elements”), a picture is beginning to emerge of talented people and organisations rallying around the company’s Rose lithium/tantalum project in Quebec ahead of the battery technology boom of the next decade, and a recent $3m of scheduled investment from a strategic partner to fund the feasibility study reminds me that even in the harshest of industrial climates, our relationships are our most valuable asset.

To this end, Critical Elements have already impressed German chemical company, Helm AG, fervent supporters of the development of the Rose deposit; last year, Helm agreed to fund the feasibility study with a $4.5m credit facility as part of a “take or pay” offtake agreement, under which Helm reserves the right to purchase up to 100% of materials produced, as well as offering logistical and sales support for every Critical Elements project going forward from a well-established and massively successful company. The first $1.5m was paid last year, and two further drawdowns of the same amount were recently paid together in order to progress the project to production as quickly as possible.

Helm’s confidence in Critical Elements is well placed; an advanced project with good lithium grades of over 6% and an estimated 26,000 tonnes per annum of lithium carbonate equivalent to be produced has a lot of promise, and the German chemical giant is clearly very keen to see these numbers fully realised. Given that the world is expected to be short of 100,000 tonnes of lithium annually by 2025, it’s no surprise that those-in-need of supply are hunting down the most likely future producers and giving them a leg up.

A primary concern for both individual and corporate investors is to see seasoned management on the company roster; past successes and meaningful experience make for a considerably safer bet, and Critical Element’s President Dr Steffen Haber previously sold Rockwood Lithium to Albermarle for over $6 billion. As if this wasn’t enough, the company more recently appointed Dr Marcus Brune as a Director; Dr Brune’s previous position was as CFO of Rockwood under Dr Haber, who remarks on Dr Brune as having an “exceptional background in the lithium industry”.

The two doctors from Rockwood are, in my opinion, very likely to achieve great things working together; **the lithium industry is in real need of additional supplies before 2025 in order to cope with the explosive demand for worldwide energy storage systems**, and companies are already looking for feedstock by backing a select few juniors that are believed to have both the resources and abilities to come out on top. Critical Elements are one such company enjoying the benefits of well-organised support.

The importance of the feasibility stage cannot be understated; it formalises years of hard work into hard evidence, and companies try all manner of tactics to reach this point, yet time and again, we see the strongest success stories decided by the best and most fruitful relationships. Trust is built up slowly over time and is known to be one of the hardest things to earn, period, but it’s payoff is almost incomparable. The

sheer weight of the relationships that exist between the two doctors of Rockwood and Helm AG makes Critical Elements into an outfit worth far more than the majority of lithium juniors out there at a comparable development stage, and this is only the beginning.

The critical race for lithium production

In the years leading up to production, many lithium juniors will confess to have regularly dreamt of the fantastic offer from one of "the big three" waiting 'just around the corner'. Those three companies were renowned for gobbling up juniors whenever they needed to scale up production, until one swallowed another at the beginning of 2015, leaving a rather lopsided duo.

Dr Steffen Haber, President of Critical Elements Corp. (TSXV:CRE | OTCQX:CRECF) ("Critical Elements") since January 2017, joined the company after being CEO of Rockwood Holdings when it was sold to Albermarle for the princely sum of $6 billion. Rockwood were heavily involved in lithium projects, catalysts, bromine and surface treatments, and now Dr Haber's experience is helping Critical Elements to more rapidly advance their expansive Rose lithium-tantalum project.

Haber has homed in on the Rose deposit primarily as it represents the safest bet for hitting production quickly and cheaply out of their total of eleven resources. A Preliminary Economic Assessment (PEA) has already been completed and is due to be published shortly, but it, amongst other studies, reveals that the particular crystal structure found at the

site is so easy to process that a concentrate grading of 6.6% should result without much effort. This would be an astonishing 20% higher concentration than competing lithium mines. In addition, impurity levels are low, meaning the time to market for this project is rather short indeed.

Critical Elements expects the project to be shipping its high-quality spodumene concentrate by 2020, but it could be as early as 2019. About one-third of the total output will be sold as technical grade spodumene required by the industrial glass and ceramics market, and the premium attached to technical grade spodumene is higher than even refined lithium carbonate.

But Haber doesn’t plan to stop there; he wants to be shipping battery-grade lithium carbonate by 2023, around 600,000 tonnes of which is widely expected to be required globally in 2025. Battery-powered products are going nowhere, are only becoming more culturally entrenched, and have led to the modern gold rush that we see today, as manufacturers rush to source the component parts of our most beloved technologies.

The target for Rose is over 26,000 tonnes per annum of lithium carbonate equivalent, much higher than many competitors, but perhaps the good doctor’s experience tells him to aim high. Unsurprisingly, offtake agreements are already appearing; HELM, for instance, are a German sales and distribution company with an equivalent turnover of around $11 billion and widely recognised in the lithium industry. They will provide not only offtake, but both global sales experience and the workforce with which to shift product, indeed an efficient value-addition.

Looking at Critical Elements, one gets the impression that the rev-counter is thrashing around in the red zone; the clear goal of efficiency-over-all, aside from being rather pleasing, is almost certainly aimed at placing the company in an imminent position to benefit from the current boom before it

runs out of steam. Reaching production in the next few years is imperative for any lithium-based company if they are to catch the wave that is Tesla *et al*. Secure and trusting partnerships are emerging every day, and these will be much more difficult indeed to break apart in ten years time.

A Key Piece in the Clayton Valley Lithium Patchwork

In the staking frenzy of recent months, little historical ground has gone unturned, and yet Sienna Resources (TSXV: SIE | OTCBB: HBNRF) has still managed to sneak under the skirts of some major players and grab hold of a key piece in the long-established Clayton Valley lithium district. While its early days to draw conclusions specifically on the Sienna territory, here I shall look at the area and its geological and production history to see if the "tealeaves" look as prospective as they seem.

Clayton Valley

This saline lake in Nevada has become a veritable patchwork of interests as the Lithium boom has fired imaginations. In the beginning there was Albemarle (which operates North America's only producing Lithum brine deposit here), but surprisingly they had been comfortable enough to have not secured all the available territory with the result that the door was left ajar for a handful of other players to move in and get themselves a foothold.

Clayton Valley is located in Esmeralda County, Nevada, USA approximately 180 km north of Death Valley, CA. Clayton Valley is a closed basin with an area of 1,342 km2 and a playa

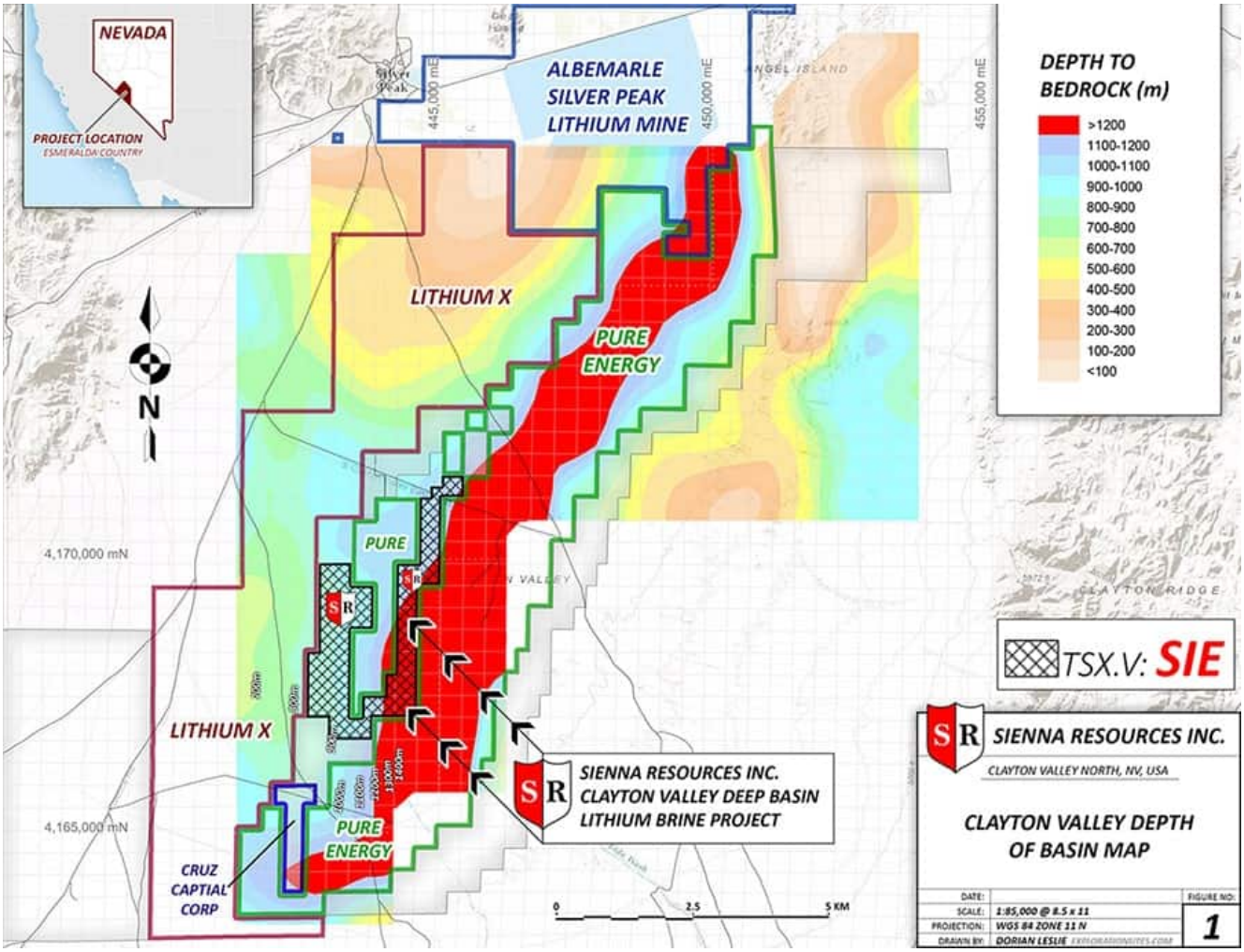
surface of 72 km2. The basin lies in the eastern rain shadow of the Sierra Nevada and is arid with an annual average precipitation of 13 cm, average evaporation rates of 142 cm/yr and an average temperature of 13°C. The elevation of the valley floor is 1298 m, lower than any of the basins in the region.

It is located in a closed-basin system with an arid climate. The Li-rich brines are currently being produced from six different aquifers in the playa. The brines have formed from a complex process involving evaporation, mixing, and halite, and hectorite (dissolution, precipitation, ion exchange and sorption). Climate fluctuations in Clayton Valley over time (at least since ~ 1Ma) have played a role in the preservation of Li in clays (hectorite).

Other Pieces of the Patchwork

As mentioned the Clayton Valley is home to the only lithium brine producing operation in North America (Albemarle's Silver Peak Mine). Lithium X is also in the scrum and so is an entity called Cruz Capital Corp. Pure Energy Minerals, which owns the Clayton Valley South project, has recently released an inferred resource of 816,000 tons of lithium carbonate equivalent on the Clayton Valley South project. According to the Pure Energy's website, "Geophysics shows that the same brine-bearing formations encountered during drilling appear to extend to much greater depths within the basin."

When we compared the zone to a patchwork quilt we are not exaggerating as the map below shows.



Some Back History

Of all the locations in North America for Lithium prospectivity the Clayton Valley has the new buzzword “closeology” going for it. The Foote Mineral Company began extracting lithium from below the floor of Clayton Valley in 1966. The mine then ended up in the hands of the German group Chemetall, which was then rolled into Rockwood, which most recently became Albemarle after a takeover. Its evaporation pans are shown below:

The company speaks of its production numbers in cagey terms blending together its output from this site with its Chilean production. However, the site is clearly important. The fact that it has received Department of Energy grants in the past for production expansion clearly shows that the *Powers That Be* in Washington have a desire to keep a US source of Lithium production going.

Sienna's Deal

In late May, Sienna announced that it had acquired what it termed the "Clayton Valley Deep Basin Lithium Brine Project". This project is located directly between and bordering Pure Energy Minerals Limited and Lithium X Energy Corp. The "Clayton Valley Deep Basin Lithium Brine Project" is located in parts of the deepest sections of the valley. Sienna's concession wraps around that of Pure Energy.

The company's attitude is that as saline brines are higher density than fresh or brackish water they therefore tend to

sink. Based on this, management is optimistic regarding this project as its concession is located in the deeper sections of this basin. Work so far on the territory is scanty but management plans to commence operations on this new project shortly.

Geology

It is useful to look at the geology of the whole saline lake. A USGS report note that the basement consists of late Neoproterozoic to Ordovician carbonate and clastic rocks that were deposited along the ancient western passive margin of North America. The basin is bounded to the east by a steep normal fault system toward which basin strata thicken. Tuffaceous lacustrine facies (termed the Esmeralda Formation) deposited during the Late Miocene or Pliocene, contain up to 1300 ppm Li and average 100 ppm Li. Late Miocene or Pliocene felsic tuffs and rhyolites along the basin's eastern flank have Li concentrations reported to be as high as 228 ppm, however, the highest Li concentrations in these volcanic rocks is actually an order of magnitude less (~22 ppm). Multiple wetting and drying periods during the Pleistocene resulted in the formation of alternating lacustrine deposits, salt beds, and Li-rich brines. Hectorite in the playa sediments contains from 350-1171 ppm Li. Prior to development of the brine resource by Albemarle's predecessors, a salt flat and brine pool existed in the north part of the basin, but groundwater pumping has eliminated the surface brine pool.

Conclusion

Sienna look like they have managed to buy the "last ticket to ride" on the Clayton Valley Express. As historical (and present) Lithium producing districts in North America go, this is the one to go for. Now it's a case of getting down to some work on the concession and seeing if it can match or exceed what Pure Energy have managed to achieve here.