

# 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 Lithium 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 km<sup>2</sup> and a playa surface of 72 km<sup>2</sup>. 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.