Lithium: Liontown changes tack on Kathleen Valley plant design

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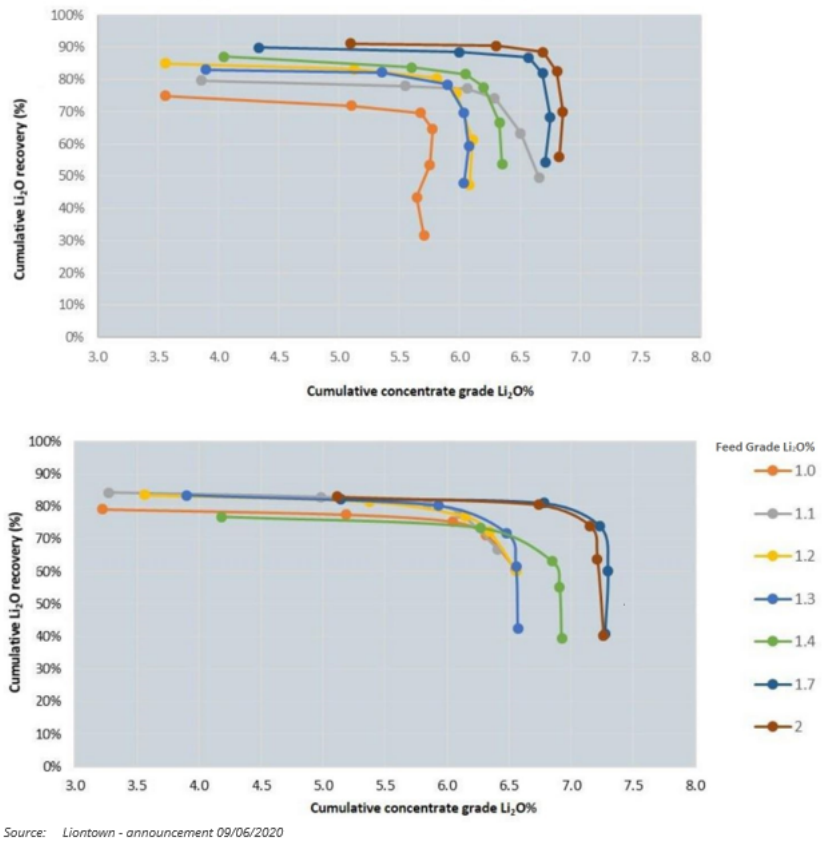
Liontown recently outlined several new points of focus for an updated pre-feasibility study on the Kathleen Valley lithium project in Western Australia. The one that caught the attention of Roskill's cost modelling team was the change in design to the project's spodumene concentrate processing flowsheet, from one using dense media separation (DMS) followed by flotation (the route used by many existing operations in Western Australia) to a whole ore flotation (WOF) process. In addition to increasing the volume of by-product tantalum that can be recovered by the project, the circuit design appears to offer greater consistency around concentrate recovery rates, as shown by the metallurgical test work below.

Liontown: Kathleen Valley grade-recovery curves for conventional combined DMS-flotation (upper) and whole ore flotation (lower)



Source: Liontown - announcement 09/06/2020

Roskill View

Plant recovery rates have been a factor that has plagued many of the recent spodumene project start-ups in Western Australia. In general, these projects have opted for DMS-flotation flowsheets in line with that already utilised by the states' longstanding producer, Greenbushes.

One of the interesting points from Liontown's metallurgical test work is the apparent greater consistency in recovery with the whole ore flotation route (lower figure), particular at lower ore feed grades when trying to achieve a 6% Li_2O spodumene concentrate (considered the industry standard concentrate grade). In comparison, the DMS-flotation test work (upper figure) shows a marked fall-off in recovery rates at feed grades between 1.1-1.3% Li_2O around the 6% product. For reference, the average reserve grade at the recent Australian start-ups is 1.1-1.3% Li_2O, while Greenbushes' is over 2.0% Li_2O.

Now, feed grade is not everything when it comes to plant recovery. Mineralogy also plays an important role, and some pegmatites are notoriously non-homogenous. As such, the representativeness of the samples used in test work is important, as is the caveat that results from one deposit will not translate verbatim to another. Furthermore, the chemistry of the process water used is also crucial and understanding any difference between water used in the lab compared to that derived from boreholes on site is important for translating lab tests in commercial scale results. Outside of this, another important factor is the specification of the concentrate produced by WOF. Grade and impurity levels are important in considerations for the downstream conversion facilities, however, concentrate particle size can also impact the running of spodumene to lithium carbonate/hydroxide conversion plants.

*Roskill's **Lithium Cost Model Service** is designed to provide miners, financial institutions, governments, and other industry stakeholders with an in-depth understanding of the costs involved throughout the lithium supply chain; for more information, click here (https://roskill.com/roskill-product/lithium-cost-model-service/).*

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