Salt lakes – their potential for potash supply boost (especially in Australia)

The Dead Sea is the world’s largest salt lake resource of potash (up to 1 billion tonnes of K2O), shared by Israel and Jordan, which has been used for potash production since the 1930s.

About 85% of sulphate of potash (SOP) in the world today comes from underground mining. Just 15% comes from evaporation processes at salt lakes. The production cost at the latter is averaging $220/tonne, which sounds appealing given the present levels of potash prices.

Those figures come from an unlisted Australian company which is exploring three salt lakes in the interior of the country.
The focus has been thrown on salt lakes as a source of potash by a recent report by Geoscience Australia, a federal agency, outlining Australia’s potential to use its own vast salt lakes for potash production – as well as for extracting lithium, borates and other commodities. But it’s potash the agency thinks the most significant because of its strategic importance to Australia’s farming sector (the country at present importing all its potash needs).

One such brine source, Lake Chandler in Western Australia, was worked for potash in the 1940s when the fertilizer feedstock was in short supply due to the war. But since then, and until just a few years back, the potential of these lakes has been lying dormant. Some interest is now being shown; in Australia the work is being led by Reward Minerals (ASX: RWD) at Lake Disappointment and Activex (ASX: AIV) at Lake Chandler; the latter is still doing test work, but at present potash prices the Lake Chandler project won’t work economically. The company is looking at options as a way to make it work financially.

As Activex points out, the Australian potash market relies completely on imports, principally from Canada, Taiwan and Germany. “The lack of domestic production means that potash prices in Australia are at a significant premium to world prices,” it adds. The company is targeting SOP because there is a big market locally within the West Australian wheat belt.

The Geoscience Australia report says that, in addition, exploration is under way at Lake Disappointment and Lake Mackay in Western Australia and in the Karinga Creek region of the Northern Territory. Moreover, the study has identified new greenfields areas of salt lakes which are favourable for the production of potash and the other commodities. At present there are no published resources for potash in Australia.

The big producers of North America and Europe are mining underground, with the depths and costs associated with that process.
The Great Salt Lake, located in the northern Utah.

But salt lakes are being seen increasingly as an alternative source. The world’s largest salt lake resource of potash is the Dead Sea (up to 1 billion tonnes of K2O), shared by Israel and Jordan, which has been used for potash production since the beginning of the 1930s. Evaporation plants for potash recovery also operate in China, the U.S. and Chile. The brine used in China is taken mainly from Qarhan Salt Lake on the Tibetan Plateau while the U.S. producers use brine from the Great Salt Lake in Utah or the Bonneville Flats in the Great Salt Lake Desert, also in that state. In Chile potash is extracted from salt solutions under the salt crust of Salar de Atacama.

The Geoscience Australia report lists the world’s largest potash-bearing salt lakes in terms of milligram of potash per litre of solution (note – this is not an indicator of the total size of the resource, just the concentrations):

- Lake Chandler, Australia 57,300 mg/L
- Searles Lake, U.S. 17,900 – 31,000 mg/L
- Lake Katwe, Uganda 30,500 mg/L
- Da Qaidam Salt Lake, China 25,700 mg/L
- Marada, Libya 22,600 mg/L
- Salar de Atacama, Chile 22,200 mg/L
- Qarhan Salt Plain, China 14,400 – 20,000 mg/L
- Pastos Grandes, Bolivia 14,200 mg/L

Just to reinforce the point about the concentrations versus the total size, the Dead Sea is — as noted above — the world’s largest resource of potash in brine. But it has 7,200 – to 9,000 mg/L. But the list given above is also useful in alerting readers to the existence of potash in salt lakes not now in production, as is the case with several of the above. Others are Lop Nur (China), Khour (Iran), Bayover (Peru), Tuz Golu (Turkey) and at least seven in Argentina. And another five in Australia.