

Lithium exploration in Saskatchewan: Data from a Decade of Sampling and New Data from the 2022 Sampling Season as Well as New Data from Recent Industry Exploration

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Abstract

Since 2011, the Saskatchewan Geological Survey has been sampling brines from wells producing from Paleozoic-aged strata in southeastern and west-central Saskatchewan from which a database of major and minor elements in the formation waters in Saskatchewan has been developed. Standard brine analysis done by the oil and gas industry typically measures only the major elements, making the Survey results some of the first publicly available data for trace elements in the province. The aim of the Saskatchewan Geological Survey's brine sampling project is to determine the distribution and concentration of the major and minor elements present in the subsurface of Saskatchewan, with an emphasis on lithium and other trace elements that could potentially be derived from basinal brines. In 2022, twenty three wells were sampled in conjunction with a University of Regina project investigating Rare Earth Element (REE) potential from Saskatchewan formation waters. These new data points are from previously unsampled formations from numerous oil producing regions across Saskatchewan. Results show lithium concentrations vary not only from formation to formation but also have spatial variations within the formations themselves. The preliminary REE results will also be presented. The University of Regina project was initiated because of REE being placed on the recently announced list of Canada's critical minerals, with this inclusion on this list it is expected demand for REE will grow over the coming years. Lithium exploration is also currently being undertaken by industry. Since April 2019 brine permit sales for the intent to produce lithium have generated over 7 million dollars of revenue for the province, via a competitive bid process and several wells have been drilled and tested for lithium concentration. This presentation will focus on the lithium exploration completed by the Survey to examine the lithium potential in the Williston Basin.