

# Lithium from Ultra-Saline Brine Made Viable

As demand accelerates for sustainable, domestic lithium sources, Canada is emerging as a key player to develop domestic supply. Among its most promising resources are subsurface brine deposits – deep underground reservoirs rich in lithium and other minerals. One such project is tapping into high-salinity brines at depths exceeding two kilometers. Supported by established energy infrastructure and a favorable regulatory environment, this site presents a bold opportunity to produce battery-grade lithium with a significantly smaller environmental footprint.

## The Challenge

A leading lithium producer in Canada faced a critical challenge: making lithium extraction from its highly-saline brine economically viable. Complex impurities in the brine source demanded costly, sophisticated processes to achieve high lithium recovery rates above 95%. But with thermal evaporation adding even more capital and operational burden, the total flowsheet cost threatened the project's economic feasibility. That's where alkaLi comes in.

## The Solution

Collaborating with the client to engineer a more cost-effective flowsheet, alkaLi deployed its Concentrate technology built around Gradiant's proprietary CFRO (Counter-Flow Reverse Osmosis) — the heart of the EC<sup>2</sup> platform. A fully customized pilot system, optimized with advanced pre-treatment, enables CFRO to handle the extreme salinity and complexity of high-TDS brine streams — delivering high recovery where conventional membranes fail.

## The Benefits

alkaLi's Concentrate technology has redefined the economics of lithium extraction for this client — transforming a challenging process into a commercially viable solution. The system delivers 15X concentration, over 90% freshwater recovery from extraction waste, and 95% lithium recovery. The result: lower costs, higher yields, and a sustainable, scalable solution. With a pilot successfully demonstrated, the process is now advancing to full commercial deployment.

## Fast Facts

Location:	Canada
End-User:	Leading Lithium Producer
Solution:	Lithium Concentration
Industry:	Resource Recovery of Lithium
Feedwater Source:	DLE Eluate from Subsurface Brine
Technology:	alkaLi EC <sup>2</sup> , featuring CFRO
System Configuration:	Single Train, Multi-Stage
Commissioning Date:	Q3 2024
Delivery Model:	Design-Build

Up to  
**15X**  
Concentration Factor

**>90%**  
Freshwater recovery from  
DLE waste

**>50%**  
Cost savings vs alternative  
technologies

## Pilot Results (All units in mg/L)

Parameters	Feed	Concentrate
TDS	10,000 – 15,000 mg/L	Up to 225,000 mg/L
Li	800 – 1,000 mg/L	Up to 15,000 mg/L