

Study D

Choose a useful recovery service

For one native feed and one product or removal service, does the proposed recovery route outperform the strongest conventional route after regeneration, material loss and finishing?

Conditional target-specific validation; material novelty not defined. This is a proposed study; no result or novelty is established.

What earlier work establishes

Magnetic sorbents, selective resins, boron pretreatment and magnesium precipitation have precedents. No exact new material composition is supplied or presumed.

The proposed difference

A target-specific comparison of cumulative qualifying output and total capture/regeneration/finishing burden, including lost support material.

A fair comparison

Best feasible selective resin or precipitation route

Proposed route at the same native feed and acceptance specification

The decision

Cumulative qualifying product or treated volume, with whole-composite and target inventories and complete service cost.

Planned scope

Up to 24 development runs and six campaigns of up to 100 cycles; 2,202 principal panels at the full ceiling.

Before confirmation

Choose one native target, an obtainable material/process and an accepted service specification; complete an element-level comparison before any invention claim.

Funding basis

18 funded months. Preliminary standalone estimate: lower \$2,759,221, base \$3,266,817, higher \$4,376,024. All studies use the same rates and cost rules, including founder coordination, scientific staff, analyses, equipment, institutional costs and reserve. These are unquoted planning estimates; shared execution requires an itemized combined scope.

Methods and source review

Complete methods and reading limits · Editable unified budget

N16: PNNL-35345: Magnetic Nanoparticle Extraction of Lithium from Produced Waters (CRADA 483), Final Project Report

N17: AU2020289275A1: Polymer-functionalized magnetic particle embodiments for solute separation, and devices and systems for using the same

N29: European Commission, SEA4VALUE results and public deliverables, grant 869703

N30: European Commission, ZERO BRINE results and public deliverables, grant 730390

S23: Boron extraction using selective ion exchange resins enables effective magnesium recovery from lithium rich brines with minimal lithium loss

S13: Energy-Efficient Seawater Lithium Extraction via a Reversible Redox-Hydrogen Coupled System

S14: Li-air chemistry inspired electrodialysis for direct lithium carbonate production from seawater