

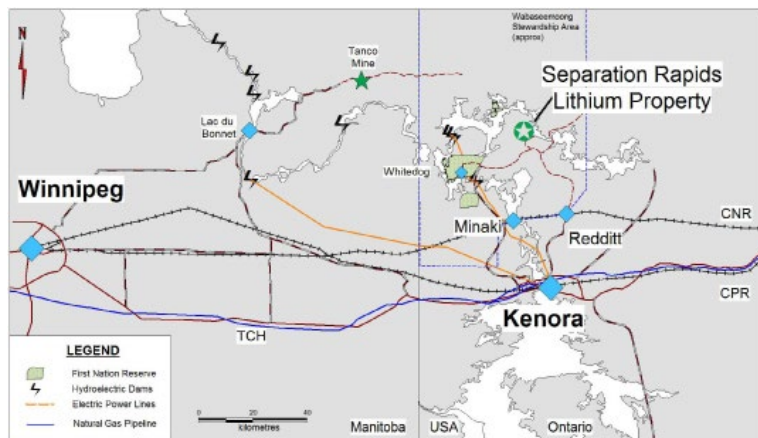
# SEPARATION RAPIDS LITHIUM PROJECT

*A unique deposit of the rare lithium mineral petalite*

*As at February 22, 2018*

## Project Overview

The 100% owned Separation Rapids property is host to a “complex-type lithium-cesium-tantalum (LCT) pegmatite deposit, unusual in its enrichment in the rare, high purity lithium mineral petalite. Separation Rapids is a potential producer of lithium chemicals for the lithium ion battery market and lithium minerals for glass and ceramics. The property covers a total of 6,000 acres and is situated close to road, rail and power infrastructure approximately 70 km north of Kenora, Ontario, Canada.



## Development Stage

Originally drilled in 1997-2001 with a Pre-Feasibility Study on lithium mineral production for glass and ceramics completed in 2000. Preliminary Economic Assessment (PEA) on producing lithium hydroxide from petalite completed September 2016. An updated PEA is planned after additional drilling is undertaken to expand the resource. Planning for construction of a minimum 50,000tpy demonstration-scale pilot plant in 2018. Approximately \$10 million has been invested in the property to date.

## Strategy

- Product design:** Working with customers to create the best quality products to serve their needs at attractive prices
- Innovative metallurgy:** Designing an efficient process to produce the best quality product at the lowest cost
- Staged development:** Start with a demonstration plant to prove process and scale up after products are optimized
- Minimizing environmental impacts:** Recycling of reagents and creating markets for by-products
- Sustainable development:** Utilize renewable energy and maximize use of the ore body

## Potential Products

- High purity lithium compounds for batteries (lithium hydroxide and/or lithium carbonate)
- Lithium mineral (petalite) concentrates for high strength glass and ceramics
- By-products rubidium, tantalum, cesium, silica and feldspars

## Next Steps

### 2018

- Identify customers for lithium chemical products
- Optimize flowsheet laboratory work
- Bulk sample trial to generate final flowsheet design and Phase 1 plant engineering
- Define potential by-products
- Drilling and exploration to increase mineral resources
- Upgrade access road
- Complete new Technical Report and Feasibility Study

### 2018-19

- Establish minimum 50,000tpy demonstration plant to generate products and serve as interim small-scale production facility

### 2020-21

- Production scale-up

### 2021

- Begin full scale commercial operations

*Please note that the projected timeline is reliant on a positive Feasibility Study as well as offtake commitments, project financing, and timely receipt of all permits and environmental approvals.*

## Strategic Advantages

- High purity makes petalite amenable both for production of high purity lithium battery materials and for sale as an industrial mineral for high strength glass and ceramics manufacturing
- Deposit also contains abundant lithium micas, including lepidolite, which can be concentrated separately for production of battery grade lithium carbonate (not considered in PEA model)
- 8.0 million tonnes of measured and indicated resources at 1.29% Li<sub>2</sub>O and 1.6 million tonnes Inferred at 1.42% Li<sub>2</sub>O, open for expansion laterally and to depth\*
- Potential for multiple by-products (feldspars, silica, tantalum, rubidium, cesium)
- Minimal environmental footprint, no hazardous waste materials
- Proximity to transportation, hydro power and community infrastructure

\*Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the Mineral Resource will be converted into Mineral Reserves.

**Purple lepidolite with K-feldspar. Lepidolite is known for its high lithium content.**



Note the PEA is preliminary, includes inferred mineral resources considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the preliminary economic assessment will be realized.

For more information:

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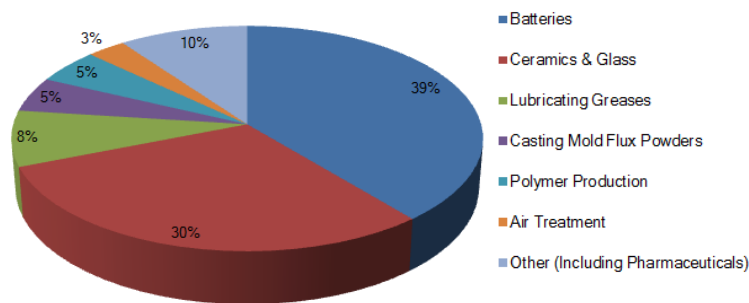


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## Lithium Demand by Application



Source: USGS, January 2017

## 2016 PEA Development Concept

The 2016 PEA development concept is an open pit mine, potentially transitioning to underground mining in later years; with milling onsite to produce a lithium mineral concentrate and by-product feldspar. The lithium mineral concentrate would then be processed in a hydrometallurgical plant (presently contemplated for Kenora) to produce lithium hydroxide for the battery industry or sold directly into the glass industry. The current model assumes average annual production of 14,600 tonnes of lithium hydroxide for a minimum of 10 years and 100,000tpy of feldspar mineral concentrate.

Total CAPEX for this initial model was estimated at \$514 million, inclusive of \$86 million in contingencies and \$7 million in sustaining capital. This includes the mine, concentrator and a hydromet plant assumed to be in Kenora. The hydromet plant accounts for approximately 50% of the total CAPEX estimate.

The average cost to produce lithium hydroxide was estimated at US\$4900/tonne versus a price assumption of US\$11,000/tonne. The CAD:USD exchange rate assumption was US\$1.00 = CDN\$1.30. Pricing for lithium hydroxide has moved significantly higher over the last year and has recently been reported at US\$18,000/tonne.

## Sustainability Reporting

At Avalon, sustainability means adopting leading industry standards for the management of health, safety and the environment, and engagement with local communities. In November 2017, Avalon released its sixth Sustainability Report in accordance with GRI Standards: core option and MAC TSM standards. The full report can be downloaded from Avalon's website.



The technical information contained in this document has been reviewed and approved by Don Bubar, P. Geo. (ON), President & CEO, Avalon Advanced Materials, the qualified person for the purposes of National Instrument 43-101; the metallurgical information contained in this document has been reviewed and approved by David Marsh, F.AusIMM (CP), Senior Vice President, Metallurgy and Technology Development of Avalon, the qualified person for the purposes of National Instrument 43-101.

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