



Canola grown on paper mill bio- solids on tailing (Sudbury, Ontario)



## East Kemptville Tin-Indium Project: Profitable rehabilitation of a closed mine site

### Project Description

The 100% owned East Kemptville Tin-Indium Project is located 55km northeast of Yarmouth, Nova Scotia, Canada. The property consists of 4 exploration licences and a Special Licence covering over 10,000 acres in aggregate.

East Kemptville was an operating tin mine from 1985-1992 and was North America's only large primary tin producer, before closing prematurely in 1992 due to a collapse in tin prices after the international cartel was disbanded.

Increasing global demand for tin and tightening supplies have resulted in strengthening tin prices, creating an opportunity for Avalon to consider re-developing East Kemptville. Avalon is presently in the process of securing full tenure to the site under a mining lease to put the company in a position to re-start production at a small scale, utilizing the existing stockpile resources for initial feed to a gravity concentrator, supplemented by accessing near-surface higher grade tin resources. The present model provides for small scale re-development that will remediate the existing environmental liability and ultimately result in the full rehabilitation of the site.

### A Sustainable Redevelopment Model

Avalon's redevelopment model involves initially processing the 5.87 million tonne stockpile of previously-mined oxidized low-grade mineralization, (a significant source of acid mine drainage), supplemented by selective mining of near-surface fresh higher-grade tin mineralization.

The freshly mined tin mineralization will serve an important purpose in the site rehabilitation concept by allowing for the generation of clean tailings free of sulphide minerals. These clean tailings will be used to create a cover for the existing dry-stacked tailings which, along with removal of the stockpiles, will fully remediate the long term environmental liability associated with the tailings and facilitate its ultimate conversion into other long term beneficial uses, such as a solar power generation or agriculture.

Avalon's small-scale, re-development model utilizes existing infrastructure and previously-mined material, making the project a low energy, low green-house gas producer that may also make the final product more attractive to Avalon's cleantech customers.

### Property Location



### Strategic Advantages

#### Infrastructure in place

- Accessible by paved highway
- Grid power on site
- Unused tailings management facilities

#### Deep water port

- Within 60 kilometres

#### Skilled labour available locally

- Within commuting distance to site

#### Politically-stable jurisdiction

- Supportive community and government
- No conflicting land uses

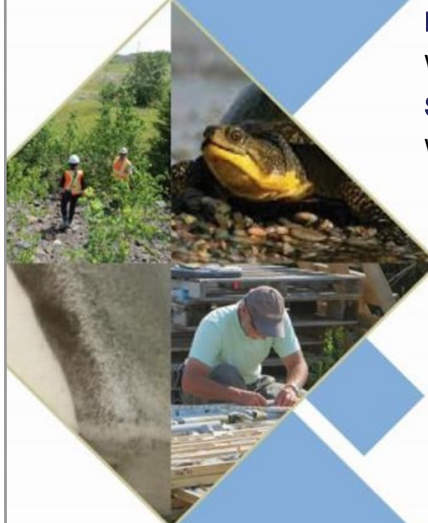
#### Large stockpiles on site

- In addition to in-the-ground resources

- Provide flexibility to future mine development

#### Potential for additional products

- Zinc, copper, indium and other rare metals



## PEA & Current Re-Development Model

Avalon's small-scale re-development model (utilized for the July 2018 PEA) contemplates a production schedule of approximately 1,300 tonnes per annum of a 55% tin concentrate for 19 years, with tin concentrates being sold to international markets. The redevelopment model primarily involves processing of the 5.87 million tonne stockpile of previously-mined oxidized low-grade mineralization grading 0.112% Sn, supplemented by the selective mining of 9.2Mt of near-surface fresh higher-grade tin mineralization from the Main and Baby Zone deposits.

The PEA concluded that tin concentrate production at East Kemptville is economically viable at current tin prices in the range of US\$20,000 to US\$22,000/tonne. Assuming an average go-forward tin price of US\$21,038/tonne (as forecast by the World Bank Commodity Price outlook for 2020), and an exchange rate of CAD 1.30/USD, the project has an indicated pre-tax IRR of 15.0% and an NPV of C\$17.9 million at an 8% discount rate. The initial capital cost is estimated at just C\$31.5 million. Average annual revenues from sales are calculated as C\$17.75 million vs. annual production costs of C\$11.6 million. With this model, Avalon has the advantage of re-starting production at a small scale and low CAPEX, with potential to scale up production in the future and recover additional by-products such as indium.

Next steps include optimizing the metallurgical process flowsheet, arranging project financing and off-take agreements and initiating plant design and procurement activities.

*The PEA is preliminary in nature, includes Inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the PEA will be realized.*



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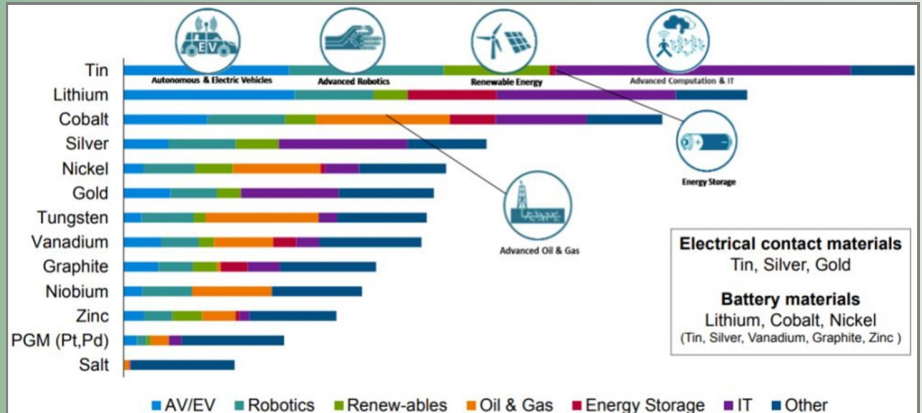
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## Tin Markets

Rising tin prices over the past 10 years reflect growing global demand for tin due to its increased application in electronics, where it is used in solders as a non-toxic alternative to lead, and in energy storage and renewable energy applications such as solar panels. In fact, tin is now increasingly recognized as a "technology metal" and was recently ranked in a study conducted at MIT for Rio Tinto as the number one metal most impacted by new technology.

## Metals Most Impacted by New Technology:

**Tin is No. 1!** Source: MIT / Rio Tinto, March 2018



Production of tin concentrates from traditional sources in southeast Asia has declined in recent years, increasing the need for new primary supply sources, such as East Kemptville, to emerge.

Over the next five years, the International Tin Association (ITA) sees modest growth in demand and stable to rising prices due to continuing supply shortages of tin recovered from conflict-free sources.

## LME Tin Prices (USD/Tonne)



The technical information contained in this document, unless otherwise noted, has been reviewed and approved by Don Bubar P.Ge. (ON), President & CEO of Avalon, the qualified person for the purposes of National Instrument 43-101.

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