Developing High Purity Lithium Chemicals from Lepidolite

Arlington Pre-daba, Mining Indaba 2020 – Corporate Update

January/February 2020
Developing a Sustainable Lithium Chemical Business on Lepidolite Resources

- Lepidico’s (ASX: LPD) strategic objective is to develop a sustainable vertically integrated lithium business that provides above average returns from mine to battery grade lithium chemical production.

- Phase 1 Plant Feasibility Study key results due May 2020 for:
  - redevelopment of two mines within the 80% owned Karibib Project (KP) in Namibia and the design of a new flotation plant to produce a lepidolite concentrate for export to...
  - ...a chemical conversion plant in Abu Dhabi employing Lepidico’s clean-tech process technologies, L-Max® and LOH-Max™, which together extract lithium and manufacture lithium hydroxide along with valuable by-products.

- Pilot Plant: produced 99.95% Li₂CO₃ and >99.5% LiOH.H₂O confirming process chemistry.

- Lepidico has a market capitalisation of c. A$80 million* and is funded into mid-2020 with A$4.7M pro-forma cash at 31 December 2019.

*20 January 2020
Integrated Phase 1 Project Overview

Karibib Project
Mine & concentrator in Feasibility Study
Measured, Indicated & Inferred Resources
11.2Mt @ 0.43% Li_2O

Phase 1 L-Max® chemical plant
In Feasibility Study
Industrial City of Abu Dhabi
Gulf Fluor LLC: MOU for Acid Supply

L-Max® Pilot Plant
**Lepidolite vs Spodumene**

### Spodumene

- **1.08% Li₂O**
  - 277 kg Li
- **6.03% Li₂O**
  - 194 kg Li

**Lithium Recovery**:
- **DMS + flotation**: 70% (55-75%)
- **Roast + calcine + hydromet**: 85%

**Concentrate**
- **6.89 t**: 1 Tonne Lithium Hydroxide 165 kg Li

**Waste**
- Tantalum conc’?
- Sodium Sulphate

### Lepidolite

- **48.4 t Ore**
  - 0.90% Li₂O 203 kg Li
- **10.15 t Concentrate**
  - 3.87% Li₂O 183 kg Li

**Lithium Recovery**:
- Flotation: 90%
- Hydromet: +90%

**Converter**
- L-Max/LOH-Max

**Residue Product**
- Potassium Sulfate
- Caesium/Rubidium Chemicals

**Waste**
- Tantalum conc’?

Source: Spodumene data selected from sample of various company announcements from ASX-listed Spodumene producers and developers. Lepidolite data based on Lepidico ASX Announcement 27 February 2017, Phase 1 Project Pre-Feasibility Study Results and consistent with Pilot Plant results.
Karibib Lithium Project

+1,000km² land position under Exclusive Prospecting Licences
30+ identified outcropping lithium bearing pegmatites
Granted 68km² Mining Licence
Brownfield sites at Rubicon & Helikon
Direct access to excellent existing regional infrastructure
Strategically Located Lithium Mines

Past producing mining assets at Rubicon & Helikon 1-5

Environmental Compliance Certificate renewal, Sept 2020

Direct access to existing infrastructure:
- all weather road
- water bores & pipeline
- camp
- 7km 22kV power line spur to grid connection pending
- 17km to railhead
- 220km to Walvis Bay port
Mineral Resource Estimate

Mineral Resource Estimate

4 JORC 2012 compliant, Lepidico ASX Announcement 30 January 2020. *Cut-off 0.20%.

- Measured-Indicated Mineral Resource includes Cs, Rb & K grades allowing by-product production estimates
- Preliminary mine plan indicates:
  - strip ratio of just 0.3 to 1 for first 2 years of operation and 1.4 to 1 over the first 10 years;
  - Elevated grades of 0.6% Li₂O for first 4 years mining
  - Concentrator 60% capacity expansion in year 5
- Mine & concentrator design due May 2020

<table>
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<tr>
<th>Deposit + Helikon 1</th>
<th>Resource Category</th>
<th>Tonnes (M)</th>
<th>Li₂O (%)</th>
<th>Rb (%)</th>
<th>Cs (ppm)</th>
<th>Ta (ppm)</th>
<th>K (%)</th>
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<td>Rubicon + Helikon 1</td>
<td>Measured</td>
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<td>0.57</td>
<td>0.27</td>
<td>389</td>
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Low strip ratio starter pit, waste to mill feed less than 1:1 at 0.8% Li₂O
Infill drilling Aug/Sept 2019 to increase MRE & confidence

Geotechnical Study to optimize Pit Design & determine underground economics
Rubicon mineralisation open down dip
The L-Max® Advantage

✓ The Australian Patent Office declared L-Max® to be “novel, inventive, industry applicable and patentable” for production of lithium carbonate

  ✓ US patent protection received 22 October 2019

✓ L-Max® leaches lithium from non-conventional, less contested mineral sources; lithium micas and phosphates, and achieves high extraction rates

✓ L-Max® utilises common use, inexpensive reagents & is energy efficient

✓ L-Max® reagents and operation have straightforward occupational health, safety and environmental characteristics

✓ L-Max® utilises conventional equipment and operates at atmospheric pressure and modest temperature

✓ By-products include: potassium sulphate fertiliser (SOP), amorphous silica and potentially Cs, Rb & Ta

✓ Scalable technology: scoping study design parameters for a larger Phase 2 Plant started; to complete in 2020

✓ Compatible with other process technologies including LOH-Max™ and S-Max™
Pilot Plant

- 15kg per hour L-Max® pilot plant completed on schedule and within A$3M budget, April 2019
- Campaign 1 completed August 2019
- LOH-Max™ capability to be retrofitted for Campaign 2

Pilot plant has:

- demonstrated L-Max® technical viability using small scale industrial equipment, similar to that employed in the Phase 1 Plant design; expenditure eligible for R&D tax refund (43%);
- produced 99.95% Li₂CO₃ and >99.5% LiOH.H₂O with very low impurities;
- produced high purity potassium sulphate (SOP) of more than 96% K₂SO₄, equivalent to 52.2% K₂O;
- production of caesium-rubidium formate; SG > 2.2, good clarity and low levels of deleterious elements;
- produced amorphous silica P₁₀₀ 25μm, complies with standards for fly ash (and fumed silica – TBD);
- reduced scale-up at nominal throughput of 6.9tph for Phase 1 Plant to 460 times; and
- provided data for optimisation of Phase 1 Plant operating parameters.
Pilot Plant Campaign
July 2019
Strategic Metallurgy Pty Ltd, in collaboration with Lepidico, has developed a hydrometallurgical process that produces high purity LiOH from a lithium sulphate intermediate without the production of sodium sulphate.

LOH-Max\textsuperscript{TM} is compatible with the highly efficient L-Max\textsuperscript{®} impurity removal stages and can replace the subsequent standard industry sodium sulphate and lithium carbonate recovery circuits.

Capital intensity and operating costs are more competitive than for conventional production of lithium carbonate:
- Elimination of sodium sulphate circuit; significant capital equipment and by-product sales risks removed
- Potential for lithium hydroxide and/or carbonate producers to retro-fit existing plants or redesign planned plants

Funding and offtake agreements for new lithium chemical plants in 2018 were heavily skewed towards LiOH operations.

Process residue is benign and alkaline, and is being evaluated as an environmental remediation product.

Lithium Hydroxide (LiOH) – introducing LOH-Max\textsuperscript{TM}

Lithium chemical demand growth has shifted strongly to LiOH.

LOH-Max\textsuperscript{TM} delivers an industry solution to high purity lithium hydroxide (>99.5% LiOH.H\textsubscript{2}O) production without by-product sodium sulphate.
New LiOH process, LOH-Max™, compatible with L-Max® flowsheet

L-Max® - 100% Owned by Lepidico

Lepidico has acquired the exclusive rights to LOH-Max™

LOH-Max™ provides an industry solution for high purity lithium hydroxide production without by-product sodium sulphate
Feasibility Study design criteria:

- Karibib concentrator design throughput of c. 0.35M tpa, with expansion to 0.50M tpa in year 5
- Chemical plant design feed of 58,000tpa concentrate with optimal grade of 4.0% Li$_2$O for c. 5,500tpa LiOH monohydrate
- Primary location, the Industrial City of Abu Dhabi (ICAD), United Arab Emirates close to excellent established infrastructure:
  - Local abundance of key reagents, sulphuric acid – MOU with Gulf Fluor – limestone and lime; competitive cost labour, gas and power; and close to markets for bulk by-products, amorphous silica and SOP fertilizer
- Non-binding off-take MOU with BASF for LioH
- Market development for Cs & Rb formates for use in oil & gas applications for a potential further by-product
- Targeting for Project commissioning to commence late 2021 for commercial production in 2022

Key results for the integrated study due May 2020, including:

- Karibib Ores Reserve estimate and mine design;
- Karibib concentrator design and site infrastructure; and
- Abu Dhabi chemical plant design employing L-Max$^\text{®}$ and LOH-Max$^\text{TM}$

Source: Lepidico September 2019 Quarterly Report
Environmental & Social Impact Assessments

Karibib Lithium Project, Namibia:
- Brownfield site – redevelopments designed within the footprints of former mining activities
- Sustainable closure – industry best practice closure plans that will rectify mining and processing legacy issues
- Social benefits – creation of 85 jobs to benefit local communities and no relocation requirement
- Renewable energy – Power Purchase Agreement that provides energy from renewable sources
- No tailings storage facility – co-disposal of benign dry stacked flotation plant tails with mine waste
- Small scale mining fleet – electric option will be reviewed when as right-sized equipment becomes available
- Water sourced locally from the ground with >85% of process water recycled

Lepidolite Chemical Conversion Plant, Abu Dhabi:
- Relatively modest power consumption; gas fired electrical power to be supplemented by nuclear (2020 start-up)
- Heat recovery equipment included in design to reduce gas consumption
- Low emissions with net carbon intensity of 5-7t CO₂/t LiOH.H₂O for the integrated project after amorphous silica credit
- SOP, Cs/Rb by-products to provide further carbon credits (to be quantified)
- Residue product could generate additional carbon credits and result in a zero-waste facility
- Social benefits – creation of 119 jobs and low impact as built on existing industrial park
- Small footprint minimises steel and concrete in construction
Phase 1 Plant Residue Product

University of Waterloo completed an assessment of L-Max® residue for land reclamation purposes

- Chemical analysis using USEPA land fill testing requirements have determined that the residue is benign and alkaline: 74% moisture, gypsum 60% of solids, pH 8.5
- When blended with soil or clay (50/50) amendments the material has the potential for use as a cover in city land fill sites or in the remediation of tailings dams and mine waste facilities
- Laboratory testwork indicates the blended soil or clay residue meets Ontario standards for industrial, non-potable ground water
- Growth trials (photo) with positive results for soil and clay blends
- A residue product would make L-Max® a zero-waste process
- Market assessment for UAE application started September 2019
Strategy summary...

...to fast track the business to free cash flow generation, demonstrate the commercial viability of L-Max® and LOH-Max™, and become a globally significant vertically integrated producer of sustainable lithium chemical.
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The information in this report that relates to Exploration Results is based on information compiled by Mr Tom Dukovcic, who is an employee of the Company and a member of the Australian Institute of Geoscientists and who has sufficient experience relevant to the styles of mineralisation and the types of deposit under consideration, and to the activity that has been undertaken, to qualify as a Competent Person as defined in the 2012 edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.” Mr Dukovcic consents to the inclusion in this report of information compiled by him in the form and context in which it appears.

The information in this report that relates to the Alvarrões Mineral Resource estimate is based on information compiled by John Graindorge who is a Chartered Professional (Geology) and a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM) and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity to which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves”. John Graindorge is a full-time employee of Snowden Mining Industry Consultants Pty Ltd and consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to the Helikon 1 and Rubicon MRE is based on information compiled by Vanessa O'Toole who is a Member of the Australasian Institute of Mining and Metallurgy (MAusIMM) and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity to which she is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves”. Vanessa O'Toole is an employee of Snowden Mining Industry Consultants Pty Ltd and consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

The information in this report that relates to Mineral Resources at the Helikon 2 - Helikon 5 deposits within the Karibib Project is based on information compiled by Mr Jeremy Witley, who is a fellow of The Geological Society of South Africa (GSSA) and is registered professional with the South African Council for Natural Scientific Professions (SACNSAP). Mr Witley is the Head of Mineral Resources at The MSA Group (Pty) Ltd (an independent consulting company). Mr Witley has sufficient experience relevant to the style of mineralisation and the types of deposit under consideration, and to the activity he is undertaking, to qualify as a Competent Person as defined in the 2012 edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.” Mr Witley consents to the inclusion in this report of information compiled by him in the form and context in which it appears.

Creative Resources Leadership

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