
TEST RESULTS DEMONSTRATE YALLOURN ASH FEASIBLE

*Test work achieves over 90% recoveries of magnesium, calcium & iron
Pyrohydrolysis of MgCl and CaCl to regenerate HCl
Higher MgO grade expected to reduce capital costs*

8 August 2018, Sydney Australia: Latrobe Magnesium Limited's (ASX:LMG) full Monash University test results have demonstrated 25% higher magnesium grades in the feed stock from Yallourn fly ash to be processed through LMG's fast cycle retorts.

As the production flowsheet are very similar between the Monash process and LMG's traditional process, the capital costs should be similar. However, the increased magnesium in the feed stock means a greater productivity in the retorts which in turn means less number of retorts and a smaller plant culminating in reduced capital costs.

Since January 2018, LMG has been working with Monash University to conduct laboratory-scale tests on coal ash from the Power Station owned by EnergyAustralia Yallourn Pty Ltd (Yallourn).

The test results have shown that the Monash approach, which uses hydrochloric acid, will dissolve magnesioferrite - the most abundant mineral in the Yallourn fly ash - and enable the extraction of the valuable constituents. The overall extraction yields for MgO, CaO and Fe₂O₃ were 95%, 97% and 92% respectively.

A preliminary flowsheet and mass balance have been prepared. The process retains the first two stages of the existing LMG hydromet process – these being the removal of unwanted carbon and silicon and the chemical reduction of the sulphur content. The LMG method for removing the iron is then replaced by a new acid leach step.

The process includes the recovery of the hydrochloric acid. This is achieved by heating the intermediate product metal chlorides ("pyrohydrolysis") to regenerate the HCl and simultaneously producing calcium and magnesium oxides in a form suitable for magnesium metal production.

The pyrohydrolysis of a number of metals, including iron and magnesium, is well-established (eg the Aman process). However, the pyrohydrolysis of CaCl₂ is not practiced. In new work at Monash, two chemical reaction systems have been identified and shown, in tests, to remove HCl to a very-high extent.

Further work is now being planned to:

- study the reaction kinetics for the MgCl₂ and CaCl₂ pyrohydrolysis conditions;
- optimise the leaching and precipitation conditions;
- determine the equipment type and sizing and upgrade the process flowsheet,
- confirm the capex and economic benefits at the pre-feasibility study level.

In January 2018 LMG and Yallourn signed a Memorandum of Understanding (MoU) for Yallourn power station to supply its fly ash to LMG's proposed 3,000 tonnes per annum magnesium plant in the Latrobe Valley. The MoU allows for the expansion of the plant to 40,000 tonnes per annum.

There are a number of stages in this project and the development of the project is conditional on the successful completion of a pilot plant program and the signing of formal agreements. To do this, LMG will need to complete the further Monash University work described above and undertake piloting the process at a larger scale, which will produce a large-scale beneficiated sample of Yallourn fly ash for processing through its fast cycle retort.

LMG owns all the developed IP of the research project which has been created utilising the background IP owned by Monash University.

Monash University has agreed to grant a non-exclusive licence for the background IP that Monash made available for the project, on reasonable commercial terms yet to be agreed, where necessary for LMG to use, in conjunction with and solely for the purpose of fully utilising the developed IP.

Upon completion of the above work, LMG will then be in a position to complete the Feasibility Study for a plant using Yallourn fly ash.



David Paterson
Chief Executive Officer

About Latrobe Magnesium

Latrobe Magnesium is developing a magnesium production plant in Victoria's Latrobe Valley and another plant near Cologne in Germany using its world-first patented extraction process. LMG intends to extract and sell magnesium metal and cementitious material from industrial fly ash, which is currently a waste stream from brown coal power generation.

LMG has completed a preliminary feasibility study validating its combined hydromet / thermal reduction process that extracts the metal. Construction is estimated to start on its initial 3,000 tonne per annum magnesium plant in the fourth quarter of 2019 year with production commencing 12 months later. The plant will then be expanded to 40,000 tonne per annum magnesium 18 months later. The plant will be in the heart of Victoria's coal power generation precinct, providing immediate access to feedstock, infrastructure and labour.

LMG plans to sell the refined magnesium under long-term contracts to Australian and overseas customers. Currently, Australia imports 100% of the 8,000 tonnes annually consumed.

Magnesium has the best strength-to-weight ratio of all common structural metals and is increasingly used in the manufacture of car parts, laptop computers, mobile phones and power tools.

The LMG project is at the forefront of environmental benefit – by recycling power plant waste, avoiding landfill and is a low CO₂ emitter. LMG adopts the principles of an industrial ecology system.