

Leigh Creek Magnesia Project

World's largest known deposit of cryptocrystalline Magnesite.

Toll processing opportunities utilising existing infrastructure.

Bulk sample work successfully completed, proving the ability to manufacture Caustic Calcined and Dead Burned Magnesia products.

The Leigh Creek Magnesia Project hosts the world's largest cryptocrystalline magnesite deposit. The project has a resource of 453Mt @ 41.4% MgO and is located near the township of Leigh Creek, approximately 570km north of the city of Adelaide.

The proposed Leigh Creek mining operations involve a relatively straightforward open cut mining operation followed by on-site crushing and screening beneficiation. The mining operation could use contract mining services to reduce upfront capital expenditure. Detailed geological data, mine reserves calculations, mine pit design, waste dump design, mining schedule plans, environmental baseline studies and risk analysis currently exist to support the start up of mining operations and could be quickly updated.

The project is strategically located and is within close proximity to existing industrial infrastructure. The town of Leigh Creek is connected to Port Augusta and Port Pirie by a standard gauge rail line and all-weather bitumen roads.

2017 highlights for the magnesia projects were:

- Successful completion of a bulk calcine trial at a commercial steel making operation.
- Manufacture of caustic calcined magnesia and dead burned magnesia products in commercial kiln.
- Completion of a Scoping Study confirming that the Leigh Creek Magnesite Project is a robust project.
- Advanced negotiations with third party operators regarding magnesite toll processing opportunities.

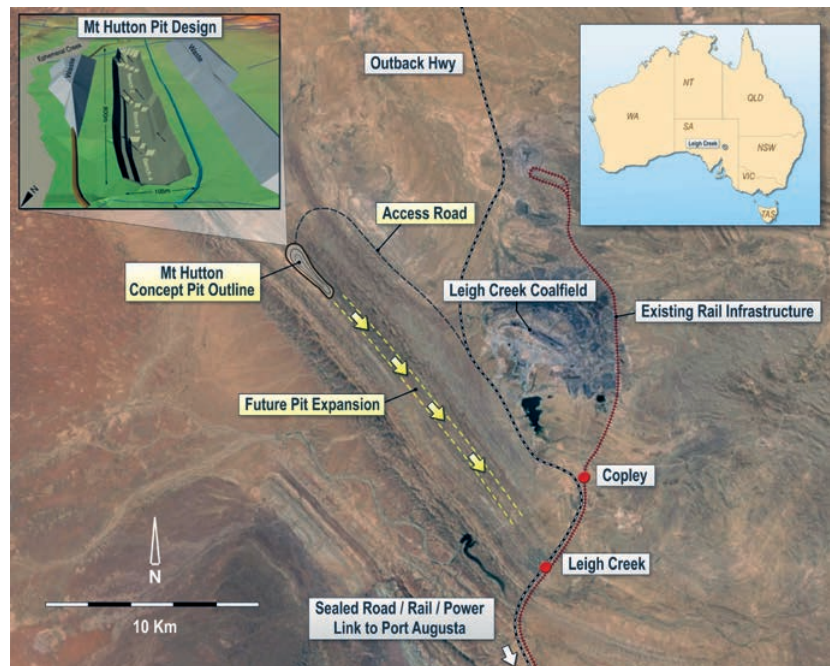
Low cost development opportunities

The Leigh Creek Magnesia Project is well known with several companies having completed historical studies to develop the project, with the most recent being SAMAG in early 2000's. These previous studies were based on the construction of a stand-alone processing facility to make magnesia products, or in the case of SAMAG for the manufacture of magnesium metal.

Archer's current development proposal is to use third party kilns and furnaces to make caustic Calcined magnesia (CCM) and dead burned magnesia (DBM) products. Archer is aware of underutilised infrastructure in the vicinity of the Project and elsewhere in South Australia and the Company is currently negotiating access to this infrastructure.

The Project is based on a simple processing scenario of contract mining at Mount Hutton and then hauling magnesite off-site to pre-existing plants for toll processing. The processing of magnesite is very simple – the magnesite is placed in a kiln or furnace and then heated to a range of temperatures to make different magnesia products. There is no grinding, flotation or other complicated mineral processing required for the Archer magnesite.

The use of toll processing and contract mining and haulage means that Archer can develop the Project for a low capital cost.



Leigh Creek Magnesite Project conceptual development layout.

Successful bulk trial

In November 2016, Archer undertook a bulk trial which involved the calcining of approximately 300 tonnes of magnesite in a rotary kiln. The rotary kiln was located at Whyalla and was part of a fully integrated commercial steel making processing plant.

The magnesite for the bulk trial was purchased by Archer from the Myrtle Springs magnesite mine which is surrounded by Archer’s larger Leigh Creek Magnesite Project. The magnesite from Myrtle Springs is identical to the Archer magnesite deposits. The magnesite was transported to Whyalla where it was crushed to a size of + 6mm and - 20mm. The crushed magnesite was then transferred to the steel works for calcining.

The rotary kiln used for the bulk trial normally calcines dolomite, however the kiln was cleaned out prior to the magnesite trial. The crushed magnesite was continuously fed into the kiln over a 24-hour period with the magnesite calcined to make CCM and DBM magnesia products. The type of magnesia product manufactured was dependent on the temperature of the kiln at the time of calcination.



Removing Archer’s dead burned magnesite from furnace.



Cooling of Archer’s dead burned sample.

The kiln operator kept most of the DBM and CCM product and has used these products in the steel making process.

The bulk trial was very successful in showing that it is possible to make a quality CCM product at a temperature range of 750 – 900 Celsius and a quality DBM product at 1500 – 1650 Celsius.

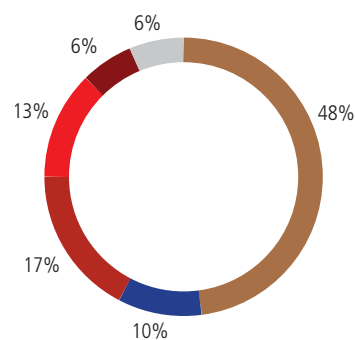
Archer is in discussions with other kiln operators regarding possible toll processing opportunities.

Target markets

Magnesia is used extensively in the steel making process. Magnesia bricks (electro fused magnesia) are used to line steelmaking furnaces, cement kilns, and other key pyrometallurgical processes. Unshaped DBM is applied to the walls of furnaces to protect the magnesia bricks from damage and decay. Whereas, CCM is used to control the pH levels of the molten steel.

Archer is targeting the refractory (steel making) industrial grade unshaped DBM market which is forecast to grow by 3.5% during the next 12 months. The use of DBM in unshaped applications (monolithics) has become increasingly popular over the last decade, especially in mature industrialised economies. Monolithics now account for an increasing proportion of overall refractory production in Europe, Japan and North America.

Archer will continue discussions with kiln operators during the next 12 months with the expectation of executing a binding agreement for either the sale of magnesite ore and/or the toll processing of Archer magnesite.



World cryptocrystalline magnesite resources

Country	Resources (Mt)
Archer's - Leigh Creek Magnesia Project	453
Australia - Other	97
Turkey	162
China	121
India	59
Other	59
sub total	951