

Stock Data

Share Price: 0.16p
Market Cap.: £2.4m
Shares in issue: 1,488.7m

Company Profile

Sector: Mining
Ticker: AXM.L
Exchange: AIM

Activities

Development and commercialisation of mining and minerals processing technologies

Share price performance



Source: LSE

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Alexander Mining plc

Alexander Mining is a mineral processing technology company. Its core asset is MetaLeach Limited, a wholly owned subsidiary which owns an exciting portfolio of intellectual property centred on hydrometallurgy. The group's core technology AmmLeach® is an ammonia-based leaching process with significant economic, operational and environmental benefits for processing amenable ore compared with conventional processes. The global implication for the successful application of AmmLeach® in particular is that, through its contribution to the reduction of mining operating costs, it has the potential to transform the development of ore deposits that until now have not been economically or technically viable.

Over the last 18 months, MetaLeach® has registered numerous patents for several processes and technologies developed under the MetaLeach® banner. To date, the company has confirmed patents awarded in the US, Canada, France, Australia, Peru, Chile, China and several key regions of northern and sub-Saharan Africa.

MetaLeach's most commercially important technological process is AmmLeach®, an ammonia-based leaching process. Leaching is an extractive metallurgical technique which converts metals into soluble salts in an aqueous media which are then separated and recovered from the insoluble waste. Importantly, this normally enables the recovery of the payable metal at the mine site.

AmmLeach® is an environmentally friendly and cost effective process for the extraction of base metals from ore deposits. The technology has a wide range of applications in the copper, cobalt and zinc markets in particular and to date; the company has signed several confidentiality and testwork agreements with a number of mining groups in order to progress towards full commercialisation of the technology.

Of particular interest is MetaLeach's licence agreement with Accudo Metals Pty. Ltd for projects in Australia, signed in August 2016. This deal is comprised of significant potential licence fees and royalties payable to MetaLeach® with the option for Accudo to convert the licence to an exclusive agreement in relation to Australia.

Accudo advised Alexander Mining in October 2016 that initial hydrometallurgical laboratory work applying AmmLeach® technology to ore from an Australian copper mine produced good recovery rates. In February 2017, Accudo completed a Scoping Study on an Australian copper project which produced positive results and is now evaluating the study with a view to starting work on a Feasibility Study.

On 2 March 2017, Alexander announced a new R&D joint venture for the recovery of lithium from hard rock sources. The JV is between Alexander and Dr Nicholas Welham, an existing consultant to the group and the planned work programme is expected to be highly complementary to existing AmmLeach® applications for cobalt production.

Alexander Mining is a pre-revenue business although ongoing operating expenses are modest. The group reported cash of £0.415m at the end of June 2016. However, the company's cash position has since been augmented with the exercise of warrants and a placing to raise £0.75m before expenses in two tranches over February 2017. Alexander will use the funds primarily to make a strategic mining corporate investment which may be complementary to the group's existing activities.

Alexander Mining's strategy is to become a highly profitable and diversified mining technology company by successfully commercialising its proprietary intellectual property. Although the prolonged challenges that the sector has experienced in recent years may now be assuaging, we believe that a company with a portfolio of technology appropriate for a lower commodity price environment is well positioned for long term growth.

MetaLeach[®]

MetaLeach Limited is a wholly owned subsidiary of Alexander Mining. MetaLeach[®] was formed to enable the commercialisation of its proprietary hydrometallurgical mineral processing technologies.

Hydrometallurgy is wholly owned efficient and comparatively environmentally friendly technology involving the use of aqueous chemicals for the enhanced recovery of metals from ore. Hydrometallurgy can provide major benefits to mine operators by enabling the production of high value metal or value added product at the mine site. It can also provide higher returns through the generation of significantly lower operating costs by eliminating high transport and refinery charges as incurred in producing concentrates, and enabling the extraction of valuable metal by-products.

The company believes that the technologies within MetaLeach could possess the potential to revolutionise the extraction processes for several base metals deposits by reducing costs and enhancing operating margins at the mine site. In particular, these technologies may provide the potential to process deposits that until now have not been economically viable to develop.

AmmLeach[®]

MetaLeach owns the intellectual property to AmmLeach[®] (patents granted and pending), which represents the group's most commercially important technological process. AmmLeach[®] is an ammonia-based leaching process which importantly, takes place at ambient pressure and temperature. A key benefit of the process is that it requires no specialised or purpose built equipment to utilise the technology.

Hyperleach[®]

MetaLeach also owns Hyperleach[®] (patents granted and pending), which is also a proprietary ambient temperature and pressure process for the leaching and extraction of base metals from sulphide ores and concentrates.

Leaching is a widely used extractive metallurgical technique for amenable ores, especially oxides, which converts metals into soluble salts in an aqueous media. Metal recovery is normally in high grade cathode form.

Compared to pyrometallurgical operations using thermal treatment of the ore, leaching is regarded as much easier to perform and less harmful to the environment given that no gaseous pollution occurs. Leaching, using the conventional acid reagent is not without its drawbacks in that leaching can produce highly acidic and in some cases toxic residual effluent which can give rise to a potential acid mine drainage liability for the mine owner. This problem is eliminated using the AmmLeach[®] process.

Current progress

The company states that AmmLeach[®] is an environmentally friendly and cost effective process for the extraction of base metals from ore deposits allowing the production of high value products at the mine site. Such products include metal powder or sheets. These technologies were developed by the company as result of its research and development work at its former copper project in Argentina.

The following metals are targets for the AmmLeach[®] process:

- Copper and Copper/Cobalt oxide deposits
- Zinc oxides (non-sulphide) deposits
- Gold/Copper oxides
- Silver/Zinc oxides (alkali leaching)

To date, the company has signed several confidentiality and testwork agreements with multinational mining groups in addition to mid-sized and junior companies.

Target applications

Alexander Mining believes that the copper, cobalt and zinc markets represent the most attractive upside for the company. The company is confident that its technology has the potential to increase significantly the share of copper recovered through hydrometallurgy given the substantially higher returns to mine operators available from implementation of the AmmLeach[®] technology.

In addition, the group believes that the development of new hydrometallurgical processes for zinc oxides has the potential to simplify zinc refining and therefore reduce overall mine operating expenditure.

Economic benefit

Alexander Mining states that AmmLeach[®] has the potential to reduce significantly operating costs at the mine site for a wide variety of copper projects. Although aggregate operating costs across a mining project are dependent upon a range of variables, an appreciable proportion of the operating costs of any acid leaching operation is the cost of the sulphuric acid consumed.

For the AmmLeach[®] process nearly all the ammonia reagent is recycled, with average ammonia consumption typically <5kg/tonne of ore processed. This is significantly lower than the most efficient acid leaching operations and significantly lower than the high acid consuming oxide ores which may consume 40-100kg or more of acid per tonne of ore processed.

Commercialisation

Alexander Mining is focused on monetising its MetaLeach[®] technologies with licensing agreements with a gross sales royalty payment structure which offers the most attractive means by which to secure long term revenues geared to metal prices for the company.

Several multinational, major, intermediate and junior companies have assessed and are currently assessing MetalLeach's technology. These assessments have been concentrated in the copper, copper/cobalt and zinc sectors. Although much of this work is subject to confidentiality agreements, companies with interests in the African copper belt (particularly Zambia and the DRC), Southern Africa, Australia, South America and North America have shown significant levels of interest.

Marketing agreement in Mongolia

In January 2017, the company signed a marketing agreement with Dr. Jadambaa Temuujin for the potential commercial adoption of its leaching technologies in Mongolia. This agreement has an initial term of two years, with a rolling mutually agreeable six monthly extension thereafter.

Under the terms of the agreement, if Dr. Temuujin introduces an opportunity which leads to Alexander Mining executing a commercial technology licencing agreement and the company receiving licencing revenue, Alexander Mining has agreed to pay Dr. Temuujin a commission fee from the licensing revenue for the first three years of commercial use under the licence terms.

Agreement with Accudo

On 25 August 2016, MetaLeach Limited executed a licence agreement with Australian company, Accudo Metals Pty Ltd. Accudo is a special purpose vehicle (SPV) established to hold granted licences for the MetaLeach[®] technologies and to test the leaching technologies on target ore bodies with a view to taking these into commercial production. Accudo is funded by sophisticated investors and clients of BlueMount Capital, a mid-tier Australian investment bank.

Pre-funding for test work and a full Scoping Study on the first targeted opportunity has been committed. Subject to the Scoping Study being positive, Accudo's foundation funders and BlueMount clients will fund a detailed Feasibility Study.

MetaLeach[®] has granted Accudo an exclusive licence for up to five mining projects in Australia to use its leaching technologies, subject to securing commercial terms with the project owners. Under the terms of the agreement, Alexander will receive a royalty of 3.5% for product produced using the leaching technologies. In addition, Accudo will pay MetaLeach[®] progress payments for each project. These include A\$0.25m for the completion of a Definitive Feasibility Study for each project that clearly established the technical and commercial feasibility of the project. A fee of \$0.25m is due within seven calendar days of the first commercial sale and shipment of plant product utilising the leaching technologies with a further fee of A\$0.25m due three months later.

Accudo has the option to convert the non-exclusive component of the licence into an exclusive licence for the use of the leaching technologies in Australia. Exercise of the option is conditional upon Accudo commencing and funding technical work with MetaLeach[®] and commencing with a Feasibility Study for the leaching technology on the first project within one year from the date of execution of the licence agreement. In return, Accudo has agreed to pay MetaLeach[®]:

- A\$0.85m at any time within 12 months from the date of execution of the licence agreement
- A licence fee payment of A\$0.25m upon reaching the point where the first project selected
- A payment of A\$1.35 within 20 working days therefrom

Progress with Accudo

In October 2016 Accudo advised Alexander that the initial laboratory hydrometallurgical test work on the AmmLeach[®] ammonia leaching technology was completed. The work tested oxide and transitional ore from an Australian copper mine. Accudo reported that the AmmLeach[®] technology successfully leached copper from the ore at good recovery rates. At this point, Accudo was actively reviewing the proposed work programme for a Scoping Study.

On 20 February, Accudo advised that it has completed the Scoping Study on the first Australian copper project to be trialled with AmmLeach[®] technology. Dr Saliba Sassine, a director of Accudo, outlined that the results of the Scoping Study were both positive and encouraging. As such, Accudo is evaluating the study in detail with a view to making a decision on the next stage of work which would logically be starting work on a Feasibility Study. Accudo intends to negotiate with the owners of the copper assets on several matters, including the proposed Feasibility Study and commercial terms beyond.

Lithium research and development joint venture

On 2 March 2017, Alexander announced a new research and development (R&D) joint venture (JV) for the recovery of lithium from hard rock sources. The JV is between Alexander Mining and Dr Nicholas Welham, Alexander's Principal Technology Consultant for ammoniacal and hypochlorous acid leaching.

The purpose of the JV is to investigate the potential recovery of lithium from lithium bearing minerals. The agreement is based on the company's belief that the only realistic source of lithium, to satisfy a rapidly growing market, is from hard rock resources. Alexander points to existing sources of lithium derived from brine and argues that the process by which brine deposits are concentrated by solar evaporation from large ponds is restricted to extremely arid areas only often in countries that represent a moderate degree of sovereign risk.

The company states that fast tracking production to obtain lithium from brine typically takes 18-24 months from commissioning to first product. By contrast, the company believes that hard rock sources are a more viable proposition for development given that the time from commissioning a project to first concentrate production may be only a matter of weeks.

JV rationale

Alexander believes that this R&D JV is complementary to the company's existing AmmLeach[®] and HyperLeach[™] processing technologies for the recovery of cobalt. Growth forecasts for electric vehicle sales and particularly the batteries they require are very strong and given that many of the preferred batteries require both lithium and also significant quantities of cobalt, we believe that there could be attractive synergies available to Alexander.

A new solution

The lithium containing concentrate produced from hard rock spodumene resources is usually sold to Chinese producers of lithium carbonate. These producers use a combined pyrometallurgical-hydrometallurgical process (extractive technologies using both thermal and aqueous treatments of minerals), shortened to 'pyro-hydro', to produce lithium carbonate (or hydroxide) product. Pyro-hydro is a high cost process and remains an impediment to the low cost production of lithium carbonate from spodumene.

Dr Welham has discovered what appears to be a promising route to the direct dissolution of spodumene under ambient temperature and pressure conditions. Although further work is required to confirm initial results, heap leaching appears the most likely mode of operation given the slow apparent rate of dissolution. Heap leaching is a process to extract precious metals and other compounds from ore via a series of chemical reactions that absorb specific minerals and then re-separates them after their division from other earth materials.

If Dr Welham's work is confirmed, Alexander believes that it will open up a significant number of opportunities with lithium resource companies. The heap leaching process will allow processing of lower grade ore potentially increasing resources considerably. Tailings from existing operations are also expected to be treatable.

Joint venture terms

Alexander will be the sole funder of the JV in return for an economic interest of 80% and a worldwide licence to commercialise the new technology. The JV will take place in two stages. Stage one is 'proof of concept' and is expected to take 3-4 months at a cost of US\$10,000. If Stage one is successful, Alexander will move to Stage two which may include a mini pilot plant. This phase will have a budget of US\$240,000 and is expected to take 12-18 months.

If Alexander does not wish to proceed with the JV, De Welham has the right to seek new development partners on the same terms as Alexander. As it currently stands, Alexander will be entitled to become the Technology Manager of the licence and will be free to market the commercial use of project IP rights under licensing agreements of its choosing.

Of future licensing fee revenue, 20% will be paid to Dr Welham and the remaining 80% will be divided among the remaining licence holders in proportion to their interests.

Financials

Alexander Mining is a pre-revenue company with low overheads. At the interim stage of 2016, the company reported a small operating loss of £0.278m which was attributed to ongoing administrative costs and research and development expenditure.

Following a placing to raise £0.5m in May and a bonus warrant issue to fund working capital, the company reported a cash balance of £0.415m at the end of June 2016. Since July 2016, the ongoing exercise of broker warrants has contributed £92,875 of additional funds and on 8 February, the company announced a placing to raise £0.75m before expenses in two tranches to fund a potential investment and provide additional working capital (see additional details below).

At the end of June 2016, trade payables were £0.62m offset by £0.05m of receivables. The group had no outstanding debt at the end of the reporting period.

Recent placing

On 8 February 2017, Alexander Mining announced that its broker, Turner Pope Investments had conditionally placed an aggregate 535.7 million shares at 0.14p per share raising a total of £750,000 before expenses. The cash will be used for a potential strategic mining corporate investment opportunity, for which negotiations are in progress, in addition to general working capital purposes. This investment may be complementary to Alexander Mining's leaching technology although at this stage, the management can give no assurances that negotiations will reach a successful conclusion.

The placing was carried out in two tranches. The first tranche was being carried out under the existing power granted to the directors and comprised a placing of 359.0 million new shares raising £502,600. The second tranche of shares were issued after a General Meeting resolution passed on 27 February. Consequently Alexander completed the placing of a further 176.7 million new shares raising £247,401 on 28 February. Following the issue of the second tranche of shares, Alexander now has 1,488.7 million shares in issue.

Five year financial performance

Year ended Dec (£'000)	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	H1 2016
Revenue	20	29	26	507	8	0
Profit (loss) before tax	-1,680	-1,537	-1,365	-848	-849	-324
Basic EPS (p)	-1.24	-1.13	-0.84	-0.48	-0.30	-0.07
Net cash (debt)	1,257	519	398	116	165	415

Source: Company

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