Revolutionising the hydrometallurgical extraction of base metals at the mine for the global mining industry

Metals resources are finite. How do we supply a growing world population with base metals?

Build new mines? Get more from existing mines?
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Introduction
Commercialising breakthrough mineral processing technology

- Alexander Mining plc is an AIM quoted mineral processing technology company with a reputation for strong technical management, allied with financial markets expertise. Its core asset is its intellectual property:

  - **MetaLeach®** is our wholly owned subsidiary and will revolutionise the extraction processes for many base metals deposits by reducing costs, enhancing operating margins and increasing production. See page 5 for more information.

  - **AmmLeach**. Our core technology has major economic, technical and environmental benefits. Unlike some new technologies, it requires no special purpose built equipment. The proprietary ammonia process selectively extracts base metals from ores under ambient temperature and pressure conditions. See page 6 for more information.

  - **HyperLeach**. A proprietary process which utilises chlorine based chemistry for the extraction of metals, especially copper, zinc, nickel, cobalt, molybdenum and rhenium from sulphide ore deposits and concentrates. See page 8 for more information.
### Corporate data

<table>
<thead>
<tr>
<th><strong>Recent Share Price:</strong></th>
<th><strong>2.75p</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares issued:</td>
<td>169,129,718</td>
</tr>
<tr>
<td>Options:</td>
<td>12,400,000</td>
</tr>
<tr>
<td>Fully diluted:</td>
<td>181,529,718</td>
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<td>Recent market capitalisation:</td>
<td>£4.7m</td>
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<td>AIM Listing code:</td>
<td>AXM</td>
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<tr>
<td>Typical daily shares traded</td>
<td>~0.5-1m</td>
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<tr>
<td>Ownership:</td>
<td></td>
</tr>
<tr>
<td>Private investors</td>
<td>40%</td>
</tr>
<tr>
<td>Institutions</td>
<td>40%</td>
</tr>
<tr>
<td>Management and insiders</td>
<td>20%</td>
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</tbody>
</table>
Commercialising breakthrough mineral processing technology

- Focused on commercialisation of AmmLeach® process for copper, cobalt and zinc recovery from deposits in Africa, Australia, Turkey, South America et al.
- Important progress made towards commercialisation.
- Scope for major operating and capital cost savings using our technology is of great interest for use at existing and potential mines.
- Several important new patents granted.
- Investigating opportunities for direct equity involvement in addition to royalties.
2012 Highlights

- **Important patents granted** for our intellectual property, encompassing a growing number of important mining countries and base metals
- **Notable progress towards commercialisation**
- **Good progress with Metalvalue** on DRC and zinc recycling opportunities
- **Established excellent foothold in Turkey**, a country with significant potential for Alexander’s leaching technologies
Mining Industry Reality in a Turbulent World
Technology has a significant role

- World economic growth, driven by BRIC countries, dependent upon raw materials.

- Mining’s a tough business and getting harder - squeeze on margins means strong interest in new technology to reduce costs.

- World class deposit discovery rate falling sharply, many new mines will be costly, technically challenging underground.

- Growing country risk & environmental aspects reduce development rates and increase costs.

Independent researchers forecast that demand for the main base metals, including copper and zinc, will double in the next decades...

Where is it all going to come from?
Desire to embrace new technologies to reduce costs and increase efficiencies will intensify.

The most potential for technical innovation is in mineral processing, and in turn – Hydrometallurgy

**International Copper Study Group (ICSG) states that annual mine copper production capacity in the period 2012 to 2015 is expected to grow at an average rate of around 6.6% pa to reach 26.2 Mt in 2015, an increase of around 5.9 Mt (29%) from that in 2011.**
Copper mining capacity is estimated to reach 26.2 million tonnes copper in 2015, with 22% being SX-EW production.
Mining Industry Future

Copper supply constraints

- Falling ore grades - copper average head grade 1990 ~1.6% cf today ~1.2%
- Project finance availability
- Major capital cost overruns due to complexity and management quality
- Unfavourable tax & investment regimes - resource nationalism
- Water supply - a critical issue
- Rising operating costs, growing move to underground mine production – underground typically +40%

- Technically challenging mineralogy for oxide/transition sulphide deposits
- Sulphuric acid supply and price: significant and, increasingly, often prohibitive cost factor for SX-EW projects
- Availability of skilled labour and management
Business Strategy

Maximise the value of our AmmLeach® intellectual property

• Breakthrough mineral processing technology with major technical and economic advantages for a large number of major base metals deposits.

• MetaLeach® subsidiary focused on ammoniacal leaching of copper, copper-cobalt and zinc oxide ores.

• Technology tried and tested through laboratory and field tests on leach pads and in pilot plant …………. leading to royalty streams and free carried equity shares.

• Non-exclusive royalty licence agreement signed with Metalvalue Ltd. complements and expands commercialisation potential.
Business Strategy
Maximise the value of our intellectual property

<table>
<thead>
<tr>
<th>MetaLeach Limited Granted Patents</th>
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<tbody>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>Method for Ammoniacal Leaching</td>
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<tr>
<td>Method For Leaching Cobalt from Oxidised Cobalt Ores</td>
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<tr>
<td>Method for Leaching of a Copper-containing Ore</td>
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<tr>
<td>Method for Extracting Zinc from Aqueous Ammoniacal Solutions</td>
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<tr>
<td>Method For Leaching Zinc from a Zinc Ore</td>
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<tr>
<td>Method of Oxidative Leaching of Sulphide Ores and/or Concentrates</td>
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<tr>
<td>Method of Oxidative Leaching of Molybdenum - Rhenium Sulphide Ores and/or Concentrates</td>
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<tr>
<td>Method of Leaching of Copper and Molybdenum</td>
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</tbody>
</table>
Major operational and economic advantages

- Alkaline/ammonia leach process at ambient pressure and temperature

- Proprietary two stage leaching process
  - Ore specific pre-treatment stage
  - Heap or tank leaching

- Proprietary solvent extraction step to avoid ammonia carry-over into electrolyte

- Greatly reduced AmmLeach® reagent consumption of high-acid-consuming ores means significant capex and opex savings

- Clean target metals PLS, unlike acid leach

- Uses conventional equipment
  - Electro-winning is identical to conventional acid circuits
  - Direct replacement for acid leaching in current operations
  - Minimal changes to plant; higher organic transfer efficiencies requires smaller plant

- Environmental benefits
  - Reduced transport/shipping impact and costs
  - Minimal likelihood of Acid Mine Drainage (AMD)
The following metals are targets for the AmmLeach® process:

- **Copper** and Copper/Cobalt oxide deposits
- **Zinc** oxides deposits
- **Gold/Copper** oxides and Silver/Zinc oxides (alkali leaching)
- **Nickel** laterites
- **Molybdenum** - using MoReLeach both oxide and sulphide based molybdenum ores can be effectively treated (also rhenium)
Geographic diversification is offered as the countries with the most prospective geology for hosting high acid consuming copper (Cu) and zinc (Zn) oxides are:

- Australia (Cu, Ni)
- DRC (Cu, Cu/Co)
- Turkey (Zn, Cu, Ni)
- Zambia (Cu)
- Peru (Cu & Zn)
- Chile (Cu)
- Mexico (Cu & Zn)
- Central America (Zn)
- USA (Cu)
Successful commissioning of first AmmLeach® plant with two circuits through to copper and cobalt cathode metal cf. majority DRC cobalt currently produced as a concentrate.

Patent for a Method of Ammoniacal Leaching granted in DRC.

DRC has world class copper and cobalt resources - currently supplies over half of the world's annual cobalt mine production (~100,000t) and with 45% (3.4Mt) of world reserves.

Predominant geology/ore mineralogy of high-acid-consuming copper/cobalt oxides – the world's largest sediment-hosted stratabound Cu & Co province.

Working with Metalvalue to investigate establishing a commercial AmmLeach® copper/cobalt processing plant in the DRC.
DRC has estimated in situ reserves of 190Mt copper.

Predominant geology/ore mineralogy copper/cobalt oxides.

Current focus on developing highest grade Cu deposits, typically >2.0% Cu with agitated leaching i.e. picking the eyes out.

Massive tonnage of resources ≤2.0% Cu and significant Co credit are heap leach amenable to AmmLeach®.

Co recovery using acid complex and costly, and often not recovered.

Capital and operating costs in DRC typically high.

More in country processing to produce metal – ban on concentrate exports now Government policy.

Slide 17

Resource diversity: The Copperbelt has a significant proportion of high-grade resources (source: Rio Tinto)
Business Review

Independent report shows major economic benefits using AmmLeach®

- Independent consultant’s report showing major capital and operating cost savings of around 30-40% for DRC copper-cobalt mine.

- Aside from the very substantial capital and cost savings, AmmLeach® has several major operational and environmental advantages over conventional acid leaching technology.

- Much simpler process circuits because of the low level of impurities in the leach solutions, and hence lower capital to clean up

- Much less complex cobalt winning circuits
Investigating potential use of AmmLeach® technology for range of base metals projects in Turkey.

RCR’s Hakkari Zinc flagship project reported good AmmLeach® amenability testwork results – similar to prevalent zinc mineralisation in other deposits in the country.

Investigate potential for developing a plant for the recovery of zinc from electric arc furnace dust (EAFD).
Royalty analysis for AmmLeach® technology

Potential valuation is substantial

- **NPV of royalty for mid size copper – cobalt mine in DRC ~ US$120m**

- **Potential ‘market share’ of global copper production using AmmLeach® may be at least 5% in 10 years’ time – i.e. 1.2Mtpa Cu (Cu equivalent including Co)**

- **Assuming an average conservative 1% royalty and average Cu price of US$3/lb = US$79m pa royalty**

<table>
<thead>
<tr>
<th>Scenario Analysis Copper/Cobalt Mine in DRC</th>
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<tbody>
<tr>
<td>Life of Mine</td>
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<tr>
<td>Copper production</td>
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<tr>
<td>Copper price (life of mine)</td>
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<tr>
<td>Cobalt production</td>
</tr>
<tr>
<td>Cobalt price (life of mine)</td>
</tr>
<tr>
<td>Royalty</td>
</tr>
<tr>
<td>Annual royalty revenue</td>
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<tr>
<td>NPV over 10y @ 10%</td>
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Alexander Mining plc

Investment conclusion

• Revolutionising the hydrometallurgical extraction of base metals at the mine for the global mining industry

• The scope for major operating and capital cost savings using our AmmLeach® technology is of great interest for existing and potential mines

• Key patents granted and pending

• Focused on royalty and/or licence fee structure, or minority project interests

• Discussions in progress about potential specific projects/deposits amenable to AmmLeach® - including Africa, Australia, Turkey and Latin America.

• Valuation models based on royalties alone show substantial upside.
Enquiries

Contact Details

Alexander Mining plc
Martin Rosser and Matthew Sutcliffe
1st Floor
35 Piccadilly
London, W1J 0DW, UK

Tel: +44 (0) 20 7292 1300
Fax: +44 (0) 20 7292 1313
Email: mail@alexandermining.com
Web: alexandermining.com

Britton Financial PR
Tim Blackstone

Tel: +44 (0) 20 7251 2544
    +44 (0) 7957 140 416