Backing for P260E tops $A6million

Backing for AMIRA project P260E, Improving Sulphide Mineral Flotation, has now topped $A6million.

This figure includes support from nine major sponsors, support from five case study sponsors, grants from the Australian Research Council and in-kind support from four supplier sponsors, as well as University of South Australia inputs.

Corporate sponsorship for the project – which builds on the work of earlier P260 programs – has always been strong, but the total was boosted last year by the addition of a $A475,000 ARC grant and in kind sponsorship from Intellection, Magotteaux and other sponsors.

Bruce Fraser, the AMIRA Research Director co-ordinating the project, said the continually growing support was an indication of the value sponsors attached to the project findings.

The Ian Wark Research Institute, which is the key research body, also announced the appointment of several key staff and eight new research students to work under their supervision on specific concurrent aspects of the program.

Major sponsors are BHP Billiton (Nickel West), BHP Billiton (Escondida), Boliden, CVRD Inco, Magotteaux, Ok Tedi Mining, Outokumpu Technology, Oxiana and Teck Cominco. Five companies, Anglo Platinum, CVRD Inco, Phelps Dodge, Rio Tinto and Somincor (Eurozinc), are sponsoring specific case studies while four supplier companies COREM, Intellection, Magotteaux and Xstrata Technology are offering in-kind support.

Onsite work for case study sponsors has been conducted at the Clarabelle concentrator of CVRD Inco in Sudbury, Kennecott Copper operations (Rio Tinto) in Utah, Bagdad operations (Phelps Dodge) in Arizona and Somincor concentrator (Eurozinc) in Portugal. The P260E team are planning the next site for Anglo Platinum.

Inquiries: Bruce Fraser
bruce.fraser@amira.com.au

New North American head for AMIRA

Terry Braden has been appointed North American representative for AMIRA International.

He will be based in Denver, Colorado.

He replaces Paul Greenhill who returns from Toronto to Melbourne to resume duties as Chief Operating Officer of AMIRA.

Terry has worked in the North American mining industry for more than 30 years. He began as a metallurgical engineer working in copper operations in Arizona with ASARCO. He gained significant research and development experience while working for Kennecott in Salt Lake City.

He then moved into sales and marketing for Outokumpu where he was involved in helping mining companies throughout North America realise gains through utilising on-stream analysis and process control.

He has authored and co-authored numerous papers, the most recent being for the Mineral Processing Plant Design, Practice and Control Proceedings entitled “Online Composition Analysis of Mineral Slurries”.

Leo Koeleman of the JKMRC, Sabina Gredelj, and Max Zanin of the IWRI at Kennecott Copper, Copperton concentrator
Why Denver is our new North American address

Real estate agents tell you the three most important qualities for selling a property are location, location, location.

When it comes to appointing AMIRA research directors, however, location comes a poor fourth. The key words are: The person, the person, the person.

The decision to relocate AMIRA’s North American office to Denver from Toronto reflects precisely that. Both cities have their merits in regard to proximity to industry and research, but the telling factor in the end was simply that the man we wanted for the job – Terry Braden – was already Denver based.

Finding a top class research director is not easy. The job requires technical competence across a range of disciplines but also a fair degree of commercial understanding. You need the personal relationship skills to bridge the academic and corporate cultures. You need someone who is a natural team player to operate in a collaborative environment, but also someone with the resilience and initiative to run an autonomous national office.

Terry proved the right person and there is no question that Denver, as one of the world’s great mining centres, was a very acceptable location. He will of course be visiting Toronto and other centres of mining and research on a regular basis.

This flexible individual-based approach to location has been adopted whenever we have initiated representation in our new offices.

However, this is only the start of our closer engagement in the region. As our activities with local industry and research groups grow, further personnel will be required to service these and issues of location (and the required functional experience such as geoscience, mine engineering etc.) will become increasingly important.

Latin America hits the technology trail

Latin America looks increasingly promising as a centre for technology development for our industry.

The announcement of P893A – Training in Automation, Control and Robotics for the Optimisation of Profitability of Technology Investments – as our first totally Latin American research project is just one indicator of this. During a visit to Latin America at the end of last year I was introduced by our Chilean based research director, Juan Carlos Salas, to a range of corporate research executives and also to a number of highly capable university and institutional researchers.

The industry in Latin America has traditionally not embraced collaborative research with the same fervour as their counterparts in North America, Australia and Africa, but I sense that is changing. All who I visited demonstrated a real desire to develop a stronger technology base and there is a growing realisation that collaborative projects offer an opportunity to link local efforts (and institutions) with global technology investment and also support a fast track to capability growth. Expect to see some interesting research emerge from there in the next few years.

Technology: Keeping you in the loop

Developments in Canada in the past few months have again highlighted the trend to consolidation in our industry. The trend towards a handful of super-miners continues as a result of merger activity.

For AMIRA this presents a number of challenges, particularly in regard to communication with our members. That challenge also confronts the executives within these expanded corporations who are the designated member contacts for AMIRA.

As organisations get bigger – and with a global spread of operations – the task of ensuring that everybody who might have an interest in development of some specific new technology is kept informed of all AMIRA activities gets more challenging.

We have been reviewing our communications activities such as this newsletter in response to these changes. AMIRA personnel are more than happy to provide in-house briefing sessions to keep all interested personnel in the loop regarding technology developments.

If we can help, let us know.

Deming Whitman
Chile project to examine Automation training

AMIRA International has begun its first all-Latin American research project.

P893A aims to analyse aspects of training in instrumentation, automation systems, process control and robotics technologies in copper mining companies.

One focus will be to review and compare employee job descriptions, level and knowledge of on-site personnel, current training practices, future training requirements, training institutions and suppliers and the various currently available products for improving training efficiency with a view to optimising the investment the sponsors have made in state-of-the-art process control systems. It follows on from P893 which reviewed the utilisation of these systems across a range of plants.

Surveys of copper operations, initially in Chile, will be undertaken.

Researchers are DICTUC, PUC, University of Chile and University of Conception.

Sponsors are BHP Billiton, Codelco, Collahuasi, Minera Los Pelambres, Phelps Dodge. Rio Tinto and Anglo American Chile Ltd.

Contact: Juan Carlos Salas
jc.salas@amira.com.au

Underground mine planning software project to boost efficiency

While the design and scheduling of open cut mines can be optimised using commercially available software no such tools are currently available for underground mines.

AMIRA project P884 plans to rectify that.

Matthew Dalziel, the AMIRA Research Director coordinating the project, says the current absence of such tools is partly due to the variability in design inputs encountered in underground mines and partly due to the complexity of optimisation encountered in underground design.

To meet these challenges AMIRA has put together a team of researchers with special expertise in optimisation of stope definition, scheduling, cutoff grade selection and design of underground networks. It is planned that they will determine stope and infrastructure designs and production schedules that maximise profitability over the lifetime of a mine.

These strategic planning tools could also help to minimise the potential for sub-optimal decisions being made at the outset of an operation by providing a review of many alternatives in a reasonable timeframe.

Integration of the following five research optimisation software modules is proposed:

- Strategy Selection (inclusive of Cutoff Grade and Mining Method selection)
- Geomechanics, Risk Minimisation
- Stope Outline Optimiser
- Access and Haulage Network Optimiser
- Automated Mine Development Scheduling and Stope Sequence Optimiser

Principal researchers are: AMC Consultants, MIRARCO Mining Innovation (Mining Innovation, Rehabilitation and Applied Research Corp. based at Laurentian University, Sudbury) University of Melbourne and University of Queensland – SMI.

Current sponsors are CVRD Inco and Rio Tinto. However, opportunities exist for other companies to become involved and so access the resultant software.

Inquiries: Matthew Dalziel
matthew.dalziel@amira.com.au

Metal accounting code winning Industry acceptance

The minerals industry now has a recognised and accepted code for accounting for metals and minerals across processing plants.

The code, which was drawn up by an industry and academic team coordinated by AMIRA and now being given widespread industry exposure and review, gives metal accounting a code with the potential to develop the same stature that JORC and SAMRAC provide for ore reserve estimation.

The code was developed with financial support from Anglo American, Anglo Platinum, BHP Billiton, Zincor (a division of Exxaro) and Rio Tinto.

Prof Peter Gaylard (AMIRA Africa) who led the code development team, now hopes that a professional body will take over the role of ongoing oversight and review of the code in the same way that AusIMM and SAIMM oversee the ore reserve codes.

A text book on the code is being edited by Dr Rob Morrison of the JKMRC, leader of the P754 research program, to support understanding and use of the metal accounting code and Prof Gaylard will be explaining it at a range of industry conferences and meetings over the coming months.

Contacts: richard.beck@amira.com.au
peter.gaylard@amira.com.au

New Nickel Project

A new fundamental look at the generation of nickel sulphide deposits is the focus of a significant project beginning in March 2007 by the CODES group at the University of Tasmania working in collaboration with scientists from the Russian Academy of Science.

P962 (Ni-PGE potential of mafic and ultramafic magmas) is being lead by Associate Professor Leonid Danyushhevsky from CODES and will make use of their world-class melt inclusion facilities, combined with sophisticated numerical modeling and field study areas in Russia.

It is being sponsored by Anglo American, BHP Billiton and Votorantim Metais.

Contact: alan.goode@amira.com.au
Australia-Chile research team hones in on predictive geochemistry

As the discovery rate of world-class mineral deposits continues to decline in many parts of the world, increased attention is being focused on geochemical exploration.

In areas of post-mineralisation cover, surface geochemical anomalies sometimes form apparently above, and related to, buried mineralisation.

If definitive, low cost surface or near-surface sampling surveys can be conducted in areas of shallow cover (say <30m), large areas can be tested and expensive unnecessary drilling can be reduced.

However, in order to apply geochemical exploration methods confidently in a given area, or to be able to determine that such techniques are inappropriate, it is necessary that we understand the mechanisms by which surface expressions may form. Explorers will then be better able to decide whether to do further drilling given a specific response at the surface.

Research is required that will determine which mechanisms can cause metal migration through post-mineralisation cover.

This has tremendous potential and is the goal of AMIRA project P778 which is being jointly pursued in Australia and Chile.

Key research institutions in Australia are Curtin University, CSIRO Land and Water, CSIRO Mining and Exploration and the CRC for Landscape Environments and Mineral Exploration in collaboration with the University of Chile.

Sponsors are: Barrick Gold, BHP Billiton, Codelco, CVRD, CVRD Inco, Independence Group, Jabiru Metals, Newmont, Teck Cominco, and Rio Tinto.

Inquiries: Joe Cucuzza joe.cucuzza@amira.com.au

Eliminate lost time on Koepe hoist rope inspections

The provision of a continuous, fully automated hoist rope inspection system is now reality – producing real savings – as provided by P833 – Hoist Rope Inspection Automation.

Project 833A is building on the extensive knowledge gained under P833 to create a prototype automated inspection system for Koepe ropes capable of commercial use which will offer significant cost-benefits.

As for P833 it will employ high speed cameras and vision system algorithms to detect rope defects while the hoist rope is moving, supported by computer based signal analysis and pattern recognition systems to interpret any loss of metallic area and local faults. Building on two generations of previous research it is expected that an effective and reliable Koepe hoist rope inspection system will be available to the sponsors within 14 months.

Key researchers are C-Core and DYI Technologies.

Current sponsors are Newcrest Mining, Rio Tinto and Xstrata Copper, but there may be opportunities for other companies which would benefit from such a product to become involved.

Inquiries: Matthew Dalziel matthew.dalziel@amira.com.au

Want to know more about AMIRA?

Visit our website at www.amira.com.au
French, African researchers take lead role in West African geoscience study

One of the more geographically ambitious projects now being undertaken is P934 – commonly referred to as The West Africa Exploration Initiative. This project is Phase I of a two stage initiative.

A key aim of this initiative is to develop a more comprehensive understanding of the Leo-Man shield which spans the nations of Burkina Faso, Guinea, Ivory Coast, Liberia, Ghana, Mali, Senegal, Niger, Sierra Leone and Togo. An important secondary aim is to help build capacity in the region through the transfer of knowledge, supported by training, to local geoscientists to enable them to support the future requirements of the exploration and mining industry.

The research team – led by the Laboratoire des Mécanismes et Transferts en Géologie (LMTG), Institut de recherche pour le développement (IRD) and BRGM in France and the University of Ouagadougou, Burkina Faso, and University of the Witwatersrand, South Africa – will begin with an extensive audit of available information, both public and commercial. This can include remote sensing data, and geochemical and soil sampling, along with other exploration data which they will align with GIS locations of survey boundaries and other relevant information. Once this ambitious task is complete, and gaps in the knowledge identified, researchers plan to canvass industry to define current and future needs in terms of basic data sets and research. They will also compile a database of research capabilities of relevant individuals and institutions that may be of interest to the exploration community. From these a collaborative research program with specific objectives addressing the gaps and industry needs identified in Phase I will be developed for Phase II.

Mine risk management: Do you have an interest?

AMIRA is seeking expressions of interest from companies for a risk management program designed to monitor and predict stresses and deformations around mines.

The proposed project – P975 – has been developed by the University of Toronto. The objective is create a system, which will enable mines to reduce production costs and improve safety through effective monitoring and prediction of stresses and deformations around excavations.

While the study is currently based around underground mining it will be equally applicable for highwall design in deep open pit mines with suitable adjustment to required field instrumentation. The proposed instrumentation represents the next generation of strategic and tactical mining geomechanics design tools.

Contact: Terry.Braden@amira.com.au

Microwave comminution technology on track for commercialisation

Microwave technology offers the biggest advance in the comminution of rock for mineral extraction since human labor gave way to the machine.

The potential of the technology – which exploits the differing thermal dielectric properties of minerals to cause them to fracture along grain boundaries – has been understood for more than 20 years, but has not been considered commercially viable until now because of the amount of energy required.

However, the research team working on AMIRA project P879A are now confident that the pulsed microwave technology they are developing will overcome this. They believe that within a few years it will be economically more efficient than conventional comminution for many ores.

“We are actively building up a database of ore types that are responsive to this approach and we now know that a lot of economically significant types can benefit from it,” says Richard Beck, the AMIRA Research Director who is coordinating the project.

Key research institutions are the Universities of Stellenbosch and Nottingham and e2v technologies, a British-based firm responsible for development of the microwave generation and deployment equipment.

Industry sponsors are Anglo American, BHP Billiton, Outokumpu and Rio Tinto.

Inquiries: Richard Beck richard.beck@amira.com.au

Continued next page
Improved heap leaching through optimised ore sizes

It has been long recognised that the efficiency of heap leaching is influenced by the size distribution within the ores and the proportion of fines.

Agglomeration to minimise fines is commonplace. However, the optimum agglomeration method and size for maximum recovery is poorly understood. Significantly improved efficiency may be possible with better understanding.

AMIRA, with the University of Utah, has developed project P986 to develop this knowledge base.

Companies interested in supporting this research and accessing the resultant technologies should contact Terry Braden Terry.Braden@amira.com.au