



HIGHLY SKILLED HUMAN RESOURCES

GOALS:

12. PROMOTE THE INDUSTRY AS AN EMPLOYER OF CHOICE
13. INCREASE PROFILE OF THE INDUSTRY AS INNOVATIVE
14. BUILD AWARENESS AND UNDERSTANDING OF THE MINERALS INDUSTRY
15. IMPROVE THE QUALITY AND RELEVANCE OF MINERALS INDUSTRY RELATED COURSES
16. FACILITATE DEVELOPMENT AND DELIVERY OF AUSTRALIA'S MINERALS EDUCATION GLOBALLY
17. ENHANCE SOCIAL INFRASTRUCTURE IN REGIONAL AND REMOTE AREAS IN PARTNERSHIP WITH GOVERNMENT AND OTHER STAKEHOLDERS



HIGHLY SKILLED HUMAN RESOURCES

Building industry profile and capacity through education and training.

GOAL: PROMOTE THE INDUSTRY AS AN EMPLOYER OF CHOICE

The minerals industry's investment in education and training exceeds \$10 million annually, and is largely driven through the MCA's two long-standing education initiatives – the school-based National Education Program (NEP) and the tertiary level program run through the Minerals Tertiary Education Council (MTEC).

The National Education Program (NEP) engages students and teachers in a range of innovative and targeted programs designed to build greater awareness and understanding of the nature of the minerals industry and the range of careers available in the sector.

MTEC is a collaborative program between the minerals industry, the academic community and government, aimed at increasing the supply and quality of technical professionals for the minerals industry in the specialist disciplines of geoscience, mining engineering and metallurgy.

UNEARTH YOUR FUTURE CAREER WEBSITE

The prime mechanism for promoting the multitude of career options in the minerals sector is the National Education Program (NEP) *Unearth Your Future* interactive website.

Unearth Your Future contains upbeat profiles of young people at work across a range of professional and trade related jobs and provides a focal point for the career programs and events offered to secondary students, teachers, career advisers and parents under the NEP.





The careers website was launched in August by Dr Jeff Harmer, Secretary of the Department of Education Science and Training, on behalf of the Minister, the Hon Dr Brendan Nelson MP. This high profile event demonstrated the alignment of MCA education initiatives with the Australian Government's priority to improve the quality and relevance of career education nationally. The MCA also produced a DVD featuring highlights of video footage from the *Unearth Your Future* website.

NATIONAL SKILLS SHORTAGES STRATEGY (NSSS) PROJECT

The attraction and retention of a high quality workforce has long been a key priority for the Australian minerals industry. The issue has become more acute as the industry responds to the extraordinary surge in demand for commodities and mineral products, coupled with high workforce attrition and declining entry rates to tertiary education and technical institutions.

The MCA is working in partnership with the Chamber of Minerals and Energy of Western Australia (CMEWA) and the Australian Government in a major two-year project under the Government's National Skills Shortages Strategy.

An industry Working Group, established in August to oversee the project, has commissioned preliminary research into the nature and extent of skills shortages across technical and trade areas in the minerals sector. The research results will guide further research and work priorities in 2005, including the establishment of targeted pilot projects as potential models to address training and skills shortages on a national basis.

VOCATIONAL EDUCATION AND TRAINING

The MCA is scoping the feasibility a national strategic framework on vocational education and training (VET) to maximise the effectiveness of the minerals industry's significant investment in education and training and to ensure the industry's advocacy on the Australian Government's reform agenda is nationally consistent.

The MCA supports the Government's increased focus on vocational education training (VET), including the creation of a Ministerial Vocational and Technical Education portfolio within the Australian Government Department of Education Science and Training (DEST).

INDUSTRY EXPERIENCE FOR UNDERGRADUATES PROGRAM

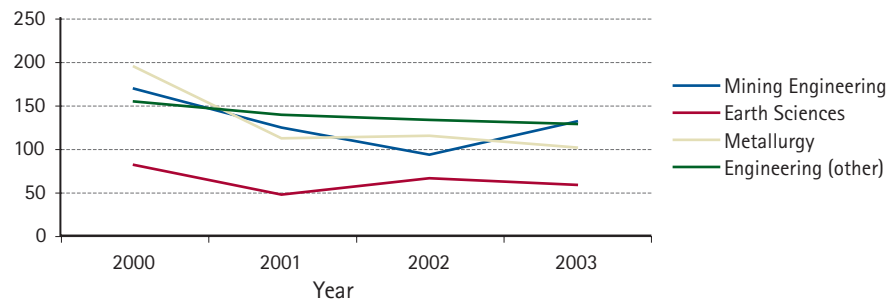
The Industry Experience for Undergraduates (IEU) program is a structured web-based program run by the MCA's Minerals Tertiary Education Council (MTEC). The IEU is designed to improve access, exposure and practical training for undergraduates seeking career opportunities in the minerals industry.

The IEU program enables minerals companies to identify possible future employees, while providing them practical on-site experience that cannot be taught at university.

More than 2000 undergraduate students register on the website each year seeking work experience in the industry. Companies provide placements for more than 600 of these students from all disciplines and universities.

Total placements in the IEU program have steadily declined since 2000 across the disciplines of metallurgy, earth science and engineering, with the exception of 'mining' engineering.

INDUSTRY EXPERIENCE PLACEMENTS



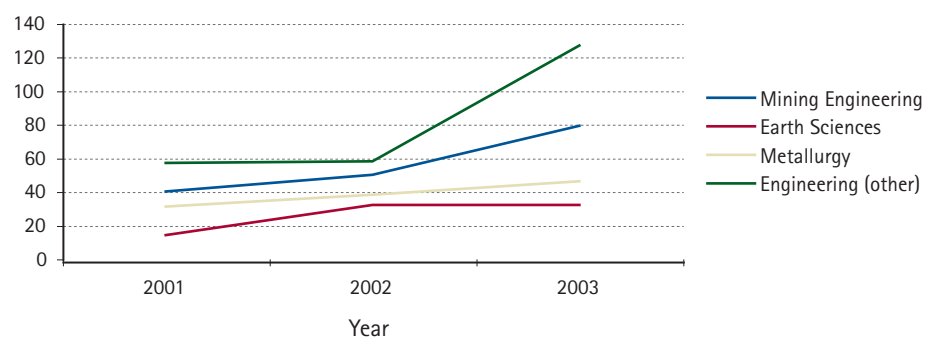
Many minerals companies also negotiated to use the IEU website to advertise graduate employment positions or opportunities within their organisations. The success of this aspect of the program will translate into a revised and upgraded facility for graduate employment from 2005.

GRADUATE EMPLOYMENT

The upward trend in graduate employment reflects the shortage of graduates in the core professions. The greatest rate of increase, however, was in the engineering (other) category - mechanical, civil and electrical engineers.

It is understood that some of the new graduates in these disciplines have been employed and then retrained to carry out the work of mining engineers. Such rapid employment demand throughout 2002-03 was, in retrospect, an early indicator of the industry's impending rapid growth and the associated skills shortages that began to emerge in 2004.

GRADUATE EMPLOYMENT





ATTRACTION AND RETENTION WORKSHOPS

The MCA, in partnership with the Australasian Institute of Mining and Metallurgy (AusIMM) and state representative bodies, conducted workshops in Perth and Brisbane to address the issues of attraction and retention of professional staff in the industry.

The objectives of the two workshops were to identify factors impacting on the industry's ability to attract and retain professional staff, to ascertain how attraction and retention issues are currently being managed within the industry, and to develop a collective strategy.

Both workshops were very successful, with strong participation from a diverse range of stakeholder groups. The principal outcomes were:

- > the need for further research to gain more information on the factors driving staff turnover and prioritise the varying skill needs of operators and service companies
- > the provision of further information to inform current government initiatives such as the Mining Technology Services Action Agenda and the Mineral Exploration Action Agenda and to deliver better outcomes for industry
- > industry to become more involved with tertiary education providers in curriculum development and delivery. The minerals industry needs to have a greater presence on tertiary campuses
- > industry should develop a strategic approach to human resource management
- > industry should provide more opportunities for professional development to their employees
- > industry and professional associations should use young professionals to deliver information on career opportunities in the sector, to target audiences in regional areas.

GOAL: INCREASE PROFILE OF THE INDUSTRY AS INNOVATIVE

NATIONAL SAFETY AND HEALTH INNOVATION AWARDS

Now in its sixth year, the MCA's National Safety and Health Innovation Awards promote the development of innovative solutions to everyday safety and health issues to achieve an industry free of fatalities, injuries and diseases.

The Awards are an effective way to harness and recognise the creativity of people working in the industry and to instil a sense of ownership for improving safety and health performance from the ground up, using technology and innovation.

BHP Billiton Mitsubishi Alliance (BMA) Blackwater Mine in Queensland won the 2004 National Safety and Health Innovation Award.

The Blackwater team's innovation is an engineering solution that significantly reduces the risk of 'crush' incidents involving operators of vehicle loading cranes. This is achieved through 'hard' and 'soft' controls including a 'bump bar' that, if contacted, ceases operation of the crane.

Haul pack driver, Melissa Marco (Coal and Allied) and rock mechanics engineer, Luke Krois (Xstrata), provided a first hand account of their on-the-job experiences at the launch of the MCA's *Unearth Your Future* career website.



Highly Commended: BMA's Crinum Mine in Emerald, Queensland, for designing electronically controlled roof bolters that reduce injuries (eg. shoulder, back, neck and arm) by eliminating the need for operators to stretch in awkward/incorrect positions to insert drills or spanners into the drill head chuck.

Commended: Boral Quarries (Metro) of NSW for their innovation – an enhancement to the 'cut-out seat' in surface drill rigs (Atlas Copco F9) to include drill rods and drill bit. The cutout switch eliminates the exposure of operators to rotating plant.

Acknowledgement: Rio Tinto Coal Australia's Kestrel Mine for the Minsup Isolation Lockout Device, which enables the econovalves in the mine's air-and-water reticulation system to be positively isolated using personal danger locks.

INTERACTIVE LEARNING IN SCHOOLS

The MCA's Nation Education Program (NEP) is firmly aligned with the Australian Government's 'national priorities' to strengthen teaching and learning in the areas of science, engineering and technology.

The NEP is achieving this objective by providing a range of professional development programs and industry-related education materials for secondary students. A major initiative in 2004 was the development of two online interactive learning programs – the *Down to Earth* geoscience series and the *Oresome Froth* chemistry interactive.

These two packages are designed to stimulate and engage students, providing them with science-based learning experiences that utilise the Australian minerals industry as the context for self directed learning.

The Down To Earth series contains six inter-related geoscience components:

- > *Rock Back in Time* – students are 'virtual time travellers' investigating the evolving geology and environment of the Australian continent over the past 545 million years. Students 'discover' from a time and space perspective, how selected rocks and mineral deposits have formed
- > *Palaeotraveller* – students use 'virtual time travel' to view crustal plate movement and track the changing location of the Australian continent. The program contains over 70 images depicting how the Australian landscape evolved and information on changing environments over time
- > *Metal Matters* – a 'virtual metal detector' enables students to discover the metal composition of selected household objects. A 'commodity calculator' provides a quantitative chemical analysis of selected objects. This information can be extrapolated to assess local, regional and global demand for the various commodities in the selected items
- > *Undercover* – guided by a hydrologist, regolith geologist and geophysicist, students can peer through the regolith and determine the impact of a proposed major development project on groundwater and salinity levels
- > *Oresome* – enables students to investigate the factors that led to the formation of mineral deposits in Australia
- > *Remote Sensing* – students work with a geologist using the latest scientific remote sensing tools to locate mineral deposits.



The *Oresome Froth* chemistry interactive challenges chemistry students to separate copper and zinc ore in a simulated minerals processing plant. The user acquires the skills by interrogating other processing plant staff and by consulting the tutorials contained within the program.

MINERALS WEEK – INNOVATION DAY

Minerals Week is the minerals industry's flagship program to present its policy perspectives and concerns to politicians, senior policy-makers and opinion leaders.

In 2004, this high-level dialogue focused on showcasing the minerals industry's embrace of innovation to build competitive strength. Innovation drives 'continuous improvement' through the development and uptake of knowledge, leading edge technology and process improvements.

As well as meeting the hi-tech needs of the minerals industry, the mining technology and services sector (MTS) has developed as a growing export market with around 60 per cent of mining software used in operations globally exported from Australia.

The MCA participates in the Mining Technology & Services Action Agenda, which is seeking to lift the global presence of the MTS sector and to assist it attain, and if possible exceed, its current export growth rate of 12 per cent per annum.

This innovative face of the industry was showcased during Innovation Day held on 1 June 2004 as a part of Minerals Week.

More than 100 industry representatives, government officials and members of the research community heard challenging and entertaining presentations from the Chief Scientist, Dr Robin Batterham, Dr Rod Hill, Group Executive CSIRO Minerals, and Mr Dick Davies previously head of AMIRA International – research broker for the minerals industry.

Further presentations were delivered by representatives of the key Cooperative Research Centres (CRCs) that are carrying out leading-edge research for, and on behalf of, the minerals industry:

| Cooperative Research Centre (CRC) | | Industry Sector |
|--|---------------|---------------------|
| Landscape Environments and Mineral Exploration | CRCLEME | Exploration |
| Predictive Mineral Discovery | Pmd*CRC | Exploration |
| Sustainable Resource Processing | CSRP | Mineral processing |
| Mining | CRC Mining | Mining |
| A J Parker CRC for Hydrometallurgy | Parker Centre | Mineral processing |
| Coal in Sustainable Development | CCSD | Energy |
| Greenhouse Gas Technologies | CO2CRC | Energy & greenhouse |

Canberra students
Phoebe Hooke and
Nikolas Brozanic
road test the MCA's
new interactive
school education
resources.



Key issues identified during Innovation Day were that:

- > Australia leads in technology advancement and the quality of its workforce
- > incremental R&D has added value for the industry, but what is needed are transformational changes in technology to move the industry to the next stage in its evolution
- > technological change must be framed by economic, environmental and social imperatives – this is a major challenge
- > the industry must identify its top five R&D priorities, focus its efforts on these and relentlessly pursue scientific excellence whilst doing so.

GOAL: BUILD AWARENESS AND UNDERSTANDING OF THE MINERALS INDUSTRY

NATIONAL EDUCATION PROGRAM REVIEW

The MCA's National Education Program (NEP) is one of Australia's pre-eminent industry-school education partnerships, building capacity in both teaching and learning in subject areas of relevance to the Australian minerals industry and in delivering appropriate career advice.

The NEP operates as a collaborative partnership between the MCA and the State and Territory Minerals Councils and Chambers. MCA-funded education managers are based in each jurisdiction providing the flexibility for the industry's education objectives to be met in line with individual State and Territory school curriculum requirements.

Since it commenced operation in 1996, the MCA has continually reassessed the NEP's strategic objectives in keeping with industry and education sector priorities. 2005 marks the final year of the current five-year commitment of MCA funding of the school-education program.

The MCA has appointed the Australian Council of Educational Research (ACER) to undertake a major review of the NEP with the objective of assisting the MCA in delivering a cost-effective school education strategy for the minerals industry post 2005.

The review will assess how a school-based industry education initiative can best operate within an Australian educational framework that is currently focussed on:

- > encouraging innovation in schools
- > promoting world class teaching and learning in science, technology and mathematics
- > improving the quality of career education
- > attracting and retaining high quality graduates in the teaching profession.

The review will be undertaken in the first half of 2005 and will include the expertise and feedback from a broad range of stakeholders from both industry and the education sector.



TEACHER PROFESSIONAL DEVELOPMENT

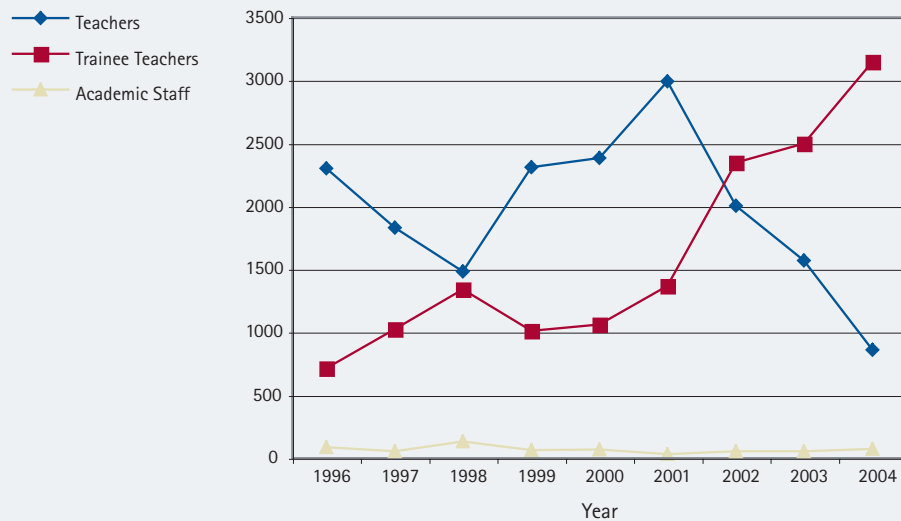
A key element of the National Education Program (NEP) is the delivery of professional development workshops for primary and secondary teachers and trainee teachers. The workshops are based on minerals-related educational materials that are produced specifically to intersect with State and Territory school curriculum requirements.

During 2004, the priority for the MCA education team was demonstrating the new interactive materials in the *Down to Earth* series, while State and Territory Chamber and Council education managers continued to build partnerships with education providers and promote the new MCA careers website *Unearth your Future*.

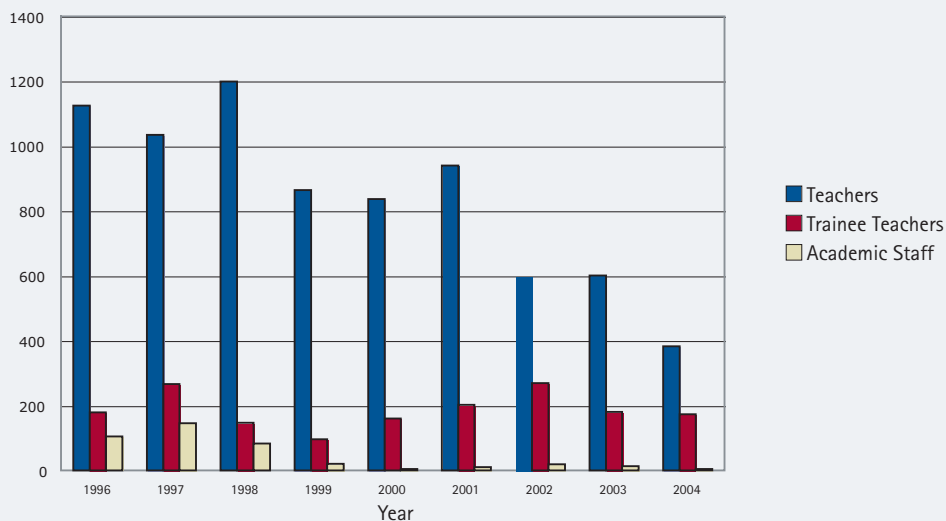
NEP managers conducted workshops and seminars for 1,121 teachers, 3,797 teacher trainees and 88 academic staff in 2004.

The heightened interest and engagement of Faculties of Education was reflected in a 26% increase in the workshop participation rate of both undergraduate and graduate teacher trainees. A further 383 teachers and 173 teacher trainees undertook industry site visits.

WORKSHOPS



SITE TOURS



EDUCATION STOCKTAKE

The MCA and the State and Territory Minerals Councils and Chambers have conducted a stocktake of public and private sector education programs with the potential to complement initiatives offered by the minerals industry. The findings of the stocktake are guiding the MCA and its education partners in the establishment of further linkages with education providers to enhance the scope and quality of the industry's education resources.

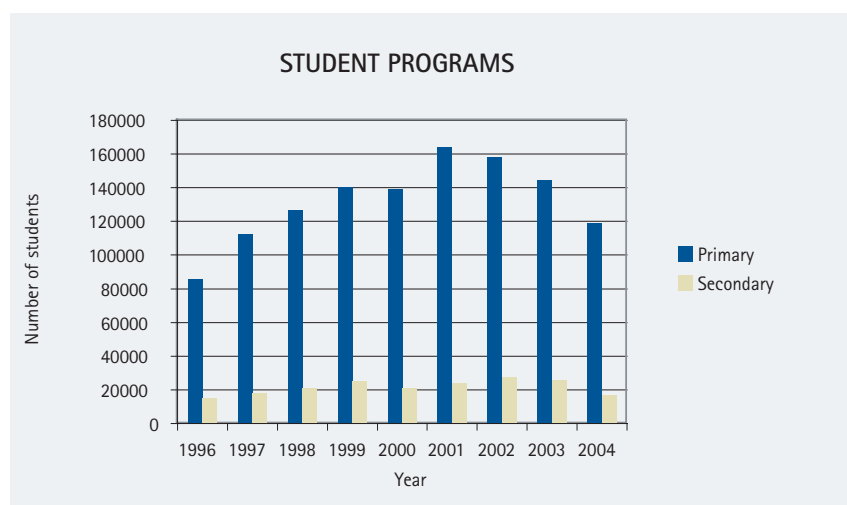
NATIONAL EDUCATION PROGRAM – REACHING OUT

During its nine years of operation, the MCA's National Education Program (NEP) has generated greater understanding of, and interest in, the minerals industry among students and teachers in primary and secondary schools.

In 2004, the NEP focussed on developing new internet-based resources that capture the interest of secondary students, while its successful 'in class' presentation program continued to engage and stimulate upper primary students.

Around 119,000 upper primary students participated in mining-related education programs throughout the year, which included taking more than 600 students 'on the road' to visit minerals operations.

More than 1000 secondary students experienced the workings of minerals operations, with more than 17,000 participating in mining-related presentations, seminar and careers events.



BLAYNEY PUBLIC SCHOOL WINS ENVIROSMART AWARD 2004

The MCA's *EnviroSmart* educational resource and national Awards provide students guidance on becoming a 'sustainable school' and national recognition in leading environmental management.

Under the themes land, water, air, energy and waste management, students are encouraged to develop, implement and report on a School Environmental Management Plan (SEMP) - drawing parallels with leading environmental management practices in the minerals industry as a learning context.



In its fourth year, the *EnviroSmart Award* was presented to Blayney Public School at the MCA's Inaugural Sustainable Development Conference.

The school's SEMP demonstrated the effectiveness of involving external stakeholders in projects to address health and safety issues, energy conservation, and water and waste management.

In an impressive presentation to the Conference delegates, Blayney Public School representatives Jenna Neal and Ashleigh Fogarty emphasised the importance of their generation in the 'sustainable development equation'.

"We realise that it is people our age who will eventually make an impact on the preservation of precious resources in our world," the students said.

AUSTRALIAN MINES ATLAS

In 2004, the MCA continued its funding support of the Australian Mines Atlas (AusMA), which is an effective online mechanism for accessing a broad range of technical data, educational material and general information on the Australian minerals industry.

The Atlas, launched during the MCA's 2003 Minerals Week, contains data on mines and mineral deposits sourced from Geoscience Australia's OZMIN database. This data is updated weekly.

During 2004, the functionality of the website was further enhanced enabling access to the complete Landsat 7 satellite mosaic of Australia and the seamless 1:250,000 Australian Topographic Map.

New data layers were added, including Federal Electoral Boundaries, Indigenous land, state forests, nature conservation parks, water supply reserves, mineral potential datasets and occurrences of mineral deposits.

3-D visualisations now support the education and information sections of the site, making it a valuable education tool, which complements the MCA's National Education Program.

The popularity of the National Mines Atlas continues to increase with Geoscience Australia reporting more than 220,000 'hits' to the site from July to November 2004.

MTEC LECTURERS

University lecturers involved in the MCA's tertiary education initiative – the Minerals Tertiary Education Council (MTEC) – are provided with professional development training to build industry experience and improve communication and marketing skills.

The MTEC lecturers are central to the development and delivery of the collaborative university program designed to enhance the supply and quality of technical professionals for the minerals industry.

As important advocates for the minerals sector, the MTEC Lecturers are encouraged to participate in school-based mine site visits and attend university 'open days' which provide the opportunity to showcase the industry, and promote the range of career options available to students.

"The students and teachers at Blayney Public are very worthy winners of *EnviroSmart* – they are great ambassadors for their school and their local community. Their commitment to, and enthusiasm for environmental management is inspirational."

Mr Mitchell H. Hooke
MCA Chief Executive



GOAL: IMPROVE THE QUALITY AND RELEVANCE OF MINERALS INDUSTRY RELATED COURSES

MTEC PROGRAM

To encourage higher levels of cooperation between the MTEC partner universities, in 2004 the MCA provided financial assistance to the institutions that actively collaborated in the delivery of industry-relevant courses. This assistance was made available to the universities that encouraged their students to take courses offered by one or more of the MTEC partner universities, as well as to the universities that delivered the collaborative course materials.

The minerals industry advised on the content and relevance of the courses and the students voted with their feet by enrolling in courses considered to be of higher quality and more relevance.

While student enrolment numbers in metallurgy programs were lower than in earth science and mining engineering, the latter disciplines also received considerably more funding, indicating higher levels of collaboration.

| | |
|--------------------|-----------|
| EARTH SCIENCE | \$271,200 |
| MINING ENGINEERING | \$250,625 |
| METALLURGY | \$ 64,328 |
| TOTAL | \$586,153 |

EARTH SCIENCE

Industry relevant courses are provided only in the Honours or fourth year of undergraduate degree programs and in coursework masters courses that are delivered as part of the Geoscience Minerals Masters Program. Material from both programs is also available as not-for-award short courses for practicing professionals to help them maintain or upgrade their skill levels.

MINING ENGINEERING

Undergraduate courses have been developed in the fields of Ventilation (University of NSW), Rock Mechanics (WA School of Mines) and Mine Planning (University of Queensland). These are being delivered across the network of three universities to students in third and fourth years of their undergraduate degree programs.

Importantly, the three universities have agreed in principle to recast the way they deliver mining engineering education in Australia and will consider the development of a new national program for 3rd and 4th year mining engineering undergraduates.

Each of the participating universities has agreed to support the concept and the model for this new structure called 'Mining Education Australia'.

METALLURGY

The metallurgy schools at Murdoch University, the WA School of Mines and the University of Queensland have jointly developed a range of undergraduate courses that have high relevance to the minerals industry.

Many of these courses have been incorporated in a new collaborative degree that has been designed as a conversion program, which enables engineers and scientists, without formal metallurgy qualifications, to gain



the necessary education to allow them to practice as mineral processing and metallurgy engineers.

The program is called the Graduate Coursework Program in Extractive Metallurgy and commenced operation in 2004 with students enrolled at the WA School of Mines and at the University of Queensland.

GOAL: FACILITATE DEVELOPMENT AND DELIVERY OF AUSTRALIA'S MINERALS EDUCATION GLOBALLY

AUSTRALIA'S INNOVATIVE MINERALS EDUCATION ON SHOW

The financial viability of the MTEC partner institutions depends on student enrolments in their undergraduate and postgraduate degree programs. The minerals industry is a global industry and Australia has a commanding presence in the provision of minerals education at the tertiary level.

Clearly the opportunity exists for Australia to capitalise on the relative strength and capability of its minerals higher education sector by attracting more international students to its programs, and MTEC has commenced work marketing Australia's capability to the rest of the world.

SHOWCASING AUSTRALIAN EDUCATION AT EXPOMIN – CHILE

MTEC in association with the University of NSW (UNSW) mining engineering department participated in Chile's *Expomin*, a large mining expo attracting more than 8,000 participants.

MTEC's aim was to increase awareness in South America of the MTEC educational programs, in particular the Minerals Geoscience Masters program; the UNSW Masters and Graduate Diploma programs in mining engineering; mine ventilation and the Graduate Diploma in Minerals Industry Risk Management offered by the Minerals Industry Safety and Health Centre (MISHC) at the University of Queensland.

The MTEC stand received considerable publicity, aided by a visit from the Australian Ambassador, Ms Elizabeth Schick, as well as the 'koala lottery' and other promotional activities. As a result of the visit, a much better appreciation of the market opportunities for MTEC programs has been obtained.

OVERSEAS STUDENTS SEEK MTEC COURSE INFORMATION

The MTEC team received a number of serious enquiries from overseas students and Australians seeking further professional development opportunities, at its trade booth at the Society of Economic Geologists (SEG) Conference in Perth in September 2004.

As decisions to undertake further study in degree programs are not made instantly, MTEC's presence at the Conference proved a valuable exercise to 'plant the seed' in the minds of the more than 800 participants.

| International students enrolled at MTEC Universities in 2004 | | | | |
|--|--------------------|---------------|------------|-------|
| | Mining Engineering | Earth Science | Metallurgy | Total |
| Undergraduates 3-4 th yr only | 1 | 40 | 1 | 42 |
| Postgraduates | 16 | 37 | 5 | 58 |

Australian Ambassador to Chile, Ms Elizabeth Schick (second left) and her husband Barry visit MTEC's education booth at Expomin Chile in April 2004. Hosting the booth were Ms Loreto Lazcano from the Centre for Ore Deposit Research at the University of Tasmania and Ms Marcela Cardenas and Associate Professor David Laurence from the University of NSW.



MTEC PARTNER INSTITUTIONS

The MCA is building strong partnerships with the tertiary education and research sectors to improve the quality and relevance of minerals industry-related courses and to increase the number of graduates available and skilled to work in the minerals industry. The participating universities are:

EARTH SCIENCES

University of Tasmania
School of Earth Sciences and Special
Research Centre for Ore Deposit Research
(CODES)

James Cook University
School of Earth Sciences and Economic
Geology Research Unit (EGRU)

University of Western Australia
School of Earth and Geographical Sciences
and the Centre for Global Metallogeny
(CGM)

Monash University
School of Geosciences (as a member of
VIEPS - Victorian Institute of Earth &
Planetary Sciences)

University of Melbourne
School of Earth Sciences (as a member
of VIEPS - Victorian Institute of Earth &
Planetary Sciences)

CRCLEME

(CRC for Landscape Environments &
Mineral Exploration) with its partners:

- **The Australian National University**
Department of Geology
- **Curtin University of Technology**
WA School of Mines
- **University of Adelaide**
School of Earth and Environmental
Sciences

MINING ENGINEERING

University of Queensland
School of Engineering – Division of Mining
and Minerals Process Engineering (through
the Sustainable Minerals Institute -SMI)

University of New South Wales
School of Mining Engineering

Curtin University of Technology
WA School of Mines

METALLURGY

Curtin University of Technology
WA School of Mines

Murdoch University
Division of Science and Engineering

University of Queensland
School of Engineering – Division of Mining
and Minerals Process Engineering (through
the Sustainable Minerals Institute - SMI)