M E R I W A

MERIWA Annual Report 2005-2006

MINERALS AND ENERGY RESEARCH INSTITUTE
OF WESTERN AUSTRALIA

"To encourage the development of the Minerals and Energy Industries within the State by fostering and promoting all aspects of minerals and energy research"

Contents

Letter of Transmittal

MINERALS AND ENERGY RESEARCH INSTITUTE OF WESTERN AUSTRALIA

Annual Report 2005-2006

Hon. Francis Logan MLA
Minister for Science and Innovation
Parliament House
PERTH WA 6000

On behalf of the Board of Directors, I am pleased to submit the Annual Report of the Minerals and Energy Research Institute of Western Australia (MERIWA) for the year ending 30 June 2006, for your information and presentation to Parliament.

MERIWA's objectives are to promote and co-ordinate research for the development of the minerals and energy industries in this State, and the Board is satisfied with the results of MERIWA's operations for the year and its performance towards the achievement of these objectives.

The Board acknowledges the valuable support given to the Institute by your office and by the Department of Industry and Resources during the year, and by the Minerals Research Advisory Committee, many of the members of which have contributed their time and assistance in an honorary capacity.

S R Baker
Chairman
Board of Directors

25 September 2006

Statement of Compliance with Relevant Written Law

Enabling Legislation

The Minerals and Energy Research Institute of Western Australia is established under the Minerals and Energy Research Act, 1987, as amended by The Energy Legislation Amendment Act, 2003.

Legislation Administered

The Institute does not administer legislation.

Legislation Impacting on the Institute's Activities

In the performance of its functions, the Institute complies with all relevant written laws including the following:

- Financial Administration and Audit Act, 1985; (FAAA)
- Public Sector Management Act 1994
- Equal Opportunity Act 1984
- Occupational Safety and Health Act 1984
- State Records Act 2000
- Government Financial Responsibility Act 2000
- Interpretation Act 1984
- Minimum Conditions of Employment Act 1993
- Industrial Relations Act 1979
- Library Board of Western Australia Act 1951
- Disability Services Act 1993
- Freedom of Information Act 1992
- Public Interest Disclosure Act 2003
- Electoral Act 1907
- Superannuation Guarantee (Administration) Act 1992

In the financial administration of the Minerals and Energy Research Institute of Western Australia we have complied with the requirements of the FAAA and every other relevant written law, and exercised controls which provide reasonable assurance that the receipt and expenditure of moneys, the acquisition and disposal of public property and incurring of liabilities, have been in accordance with legislative provisions.

In its general administration, MERIWA has also complied with public sector standards for human resource management and the code of ethics and code of conduct, as required by the Public Sector Management Act 1994, and report that no applications for breaches of these standards have been lodged during the 2005/2006 year.

The Board continues to support regional research centres, particularly the Western Australian School of Mines at Kalgoorlie.

Statement of Compliance with Relevant Written Law

Compliance Statements

Advertising and Sponsorship

Expenditure incurred by the Minerals and Energy Research Institute of Western Australia during 2005/2006 in relation to section 175ZE of the Electoral Act 1907 was as follows:

	$
Advertising agencies	Nil
Market research organisations	Nil
Polling organisations	Nil
Direct mail organisations	Nil
- West Australian Newspapers	2,159

Freedom of Information

There were no applications under the Freedom of Information Act during the year. A copy of the Information Statement is available by contacting the Executive Officer on 9222 3397 or by writing to the Minerals and Energy Research Institute of Western Australia, 100 Plain Street, East Perth 6004.

Disability Services Plan

The Institute is housed within the Department of Industry and Resources building, Mineral House, 100 Plain Street, East Perth, which has a comprehensive and effective plan to ensure compliance with the Disability Services Act, 1993.

Waste Paper Recycling and Energy Smart

The Institute participates with the Department of Industry and Resources paper recycling and Energy Smart programs.

Customer Group Outcomes

Due to the small size of the Institute matters concerning women, family and domestic violence, equal employment opportunities, language, cultural diversity and youth will be addressed on an individual basis as required.

Public Information Disclosure

The Executive Officer is responsible for public information disclosure.

Corruption Prevention

The Board of MERIWA is satisfied that the processes and procedures followed by the Agency, its staff and committees are robust and effective in the requirement to eliminate the possibility of corruption.

Statement of Compliance with Relevant Written Law

Information Systems and Services

In accordance with the State Records Act of 2000, the effectiveness and efficiency of the record keeping and disposal schedule was completed during the year.

- Staff were familiarised with the Plan.
- Due to the small size of the Agency, training and familiarisation for new employees will be undertaken on a "one on one" basis as required.
- The effectiveness of the Plan will be reviewed as required but no later than 30 June 2010.

Cultural Diversity and Language Services were not required by clients during the year. The supplementary scholarship program continues to support young people in research.

All research completed is published as reports that are available to the public at cost of production. Reports are available in both CD-ROM and hardcopy formats. Some earlier copies are only available as hardcopies or microfiche.

At the date of signing, we are not aware of any circumstances, which would render the particulars included in this statement misleading or inaccurate.

A Webster
DIRECTOR AND
CHIEF FINANCE OFFICER

S R Baker
CHAIRMAN,
BOARD OF DIRECTORS

25 September 2006

Functions

The Minerals and Energy Research Institute of Western Australia (MERIWA) was established under the Minerals and Energy Research Act, 1987 (No. 89 of 1987), and is a statutory authority. The function of the Institute is to encourage the development of the minerals and energy industries for the benefit of the State by fostering and promoting all aspects of minerals research and energy research through:-

(a) undertaking, in its own right or in conjunction with other persons, such research projects as it thinks fit, and evaluating research projects so undertaken;

(b) investigating matters, and undertaking research projects relevant to the development of those industries, referred to it by the Minister;

(c) co-ordinating, when appropriate and practicable, research projects undertaken by persons who -

(i) have received financial assistance or any other form of support from; or
(ii) seek or agree to have their research projects co-ordinated by,

the Institute;

(d) receiving and considering applications from persons undertaking or wishing to undertake research projects and seeking financial assistance from the Institute;

(e) allocating, at its discretion, to persons out of the Account financial assistance to enable or assist persons referred to in paragraph (d) to undertake or continue research projects;

(f) entering into agreements with persons to whom the Institute has allocated financial assistance with respect to the terms and conditions of the allocation of that financial assistance, which terms and conditions may include a condition that such a person shall comply with any directions or guidelines issued by the Institute in relation to the conduct of a research project;

(g) monitoring and evaluating research projects in respect of which the Institute has allocated financial assistance and other minerals research work or energy research work within the State and elsewhere;

(h) maintaining a collection of all reports or other literature or information issued or compiled by the Institute or by the Mining Institute;

(i) the reports produced by the Institute; and
(ii) the reports produced by the Mining Institute formerly established by the *Mining and Petroleum Research Act 1981*;

(i) conferring and collaborating on matters relating to minerals research and energy research with the Department and other appropriate authorities and institutions within the State and elsewhere; and

(j) promoting public awareness of matters relating to minerals research and energy research, informing the public concerning the latest developments in the fields of minerals research and energy research and receiving and considering submissions from the public concerning -

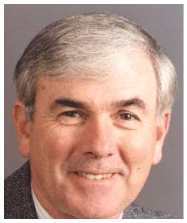
(i) the performance by the Institute of its function; or
(ii) matters relating to minerals research and energy research in general.

[Section 5 amended by No. 89 of 1994s. 109; No. 53 of 2003s. 76 and 90]

Structure

MINISTER FOR SCIENCE AND INNOVATION
THE HON FRANCIS LOGAN MLA

BOARD OF DIRECTORS



MR S R BAKER
CHAIRMAN

DR C D BRANCH
PAST CHAIRMAN

MS A WEBSTER
CHIEF FINANCE OFFICER

PROFESSOR B F RONALDS
CHIEF – CSIRO PETROLEUM

MINERALS RESEARCH ADVISORY COMMITTEE
CHAIRMAN: PROFESSOR ODWYN JONES

PROJECT COORDINATOR
DR PAMELA SMITH

EXECUTIVE OFFICER
MR ROD JONES

Board of Directors' Report

MERIWA is a Statutory Authority established under the Minerals and Energy Research Act (1987) to promote minerals and energy research which will encourage the development of the Minerals and Energy Industries in this State. The desired outcome is that the amount of research undertaken will achieve the level of technological advancement required to meet the future technical challenges of these industries, ensuring their competitiveness and hence continued development.

MERIWA's financial results and research achievement for 2005/2006 are summarised in this report from the Board. The outputs produced and performance indicators are examined in more detail in a later section of the report, as well as the detailed financial statements for the 2005/2006 year.

Overview

MERIWA's financial results and research achievement for 2005/2006 for minerals research are summarised and compared with the results for 2004/2005 in Table 1. Points of note for the year are -

- Total value of new minerals research projects was $2.547 million, an increase of $0.924 million on the 2004/2005 figure of $1.623 million.
- Industry sponsorship was $1.800 million compared to $1.072 million in 2004/2005. The proportion of industry sponsorship for minerals research was 71% against a target of 65%.
- For every dollar expended by the Government through MERIWA, $3.32 of minerals research was generated.
- Administration costs were 10.41% of the value of research generated.
- MERIWA finished the year increasing the value of net assets by $39 464.

Research Activities

MERIWA's minerals and petroleum research results are identified in Table 4 (refer "Operating Report"). Eight new research projects were commenced in 2005/2006 for a total value of $2.547 million. This compares with $1.623 million in 2004/2005. It is evident that there is an increase in environmental projects with an improvement in mineral processing but a decrease in geoscience and hydrocarbons exploration. Mining and engineering projects remain the same as last year's figure.

TABLE 1: Summary of Results

	2005/06 $'000	2004/05 $'000
FINANCIAL		
ACCUMULATED FUNDS **Opening balance at 1 July**	***2 785**	**2 799**
Plus funds received and sponsorship committed	**2 558	1 9 71
Less funds expended and committed	****2 518	1 985
ACCUMULATED FUNDS **As at 30 June**	**3 180**	**2 785**
Total value of research commenced	**2 547**	**1 623**
% sponsorship to new research commenced	71%	66%
Ratio of research value to government funds utilised (grants and administration)	3.32	2.26

* **Cash plus investments held in trust or yet to be collected from industry sponsors for committed research activities over the next three years.**
** **Government funding, industry sponsorship, interest.**
*** **Research grants, scholarships, administration**

New industry sponsorship coordinated through MERIWA for the year was $1.800 million, while at year's end the sponsorship vested under MERIWA control was $2 826 560. Industry sponsorship for the year in review was 71% of the research value of projects against a target of 65%.

No projects were abandoned or completed below budget during the year. Government funds utilised by MERIWA for minerals research, including funds brought forward from 2004/05 and resources received free of charge totalled $929 619 of which $638 473 was applied to research grants and $65 000 to scholarships with the remainder for administration.

The actual administration cost of $190 129 was 10.41% of the value of research generated. Real expenditure on new applications was $746 519.

Table 2 shows the allocation of funds among different research areas as well as the industry support achieved in each, while Table 3 shows the organisations that have contracted to undertake MERIWA research projects and have been recipients of MERIWA post-graduate scholarships this year.

Board of Directors' Report (Continued)

TABLE 2: Allocation of Funds

Research categories	No. projects	MERIWA $'000	Industry $'000	Total $'000
Geoscience	1	218	935	1 153
Hydrocarbons	0	0	0	0
Engineering	1	139	335	474
Minerals processing	1	141	0	141
Environmental-rehabilitation	5	249	530	779
Total	**8**	**747**	**1 800**	**2 547**

TABLE 3: Allocation of Mineral Research Funds to Research Organisations

Research Organisation	No. projects	Funding $'000
The University of Western Australia	1	145
Murdoch University	1	141
Curtin University of Technology	3	179
WA School of Mines	1	474
C.S.I.R.O.	2	1 608
Total research	**8**	**2 547**
SCHOLARSHIPS		
The University of Western Australia	1	20
Murdoch University	-	-
Curtin University of Technology	2	45
Edith Cowan University	-	-
Total scholarships	***3**	**65**
Total funding		**2 612**

*** One scholarship was awarded in 2004/05 but did not commence until July 2005.**

The quality of research projects, their innovation and potential benefits to Western Australia continue at a very high standard.

This year seven projects were approved by the Board. Four of the seven projects and four carried forward from last year were contracted to receive funding this financial year 2005/06. Again the research activities involved Curtin University of Technology with three, CSIRO with two and the University of Western Australia, Murdoch University and WA School of Mines with one each. The minerals sector has continued its research resurgence with all of the projects being related to this area.

Projects

Seven projects received Board approval in the course of the year. One of these (M381) is conditional on the success of an ARC Linkage application made in early 2006, and two others are AMIRA projects with important application in WA. Four of the seven projects are directly concerned with environmental quality or mine site restoration issues. Of the remaining three, one continues a major gold processing study, one expands on mine seismicity monitoring and analysis, and one takes on evaluation of lithogeochemical trends in exploration for nickel.

M379 – *Classification of Western Australian Inland Waters*

In the Goldfields of WA many mining operations face the challenge of managing large quantities of hypersaline water and often have few disposal options. Now environmental guidelines are being tightened as awareness increases of the available salt lakes, and mandate regulation and management of the use of these inland water bodies. Therefore numerous companies are supporting this project that has undertaken to collect and validate data on salt lakes, identify gaps in current knowledge and use all validated data in developing a classification system for Western Australian inland waters by multivariate analysis. Intended project outcomes are a series of baseline data ranges for each lake classification, a description of typical ecological communities for each, and a report on the classification system and features of different salt lake types in WA. The two year study by Associate Professor Jacob John at Curtin University and Ms Melanie Ward of Outback Ecology Services is supported by eight companies and two government bodies, along with the Department of Environment, and MERIWA at $15 071 for $50 071 total project cost.

M383 – *The Use of Deterrents for Reducing Herbivory by Kangaroos on Disturbed Lands*

Having shown in a previous MERIWA project that kangaroos' browsing habits are pivotal in controlling the recovery of vegetation after disturbances such as mining, Dr Michael Parsons and Professor Byron Lamont at Curtin University undertook this project to develop deterrents for kangaroos and other herbivores. Primarily olfactory cues, but also auditory and visual cues, are being evaluated and herbivore density and distribution are being monitored. An expected outcome of the work is a commercial deterrent deriving from the olfactory cue studies, and preliminary results have already received national and worldwide publicity. The deterrent is being developed by cooperation among eight partners. Project funding is from four partners, Alcoa, Worsley, Chemistry Centre, and Whiteman Park at $44 000 total, and MERIWA is contributing $40 339.

M384 – *Gold Processing Technology*

This AMIRA project with four modules attracted MERIWA support for module 2, Thiosulfate Process Development, and module 3, Sustainable Cyanide Management, for their importance to Western Australian industry practise. Module 2 continues the development of an alternative to the conventional thiosulfate process already underway and will include assessment of a number of Western Australian gold ores. Module 3, concerned with sustainable management practise, will continue the development of a simulation package that allows sponsors to model the cyanide chemistry in their circuit, optimising for WA conditions. This work will ensure companies can meet all recognized bench marks of the recently developed International Cyanide Code. The three-year project supervised by Professor Mike Nicol and Greg Wardell-Johnson of the A J Parker Centre at Murdoch University is funded by 14 companies, and MERIWA is contributing $140 800.

M385 – *The Development of a Hyperspectral Environmental Measurement Tool for Monitoring Mining Related Infrastructure and Rehabilitation*

Following on from recent award-winning research in hyperspectral imaging, this project is evaluating airborne hyperspectral imaging technology's use in environmental monitoring. A team led by CSIRO researcher Cindy Ong, and Mark Piggott of BHP Billiton Iron Ore, is applying hyperspectral technology to monitoring with several objectives, including: (1) development of case histories of mine site and related operations in monitoring iron ore, bauxite and nickel-laterite mining; (2) establishment of standards for hyperspectral technology such as reproducibility and accuracy; (3) development of an operational monitoring system for iron-derived dust in Port Hedland, and (4) promoting the writing of guidelines for hyperspectral technology as "best practise" procedures, in concert with legislative bodies such as EPA and DoIR. Anticipated benefits to industry from this 18-month project are more efficient assessment and management of mining environment activities. There also will be significant benefits to people in dangerous working conditions, and to environmentally sensitive zones since the need for ground access may be alleviated. BHP Billiton Iron Ore is funding the research for $290 000 and BHP Billiton Nickel for $35 000 with MERIWA contributing $130 000.

M386 – *Broadening the Application of Seismic Monitoring in Australian Underground Mines*

Increasing risks associated with seismic events in underground mines are driving this ongoing research theme, further developed from Projects M328 and M355. The risks include increased hazards affecting workforce safety, higher mining costs, lower mine productivity and loss of ore reserves. M386 is undertaking to mitigate these operational consequences by enhancing regional seismic monitoring networks in Kalgoorlie-Kambalda and Leinster mining districts, and improving the techniques for interpreting seismic data in high stress and rockburst-prone mines. Data acquired from the regional networks will be analysed for focussing of seismic source parameters to obtain more information about the stresses and deformation associated with mine seismic events up to Richter magnitude 2.5-3. The research team at the Australian Centre for Geomechanics is led by Professor Yves Potvin and Dr Daniel Heal and is funded for 3 years by 13 companies. MERIWA's contribution of $150 000 brings total funding to $1 068 000.

M388 – *Controls on Platinum Group Element Variation in Mafic and Ultramafic Magmatic Systems*

Exploration for Ni sulphide deposits in mafic or ultramafic systems has been handicapped by the fact that all lithogeochemical vectors currently used are somehow ambiguous, providing results that are inconclusive or even contradictory. Promising approaches that involve high-precision analyses of Platinum Group Elements (PGE) are being investigated through this project. The research, conducted by UWA Professor Mark Barley, Dr Steve Barnes of the CSIRO and Dr Marco Fiorentini of UWA's Centre for Exploration Targeting, will evaluate how usefully variations in PGE distribution reflect NiS mineralisation in mafic and ultramafic rocks. It will test the applicability of PGE lithogeochemistry to distinguishing barren from mineralised rock units. Three companies are sponsoring this three-year AMIRA project, with MERIWA contributing $75 000 to it.

M381 – *Ecohydrological Characterisation of the Natural and Rehabilitation Ecosystems at Newcrest's Telfer Gold Mine*

This proposal for five years' research into preventing acid mine drainage and ensuring waste-dump stability forms part of an ARC-Linkage application. The project is contingent on awarding of the ARC funding, and is also the first proposal for more than 3½ years' work that

Board of Directors' Report (Continued)

MERIWA has approved. If it proceeds, this project will combine for the first time in Australia cutting edge technology in soil hydrology, geophysics and plant ecophysiology, to address engineering design and rehabilitation strategy for the tailings structure at Telfer to mimic a planned flat-topped mesa landform. The work is expected to foster close collaboration between the mining and academic sectors, with MERIWA's project coordination role particularly sought, and it will also involve a number of post-graduate and postdoctoral researchers. Professor Hans Lambers, Dr Christoph Hinz and Dr Erik Veneklaas of UWA submitted the proposal in July 2005. $200,000 of MERIWA funding is committed for the 5 year project term, if it is successful in obtaining ARC funds.

Scholarships

In keeping with its policy to encourage PhD students to embark upon careers in the minerals and petroleum industry, MERIWA has again offered Supplementary Scholarships to help finance students and their projects. Each comprises a $5 000 per annum stipend and $5 000 per annum for project maintenance. The selection committee awarded two scholarships. Mr Eujay McCartain of the University of Western Australia and Mr Robert Galvin of Curtin University of Technology (both commencing February 2006). A scholarship was awarded to Ms Annika Gillgren in the 2004/05 financial year but did not commence until July 2005 (this was detailed in the 2004/05 annual report).

Eujay McCartain

Eujay is one year into his PhD at The University of Western Australia. He has set out to gain a greater understanding of the geology of the northern margin of the Bonaparte Basin where these rocks of Permian to Jurassic age outcrop in East Timor. Timor provides an opportunity to study the lateral variation of these rocks which are only otherwise seen in drill cuttings from petroleum exploration activity and Eujay will spend significant amounts of time in the field in East Timor.

MERIWA's supplementary scholarship will go some way to helping with the expense of the offshore field work that Eujay will be undertaking. Ultimately the study will contribute directly to the future hydrocarbon exploration potential of both Timor and Australia.

Robert Galvin

Robert is commencing the last year of his PhD at Curtin University. Naturally fractured rocks are becoming increasingly important for oil and gas exploration. The ability to estimate fluid reservoir properties from seismic data is a central issue in petroleum exploration but not one that has been formulated for fractured as opposed to porous rock. Robert has set out to create a theoretical model and methodology for remote detection and characterisation of fractured zones in fluid-saturated porous rock.

There are many oil and gas reservoirs in Western Australia where production is only possible from fractured zones and, thus, from the practical perspective the project will considerably benefit exploration and exploitation of oil and gas in those areas.

Finance

The financial statements for MERIWA for 2005/2006 appear later in the report.

The net assets reflect industry sponsorship yet to be received of $1.425m, contracted for the next 3 years.

The total cost of services was $2 518 468 ($1 984 590 in 2004-05) of which $2 227 322 was paid for research grants. Revenue of $1 815 040 was received from industry and $79 717 from interest and other income related to services. The net cost of services was thus $623 711 ($672 397 in 2004-05) which was funded by government appropriation and resources free-of-charge of $663 175 ($658 675 in 2004-05). The surplus was added to previous accumulated surplus.

Publications

Eleven final reports on minerals projects were published during the year and distributed in CD-ROM form to technical libraries in Western Australia and interstate. A synopsis of each of the reports is included in later pages of this document.

The number of reports published by MERIWA since its inception now totals 250, and it has been pleasing to see an ongoing demand for copies of them. Reports in hard copy, microfiche or CD-ROM are provided to companies or private individuals on request, at nominal prices, sufficient to recover the cost of reproduction. In 2005/2006 18 hard copy and 39 CD-ROM format reports were sold, producing revenue of $3 473.50.

Board of Directors' Report (Continued)

Office Services

Services provided by the Department of Industry and Resources, notably the provision of office space, along with its continued support in associated areas, are much appreciated by the Board.

Code of Conduct for Government Boards and Committees

The Board and the Minerals Research Advisory Committee adopted individual Codes of Conduct in accordance with the recommendations of the Commissioner of Public Sector Standards.

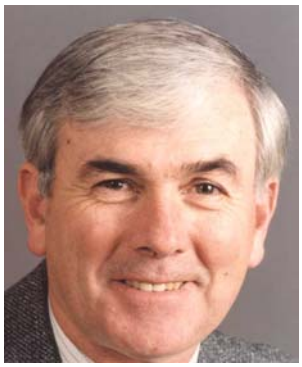
Staff and Committees

The Board again acknowledges the valuable assistance that has been provided to the Institute by the Minerals Research Advisory Committee under the able Chairmanship of Professor Odwyn Jones.

Both the members and deputy members met on a regular basis during the year, in sub-committee or in committee, to assess the research proposals received, and to advise the Board of their suitability and technical merit before grants were approved. This takes considerable time, and as the great majority is provided on an honorary basis, MERIWA is most appreciative of this contribution.

A special tribute is paid to Mr David Milton who resigned during the year after five years as Executive Officer. He has been replaced by Mr Rod Jones. Finally, the Board acknowledges the contribution and competence of the four part-time contractors and consultants in coordinating and administering the affairs of the Institute.

S R Baker
CHAIRMAN,
BOARD OF DIRECTORS



Operating Report

MERIWA's Minerals Research Program

MERIWA's mission is:

"To encourage the development of minerals and energy industries within the State by fostering and promoting all aspects of minerals and energy research".

Mineral deposits and oil and gas accumulations are finite, and new discoveries must continue to be made and developed to replace depleted deposits. If this is not achieved, and the industry does not sustain itself but slowly degenerates, the effects on the State's economy would be quite disastrous.

Much of the industry is international, and companies operating internationally will compare the prospectivity and exploration and mining costs in Western Australia with those applying in other countries, before deciding on where their exploration budget will be most profitably spent. Investment in mining project development is also based on the quality and cost of supporting services, such as infrastructure, but also in the downstream processing-orientated industries and the availability of highly skilled technical "problem solvers".

Western Australia has established itself as a reliable provider of not only physical resources to the world but also as centre for excellence in many areas of mineral and hydrocarbon research. The Board of MERIWA continues to foster and encourage this "intellectual" development process with the knowledge of past experiences that industry, research institutes, government and individuals profit from investments in "ideas".

There is also a continuing need to promote research on regulatory issues of concern to the community at large, such as minesite rehabilitation, tailings disposal and containment, as well as occupational health and safety issues in the industry. The advances made in these fields and the support from the mining industry in undertaking this research have been excellent over recent years.

To achieve its mission, MERIWA aims for an outcome by which the amount and quality of research undertaken by the Minerals and Petroleum Industries achieves the level of technological advancement required to meet the future technical challenges of these industries, and helps ensure their competitiveness and continued development.

Promotion of Research

The key incentive provided by governments to encourage more research is to subsidise its cost. MERIWA's policy has been to retain the magnitude of the subsidy to nominally 35% of the cash cost, encouraging a higher level of participation from industry. This allows a larger volume of research to be supported and ensures that the key objective of promoting research relevant to industry is achieved.

The level of subsidy must be such, however, to allow MERIWA to maintain the authority to rigorously assess research programs and to establish "Conditions of Grant" that facilitate coordination and accountability, and ensure that final reports can be published and widely distributed. The subsidy must be of a level to enable promotion of research on regulatory issues such as occupational health and safety and minesite rehabilitation.

Value of Minerals Research Financed Jointly with the Minerals and Petroleum Industries

The table below compares the value of research commenced for each of the last five years, jointly financed by MERIWA and industry sponsorship. The level of research funding has fluctuated over the period, a direct reflection of industry's economic performance. The variation in commodity prices, exchange rates and levels of activity continues to be erratic across all sectors. Continued consolidation in the corporate sector has also changed research investment patterns. It is expected that the levels of investment will remain within these limits for the foreseeable future capped mainly by the limited funds available from budget appropriation.

	$'000				
	2005-06	**2004-05**	**2003-04**	**2002-03**	**2001-02**
Value of minerals research commenced	2 547	1 623	1 201	1 053	2 079
Scholarships	60	30	45	30	40
Total	**2 607**	**1 653**	**1 246**	**1 083**	**2 119**

Operating Report (Continued)

	2005-06	2004-05	2003-04	2002-03	2001-02
Industry sponsorship achieved	71%	66%	80%	55%	74%
Target	65%	65%	65%	65%	65%

Industry Participation

Industry participation is encouraged by MERIWA through every phase of a project.

- Industry involvement from the initial draft proposal stage ensures that the project is focussed to its particular needs.
- Industry sponsorship encourages ongoing participation through regular sponsor meetings; this creates closer communications between industry and the research groups and is beneficial to both sides.
- Its investment in the research means that the research results are more likely to be applied.
- Its participation facilitates the provision and availability of data to the research group, and by working closely with researchers, creates a more research and technically oriented industry, and a more practical research group attuned to the technical challenges faced by industry.

The table above shows the average level of industry sponsorship achieved as a percentage of the research value.

Technology Transfer

Research benefits will best eventuate if the results are made widely available and are applied. The importance of this aspect of MERIWA's operations is recognised in the functions of the Institute as listed in the Minerals and Energy Research Act (1987). Because of their financial commitment and participation throughout the study, sponsoring companies require a return on their research investment by application of the results. In a broader, industry-wide sense, however, technology transfer is encouraged by publication of the final reports and their distribution to most universities, CSIRO and state technical libraries, or by the provision of copies directly by MERIWA.

The benefits of publication are two-fold:

- Publication of reports gives all companies relatively cheap access to the technology.
- Publication benefits the researchers and their institutions, by enabling their work to be acknowledged internationally and increasing their profile professionally. This attracts students and external funding, which in turn is beneficial to both industry and the State.

MERIWA has published 250 reports on the research projects it has supported since its inception. CD-ROM copies are distributed widely to all relevant technical libraries in Western Australia and to most Australian universities. Reports in microfiche, CD-ROM or hard copy format are sold to industry at prices which cover production and distribution costs. The table below shows that 2,453 research project reports have been distributed to industry and technical libraries over the past 5 years.

Synopses of all reports published during 2005/06 are included in this annual report, and complete lists of reports available are included with the twice-yearly publication "Research News" and on the MERIWA webpage at:
www.doir.wa.gov.au/meriwa/reports/reports.html.

Measures of Performance

The predominant measure of performance is the value of research undertaken, but as MERIWA is often limited by the funds available, its effectiveness is measured by the ratio of the total value of research commenced to the Government funds utilised.

MERIWA measures its efficiency by the administration cost as a percentage of the value of research generated. This is calculated on a three-year moving average basis to reflect the average duration of projects, covering the project development assessment and funding phase, coordination while in progress, and the final reporting and publication phase of the project.

No. of reports distributed or sold	2005-2006	2004-2005	2003-2004	2002-2003	2001-2002
Microfiche	-	1	1	3	8
Hard copy	150	78	95	73	66
CD-ROM	478	364	314	295	527
Total	**628**	**443**	**410**	**371**	**601**

Operating Report (Continued)

Effectiveness

The table below indicates that for every dollar of government funds expended on research in 2005/2006 (excluding scholarships), $3.32 of research was commenced.

	2005-2006	2004-2005	2003-2004	2002-2003	2001-2002
Ratio of research value to government funds utilised	3.32	2.26	3.41	2.21	2.60

Efficiency

MERIWA's overall efficiency increased in 2005/06 with slightly higher value of research commenced offset by higher administration costs. (Three year moving average).

	2005-2006	2004-2005	2003-2004	2002-2003	2001-2002
Administration cost as a percentage of value of research generated	10.41	8.14	8.4	10.97	8.83

Table 4 summarises the key components of MERIWA's performance over the past five years.

Operating Report

TABLE 4: MERIWA Results

Factors	2005/06	2004/05	2003/04	2002/03	2001/02
PROJECTS					
Applications received	12	14	12	11	16
Projects approved	7	9	7	8	9
Projects completed	11	8	7	7	4
TECHNOLOGY TRANSFER					
No. reports published	11	8	7	7	13
No. microfiche issued or sold	0	1	1	3	8
No. hard copies issued or sold	150	78	95	73	66
No. CD ROM copies issued or sold	478	364	314	295	527
Other publications (Research News)	2	2	2	3	2
FUNDS UTILISED ($'000)					
Budget appropriation	649	645	631	617	612
Interest on cash flow	76	83	95	87	81
Other income	3	3	2	3	3
Transferred from (to) reserves	39	(14)	(246)	(231)	*(2 130)
Total Government funds utilised	**767**	**717**	**482**	**476**	**(1 434)**
Less administration costs	**190	**188	**138	**150	**137
Funds utilised to support research	**577**	**529**	**344**	**326**	**(1 571)**
MERIWA GRANTS					
For research projects	747	551	335	472	531
For scholarship	60	30	45	30	40
Total grants	**807**	**581**	**380**	**502**	**571**
INDUSTRY SPONSORSHIP					
Total industry sponsorship coordinated through MERIWA	1 800	1 072	1 309	581	1 548
Total value of new research projects	**2 547**	**1 623**	**1 201**	**1 053**	**2 079**
Value of research generated to government funds utilised	**3.32**	**2.26**	**3.41**	**2.21**	**2.60**
Administration cost to value of research generated**	**10.41%**	**8.14%**	**8.4%**	**10.97%**	**8.83%**

* A one-off accounting change due to adoption of new accounting standards relating to the carrying values of committed research.

** Three-year moving average.

Minerals Research Advisory Committee

Nominated by the Minister	Professor I O Jones (Chairman)	Consulting Mining Engineer
	Mr J G D Crone	Consulting Mining Engineer
	Dr A Buckingham (Deputy Member)	Senior Geophysicist, Geoinformatics Exploration
	Dr A N Bagshaw	Australian Mineral Industries Research Association
	Mr P C Lockyer (Deputy Member)	Consulting Mining Engineer
	Ms D Lord	Senior Consultant - Geologist, SRK Consulting
	Mr P W Baillie (Deputy Member)	Chief Geologist Asia Pacific, TGS NOPEC Geophysical Company
	Professor W Stock	Centre for Ecosystem Management, Edith Cowan University
	Dr E van Etten (Deputy Member)	Faculty of Computing, Health & Science, Edith Cowan University
	Mrs A Meakins	Principal Consultant (AMEC)
	Dr B Smith (Deputy Member)	Consulting Geologist - Geochemist (AMEC)
Nominated by: Department of Industry and Resources	Ms B S Bower	General Manager – Major Projects Development
	Mr R J Hart (Deputy Member)	Project Manager – Industry and Infrastructure Development
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Dr C R M Butt	Group Leader, Exploration and Mining
	Dr B McInnes (Deputy Member)	Program Leader, Exploration Geoscience
The University of Western Australia	A/Professor J J Barrett	School of Civil and Resource Engineering
	Professor R J Gilkes (Deputy Member)	Centre for Land Rehabilitation
Murdoch University	Professor M J Nicol	Mineral Science
	Mr W Staunton (Deputy Member)	Principal Gold Metallurgist
Curtin University of Technology	Professor B Evans	Department of Exploration Geophysics
	* Professor R T Pidgeon (Deputy Member)	School of Applied Geology
Chamber of Commerce and Industry of WA	Dr G I D Roach	Technical Manager, Extraction Technology, Alcoa World Alumina
	* Ms M Askey (Deputy Member)	Environmental Policy Adviser
Chamber of Minerals and Energy of WA (Inc.)	* Mr B Parker	Operations General Manager, AngloGold Ashanti Limited
	* Ms C Thomas (Deputy Member)	Executive Officer, Minerals Institute
Australian Petroleum Production and Exploration Association	**Mr N Kavanagh	Development Planner and Technology Leader, Woodside Energy Ltd.
	Dr J D Gorter (Deputy Member)	New Ventures Manager Eni Australia Limited

* Member resigned during year.

**Member appointed during year.

Minerals Research Advisory Committee

I am pleased to report the continuing effectiveness of the Minerals Research Advisory Committee (MRAC) in assessing the scientific and technical merit of the research projects seeking MERIWA sponsorship. In doing so I must acknowledge the dedication and commitment of its members who devote considerable time and effort in carrying out this work with much of it being done on a voluntary unpaid basis.

During the past twelve months seven research projects were approved by MRAC for funding. Each one of these projects was carefully scrutinised by the relevant sub-committee and, if necessary, the research proposal was modified and/or amended in accordance with the sub-committee's wishes before it was discussed in detail at a full MRAC meeting.

The total cash value of the projects approved for funding during 2005/06 was $2,546,559 which included $746,519 of State Government funds channelled through MERIWA. This highlights the effectiveness of MERIWA in leveraging industry sponsorship.

The membership of MRAC is ever changing as individuals retire or move on and others are appointed to take their place. During the past year Mr Keith Spence representing APPEA retired and was replaced by Mr Neil Kavanagh; Professor Bob Pidgeon of Curtin University retired and will be replaced by Dr Graham Bates. Others who have retired more recently and have yet to be replaced include Mr Barrie Parker and Ms Claire Thomas of the Chamber of Minerals and Energy of WA and Ms Mary Askey of the Chamber of Commerce and Industry.

Needless to say MERIWA and MRAC rely heavily on the work of its part-time secretariat and their dedication and the quality of their work should be acknowledged. In this regard special recognition should be accorded to Mr David Milton who retired in the early part of the year, having been MERIWA's Executive Officer for some 5 years. A warm welcome is extended to his recent replacement Mr Rod Jones. The other members of the team are Dr Pam Smith, Project Coordinator and Ms Gwen Davies who as MERIWA's secretary is in many ways the administrative hub of the Institute.

In keeping with past practice two supplementary scholarships were awarded by MERIWA to PhD candidates pursuing minerals-related projects. This year's recipients are Mr Eujay McCartain from the School of Earth and Geographical Sciences, the University of Western Australia and Mr Robert Galvin from the Department of Geophysics, Curtin University of Technology. Needless to say, we wish them well with their research programs and their future careers in the minerals industry.

All in all this past year has been another fruitful and rewarding period in MERIWA's distinguished 25 year history. As an organisation it has always served the WA community and its minerals and energy industries in a most effective and efficient manner. Due, however, to the dramatic expansion in the State's mineral industry over the past few years, it is increasingly in need of more government and industry funds to meet the growing demands for applied research projects of relevance to the continued well-being and competitiveness of the State's mineral resources sector.

Emeritus Professor Odwyn Jones, AO
Chairman.

Reports Published in 2005/06

M328 MINE SEISMICITY AND ROCKBURST RISK MANAGEMENT

Report No. 237

Grantee: *Australian Centre for Geomechanics / The University of Western Australia*
Applicants: *Prof Y Potvin/Prof R Jewell*
Grant Amount: *$747 000*
Duration: *3½ years*
Commenced: *July, 1999*
Sponsors: *Homestake Gold of Australia, Kalgoorlie Consolidated Gold Mines, New Hampton Goldfields, Sons of Gwalia, WMC Resources.*

This ground-breaking study addressed rockburst and mine seismicity issues in Western Australian mines by better defining the nature and extent of the problem, then introducing ideas and technology in use overseas and also developing analytical methods to better quantify the associated hazards. Initial assessment at mines operated by the sponsors found that there was no quantitative means to evaluate seismic risk, that limited seismic data analysis was undertaken at mine sites and adequate tools for this were lacking, and that there was variable understanding of mine seismicity by staff on-site. Project outcomes included both training and applied research results to address these gaps. The creation of the MS-RAP (Mine Seismicity Risk Analysis Program) software provides a better means of back analysis of seismic data. The applied research results include: (1) a methodology to quantify the mine seismicity risk; (2) development of a numerical parameter that relates fault-slip seismicity to the deformation and stress state on mine faults; and (3) a survey of seismicity in underground, mechanised hardrock mines from 73 mines in 11 countries.

M331 SHALLOW WATER TOW-OUT ISSUES IN WA-BASED CONSTRUCTION OF CONCRETE GRAVITY STRUCTURES FOR OFFSHORE OIL AND GAS PRODUCTION

Report No. 251

Grantee: *The University of Western Australia*
Applicant: *A/Prof K Thiagarajan/Prof B Ronalds*
Grant Amount: *$97 567*
Duration: *2 years*
Commenced: *February, 2000*
Sponsors: *Concrete Offshore Structures Industry, Ove Arup, Woodside Energy Ltd.*

Once constructed in a casting basin, long-skirted Concrete Gravity Structures (CGS) must be towed to the open sea along a shallow unsheltered channel. The CGS seabed clearance may be increased by use of air cushions, but these in turn increase the dynamic response of CGS to waves during tow-out. This study undertook experimental, numerical and theoretical approaches to understanding the interaction of a CGS and its air cushion. A new theoretical formulation resulted for predicting heave and pitch response of these structures, and its predictions were found to agree with experiments over a range of values for under-keel clearance and water-plug height. Three different generic models were used in the experiments in a wave flume. One of these, the multi-compartment design, was found to increase CGS stability significantly. Results specific to tow-out from the Port of Bunbury are also given in the final report.

M332 MANAGEMENT OF *RUMEX VESICARIUS L.* ON REHABILITATED MINE SITES IN THE GOLDFIELDS OF WESTERN AUSTRALIA

Report No. 242

Grantee: *Curtin University of Technology*
Applicant: *A/Prof J Osborne/Dr A Schatral*
Grant Amount: *$79 000*
Duration: *2 years*
Commenced: *February, 2000*
Sponsors: *Conservation & Land Management, Delta Gold NL, Homestake Gold of Australia, Normandy Mining Ltd, Placer (Granny Smith), WMC Resources Ltd.*

Some newly rehabilitated mine sites in Western Australia and the Northern Territory were overgrown by the weed Ruby Dock (*Rumex vesicarius L)*, prompting this study into the weed's ecology. The study's objective was to develop a management system capable of drastically reducing *R.vesicarius* on mine sites already affected, and preventing its spread to adjacent areas as yet unaffected. Such long-term control required knowledge of both the total seed bank size and its properties and also the ecological variables for this sub-species. Ruby Dock seeds germinate earlier and the seedlings grow faster than for desirable native plant species. Therefore, a conclusion of the research is that establishment of a vigorous community of native plant species in rehabilitated mine sites is the most likely way to achieve a self-sustainable eco-system. In newly rehabilitated saline tailings dams, Ruby Dock is likely to be out-competed by the more salt tolerant chenopods.

Reports Published in 2005/06

M349 DYNAMIC TESTING OF GROUND SUPPORT SYSTEMS

Report No. 249

Grantee: *WA School of Mines*
Applicant: *Prof E Villaescusa/Dr A Thompson*
Grant Amount: *$238 689*
Duration: *2 years*
Commenced: *July, 2002*
Sponsors: *Geobrugg Schutzsysteme, Grinaker-LTA Mining Products, Kanowna Belle Gold Mines Limited, MBT (Australia) Pty Ltd, Newmont Australia, Rock Engineering (Australia) Pty Ltd, St Ives Gold Mining Company, Strata Control Systems, WA School of Mines.*

Mine operators in Western Australia recognise that ground conditions are becoming increasingly difficult as mines become deeper. Mining-induced seismicity and the related rockbursts caused by high *in situ* and mining-induced stresses are one of the main technical problems, particularly in the Yilgarn Craton. To design effective ground support schemes, it is necessary to know the dynamic response characteristics required of reinforcement and support systems. Moreover, no facility to perform dynamic tests to obtain such response characteristics yet existed in Australia, and those used overseas were thought not to simulate the loading expected from rockbursts. A new loading concept formulated by the principal researcher was designed and constructed in prototype, and tested to demonstrate the validity of this new concept prior to the proposed research.

This project then set out to design, build and commission an Australian test facility and instrumentation, and to test rock reinforcement systems comprising various elements, fixtures and face restraints. Simulated rockburst event testing by dynamic/impact loading of reinforcing systems was begun, and over 80 tests on more than 20 specimens have been performed and monitored during the commissioning. An additional task that evolved to be essential to the project was the development of software for analysis of different specimen configurations, and also for the efficient analysis of the large quantity of test data. An addendum to the final report contains a database of the responses of different reinforcement systems.

M350 SELECTIVE HERBIVORY BY KANGAROOS IN MINED LAND

Report No. 254

Grantee: *Curtin University of Technology*
Applicant: *Prof B Lamont*
Grant Amount: *$126,011*
Duration: *3½ years*
Commenced: *June, 2001*
Sponsors: *Alcoa World Alumina Australia, Whiteman Park, Worsley Alumina Pty Ltd.*

This proposal was based on recognition that kangaroos play a pivotal role in controlling the way vegetation recovers after a mining disturbance or fire. The highly selective herbivory of kangaroos can have an adverse effect on ability of revegetated plant communities to thrive, unless the kangaroos' browsing preferences are well known and are not catered for by land management practises. The project combined plant assessments and animal behaviour experiments to investigate the causes and impacts of selective browsing by western grey kangaroos (WGK), based at two recently rehabilitated bauxite mines in the south-west of Western Australia. Very close cooperation of sponsoring company personnel with the researchers was an important contributor to the project's success. In the course of the project the investigators showed that of the three prominent environmental stresses on plants, herbivory was more important than competition or drought, and that the rarity of a plant might make it more favourable for selection, rather than less.

The research results include evidence that WGK are in fact particularly selective in their forage and thus nearer the browser end than the grazer end of the forage continuum. They avoid salts and tannins, though protein content is unimportant to their selection of forage. Palatability was shown to at least correlate with the impact of herbivory, and it was found that widely separated WGK populations behaved similarly. Recommendations include defending plants that have grass-like architecture during establishment, at least in the first year, and planning "biotic refuges" for recalcitrant and vulnerable species. Land managers are encouraged to consider undertaking a thorough study to understand the response of each plant species to herbivory in both space and time. At the same time, deterrents to local herbivores should be sought.

Reports Published in 2005/06 (Continued)

M356/ AMIRA STRUCTURAL AND STRATIGRAPHIC ARCHITECTURE OF THE AGNEW-WILUNA BELT

Report No. 255

Grantee: *The University of Western Australia*
Applicants: *A/Prof. M Barley/Dr B. Stone*
Grant Amount: *$53,153*
Duration: *2 years*
Commenced: *September, 2001*
Sponsors: -

The northern third of the Norseman-Wiluna Greenstone belt is designated the "Agnew Wiluna Belt" (AWB). Two of the world's largest komatiite-hosted Ni-Cu-PGE sulphide deposits as well as a recent high-grade discovery were known in the AWB at the time this AMIRA project was proposed. The AWB rocks are, however, complexly deformed and poorly exposed, which has complicated attempts to understand the stratigraphic relationships and mineralisation processes in this important belt. This multi-disciplinary approach to defining the stratigraphy and structure of the AWB was planned with goals that included the resolution of age relations among multiple komatiite units. The prospectivity of individual ultramafic horizons is related to their position in this sequence of komatiites that may repeat structurally and/or stratigraphically. To attempt to resolve the age relations in this sequence, systematic SHRIMP and TIMS U-Pb geochronology was proposed as a useful approach and MERIWA funding was sought to carry it out. The hoped-for outcome was definitive recognition of either a single mineralised komatiite stratigraphic unit, or multiple such units, distinguishable within any structural repetition of komatiites that may exist in the AWB.

The SHRIMP dates were obtained for Late Archaean felsic volcanics and volcaniclastics interlayered with the komatiite sequences. Dates obtained show the felsic volcaniclastic rocks in the Kalgoorlie Terrane span 40 My, and indicate at least three main episodes of felsic volcanism. Certain units in the AWB were shown to represent time-equivalent horizons to the Kambalda ultramafic sequence. A complex magmatic and subsidence history for the AWB is reflected in the apparent episodic felsic volcanism revealed by the SHRIMP dating. Lateral persistence of proximal felsic volcanic facies along the belt may represent facies geometry from an inverted paleo-rift, consistent with the intrusive and extrusive komatiites along the axis of the belt being proximal to vent as suggested by their features.

M360 AUSTRALIAN ROCKFALL RESEARCH PHASE II

Report No 247

Grantee: *Australian Centre for Geomechanics/ The University of Western Australia*
Applicant: *Prof. Y Potvin*
Grant Amount: *$185 000*
Duration: *18 months*
Commenced: *May, 2003*
Sponsors: *AngloGold Australia Limited, BHP Billiton Cannington, Mount Isa Mines Holdings, Newmont Australia Limited, Placer Dome Asia Pacific, Rio Tinto Technical Services, WMC Resources Ltd.*

The initial phase of the research by the Australian Centre for Geomechanics into rockfalls in Australian metalliferous mines assembled a comprehensive database that clearly established there are two types of rockfall risks. These are the risks in the intense work areas near active faces, and the risks present in the rest of the mine. The second phase has now focussed on gathering and analysing critical rockfall information for both types of risk, in order to develop practical solutions for the industry to reduce the incidence of the related injuries and fatalities. This focus included detailed investigation of the mining processes, activities and personnel near the active face to determine circumstances leading to injuries and at what stage injuries occurred. The research highlighted the state of record-keeping on rockfalls at mines and found it has improved somewhat since 1997/98. Rockfall risk statistics indicate that after a significant reduction in rockfall related injuries around that time, there has not been further improvement since 1999.

Rockfalls causing injuries were found to generally originate from the unsupported rock surfaces near active-faces, so that the tasks most at risk are the ones exposing workers to the active surfaces. The project concluded that implementing flexible risk management and control measures at individual mines, targeting to address local rockfall hazards and personnel exposure, has greater merit than a "one-size-fits-all" solution. A methodology that combines development mining process mapping and rockfall hazard matrices was proposed to assess rockfall risks and to focus management on ensuring the level of hazard associated with a given task is thoroughly understood.

Reports Published in 2005/06 (Continued)

M361 THE DEVELOPMENT OF A NEW MOLECULAR METHOD FOR THE DETECTION OF *PHYTOPHTHORA CINNAMOMI*

Report No 245

Grantee: *Murdoch University*
Applicant: *Dr P O'Brien/Ms N Anderson*
Grant Amount: *$12 000*
Duration: *3 months*
Commenced: *August, 2003*

P.cinnamomi has been nationally recognised in the Commonwealth Environment Protection and Biodiversity Act (1999) as a 'key threatening process to Australia's biodiversity'. This soilborne plant pathogen is responsible for the destruction of thousands of hectares of native forest in Australia, and management of it is heavily reliant on detection of the pathogen directly from soil and plant samples. Molecular based detection methods overcome many of the problems associated with conventional, culture-based methods. This project demonstrated the benefits of the PamGene microarray system developed in Holland for detecting *Phytophthora* species. The consistency of analysis with variable amounts of target DNA and background non-target DNA when compared to conventional microarray systems suggests the PamGene system may offer greater potential for multiple analysis than conventional 2D microarray systems. Such a rapid and reliable detection assay can facilitate the management of *P.cinnamomi* in both native and agricultural plant communities.

M362 INNOVATIVE TECHNIQUES FOR PROMOTING FAUNA RETURN TO NATIVE ECOSYSTEMS ESTABLISHED FOLLOWING MINE REHABILITATION

Report No. 248

Grantee: *Curtin University of Technology/ACMER*
Applicants: *Prof.J. Majer/Prof. C Bell*
Grant Amount: *$19,229*
Commenced: *May, 2004*
Duration: *6 months*
Collaborative with ACMER

The continuity of access to mineral deposits by the Australian mining industry is critically dependent on demonstrations that mined lands can be rehabilitated to a standard that meets industry, governmental and community expectations. While the re-establishing of vegetation and the function of ecosystems have received attention, there has been little appreciation that getting all fauna to re-colonise requires more than simply putting back the plants. This project undertook to assess which techniques are currently in use in the Australian mining industry to recolonise effectively, and then to consider the potential benefits of each and to make recommendations about which techniques to pursue. Information was collected from 30 respondent mine-sites and it showed that while a wide variety of techniques is in use, many companies do not have specific goals set out for faunal re-habilitation. Control of feral predators is among the numerous recommendations for enhancing recolonisation that are offered in the final report.

M367 INDUSTRIAL APPLICATIONS USING IMPROVED MEASUREMENTS OF PARTICLE SURFACE CHARGE

Report No 253

Grantee: *Central Chemical Consulting Pty Ltd*
Applicant: *Dr V Patrick*
Grant Amount: *$203 000*
Duration: *1 year*
Commenced: *March, 2004*
Sponsors: *Alcoa World Alumina Australia, Central Chemical Consulting Pty Ltd, Tiwest Joint Venture, Worsley Alumina Pty Ltd.*

This project was developed principally to bring to Western Australia state-of-the-art instrumentation for measuring the zeta potential in concentrated electrolyte solutions. Developed by Dispersion Technology, the DT1200 Acoustic Spectrometer® was used to conduct various demonstration trials and sub-projects for the industry sponsors. These individualised projects investigated the effect of various experimental conditions on settling dewatering, drying and slurry rheology of each sponsor's samples. Zeta potentials in high ionic strength solutions were measured with the DT1200 instrument. Sub-projects included an examination of the effects of specific additives on the zeta potentials of gibbsite and sodium oxalate surfaces, and of zeta potential changes in red mud during flocculation. Another sub-project correlated titanium dioxide zeta potentials with processing stages during pigment production. The DT1200 was found to be ideally suited for the measurement of the zeta potential of particles less than 1µm in diameter with electrolyte levels of less than 1M. Difference in zeta potentials were observed for additives such as oleic acid and sodium gluconate.

Reports Published in 2005/06 (Continued)

M370 REGOLITH, GEOLOGY AND ALTERATION MINERAL MAPS FROM NEW GENERATION AIRBORNE AND SATELLITE REMOTE SENSING TECHNOLOGIES

Report No 252

Grantee: *C.S.I.R.O.*
Applicant: *Dr T Cudahy*
Grant Amount: *$250 000*
Duration: *1 year*
Commenced: *June, 2004*
Sponsors: *CRC Leme/C.S.I.R.O, Geological Survey of Western Australia.*

This project was developed to produce the first of a new generation in publicly available, standard maps of regolith, geology and alteration mineralogy. The map legends will show mineral abundances and mineral physico-chemistry, at a typical scale of 1:100,000, tiled across Western Australia and within the next decade, across all of Australia. This initiative was launched with the demonstration in M370 that HyMap and ASTER data can be used to deliver useful mineral maps for regolith and alteration characterisation for the 1:100,000 scale map sheet centered over the town site of Kalgoorlie. Extensive ground validation of the derived mineral maps was a critical aspect of this project since such validation is essential if the mineral exploration community is to gain confidence in these new products. Kalgoorlie was chosen for the potential to demonstrate the real value of this surface-sensing technology in regolith-dominated environments, which are typical of much of Australia. The project produced 23 mineral maps in GIS compatible format that now are available through the Geological Survey of Western Australia. The mineral abundance maps include regolith-related minerals such as kaolin, iron oxide, and gypsum and also “fresh-rock” minerals. Maps showing the chemistries of chlorite and muscovite were also generated. The image mineral abundances and chemistries were validated through comparisons with analyses of over 200 field samples. The value of these hyperspectral mineral information products is maximised when used in the context of regolith and alteration mineral models.

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Research Assistance

The function of the Institute is to encourage the development of the minerals and petroleum industries in Western Australia by fostering and promoting research in the exploration, development and production of minerals, hydrocarbons and fossil fuels.

Applications for financial assistance for funding of projects may be submitted to the Executive Officer at any time but will only be considered by committees twice a year. The approval process generally takes 3 to 4 months and submission deadlines will therefore be 1 March and 1 August. These are scrutinised first by the Minerals Research Advisory Committee before its recommendations are considered by the Board.

Organisations with research proposals that have the potential to benefit the minerals or petroleum industries in this State may seek further information by contacting:

The Executive Officer, MERIWA
3rd Floor, Mineral House
100 Plain Street
EAST PERTH WA 6004

Telephone: (08) 9222 3397
Facsimile: (08) 9222 3727
Email address: gwen.davies@doir.wa.gov.au
Website: www.doir.wa.gov.au/meriwa

Projects in Progress: 30 June 2006

No.	Project Title	Applicants	Institute	Term (years)	Cash Cost ($)	Notional Value ($)
M289	Radiographic silicosis and lung cancer in Kalgoorlie miners	Dr N de Klerk Prof A Musk	UWA/ Sir Charles Gairdner Hospital	2	74 363	158 937
M333	Corrosion of rock reinforcement in underground excavations	Prof E Villaescusa	WASM	3	350 000	620 511
M349A	Dynamic testing of ground control systems	Prof E Villaescusa Dr A Thompson	WASM	3	474 000	627 900
M351	The effect of seismic anisotropy on amplitude-based reservoir characterisation	Prof B Gurevich Prof B Evans	Curtin	3	122 917	179 017
M354	The occupational health risk of Melioidosis in the mining industry	Dr T Inglis Dr K Howard	PathCentre	2	31 000	31 000
M355	Mine seismicity and rockburst risk management – Phase II	Prof Y Potvin Mr M Hudyma	ACG	3	777 000	777 000
M358	Scale-integrated, architectural and geodynamic controls on alteration and geochemistry of gold systems in the Eastern Goldfields Province, Yilgarn Craton	Dr J Walshe Dr S Hagemann	CSIRO	2	937 720	1 504 720
M359	Improved anode and cathode processes in the electrowinning of base metals	Prof M Nicol	Murdoch	3	806 000	966 000
M363	Feasibility of seismic methods for exploration of gold deposits in Western Australia	Dr M Urosevic Prof B Evans	Curtin	2	869 000	869 000
M364	Successful rehabilitation of species-rich heathlands after mining for heavy minerals	Prof B Lamont Prof N Enright	Curtin	3	66 000	85 000
M366	High resolution seismic monitoring in open pit mines	Prof Y Potvin	UWA/ACG	3	553 666	553 666
M369	Integration of ichnology and diagenesis in field-scale correlation and reservoir modeling	Dr F Burns Prof L Collins	Curtin	3	223 899	223 899
M371	Laterite geochemical map of the Western Yilgarn Craton	Dr M Cornelius Dr P Morris	CRC LEME/ CSIRO	3	100 047	628 047
M372	A physiological and biochemical basis for seed storage for biodiversity conservation and restoration	A/Prof D Turner Dr K Dixon	UWA	3	15 000	628 063
M373	Development and implementation of advanced automated core logging technology for enhanced mine feasibility and development in Western Australia	Dr J Huntington Dr L Whitbourn	CSIRO	2	360 417	677 417

Projects in Progress: 30 June 2006 (Continued)

No.	Project Title	Applicants	Institute	Term (yrs)	Cash Cost ($)	Notional Value ($)
M375	Erosion resistant landform design for steep slopes in rehabilitated bauxite mines	Prof B Gilkes Dr C Grant	UWA	15 mths	144 919	232 919
M376	Stratigraphic and structural architecture of late basin depositional systems in the Eastern Goldfields Province, Yilgarn Craton	Prof R Cas	Monash University	1	120 000	215 000
M377	Scale-integrated, architecturally, geodynamically and geochemically constrained targeting models for gold deposits in the Eastern Goldfields Province, Yilgarn Craton	Dr J Walshe Dr P Neumayr	CSIRO/ UWA	2	1 153 040	1 783 040
M378	Use of metham sodium to eliminate *Phytophthora* from roading gravel	Dr E Davison Dr B Warton	Curtin	1	44 390	44 390
M379	Classification of Western Australian inland waters	A/Prof J John	Curtin	2	50 071	50 071
M383	The use of deterrents for reducing herbivory by kangaroos on disturbed lands	Dr M Parsons Prof B Lamont	Curtin	1	84 339	167 594
M384	Gold processing technology	Mr W Staunton	Murdoch	2½	140 800	2 053 200
M385	The development of a hyperspectral environmental measurement tool for monitoring mining related infrastructure and rehabilitation	Ms C Ong Mr M Piggott	CSIRO	18 mths	455 000	1 161 000
M386	Broadening the application of seismic monitoring in Australian underground mines	Prof Y Potvin Dr D Heal	ACG	3	1 068 000	1 293 000

Reports not yet Published as at 30 June 2006

Report No.	Project No.	Project Title	Author	Status
212	M256	Influence of oxalate seed poisons on the crystallization and surface properties of sodium oxalate in the Bayer process	A McKinnon	In process of publication
244	M288	Development of an electrochemical corrosion probe for use in gas and oil flowlines	B Kinsella et al	To be published on CD-ROM

Financial Assistance from Industry

The following list is of companies and organisations which provided financial sponsorship in 2005/06 for projects in progress. The Board of Directors thank these groups for their sponsorship and support.

MINERALS RESEARCH

Alcoa World Alumina Australia
Allstate Explorations NL
AngloGold Ashanti Australia Limited
Atlas Copco Australia Pty Ltd
Barrick Gold of Australia Limited
BHP Billiton
B & J Catalano Pty Ltd
Chemistry Centre (WA)
Codelco – Division of El Teniente
Department of Environment
Dywidag-Systems International Pty Limited
Geobrugg Protection Systems
Geological Survey of Western Australia
Gold Fields Ltd – St Ives Gold Mine
Harmony Gold Operations Limited
Iluka Resources Limited
Independence Group NL
Jubilee Mines NL
Kalgoorlie Consolidated Gold Mines Pty Ltd
Kirkland Lake Gold Inc.
LionOre Australia Pty Ltd
Main Roads Western Australia
Newmont Australia Limited
Nufarm Australia Limited
Perilya Broken Hill Limited
Reliance Nickel Pty Ltd
St Barbara Mines Limited
Strata Control Systems
Vision Reservoir Management Technologies International
WA School of Mines – Curtin University
Whiteman Park
Wiluna Operations Limited
Woodside Energy Ltd
Worsley Alumina Pty Ltd

Audited Statements

Performance Indicators
for the year ended 30 June 2006

Minerals Research Program

Outcome

"Promote all aspects of minerals research"

The key incentive provided by governments to encourage more research is to subsidise its cost. Government research funding schemes generally provide this subsidy on a dollar-for-dollar basis, in which case the amount of research undertaken is theoretically doubled. MERIWA's policy has been to reduce the magnitude of the subsidy to nominally 35% of the cash cost, encouraging a higher level of participation from industry.

The subsidy level must be such, however, to give MERIWA the authority to rigorously assess research programs and to establish "Conditions of Grant" that facilitate coordination and accountability, and ensure that final reports can be published and widely distributed. The subsidy must be of a level to enable promotion of research on regulatory issues such as occupational health and safety, and minesite rehabilitation.

In addition, research at PhD level is encouraged by the awarding of two supplementary research scholarships annually.

Effectiveness Indicator

Research was promoted by subsidy to the extent of the funds available. To maximise the effectiveness of this investment, sponsorship was maximised and the involvement of industry in each phase of the research was promoted to focus the scope of the study on the needs of industry and maximise technology transfer. By publishing reports, the research results were disseminated as widely as possible.

The average level of industry sponsorship as a percentage of research value in 2005/2006 was 71% against a target of 65%. The effectiveness of postgraduate doctoral research scholarships in promoting research will be gauged by the success of students in ultimately achieving their PhDs and in presentations of technical papers and posters at Australian and international symposia. Two scholarships were awarded in 2005/06 and one which was approved in 2004/05 but commenced July 2006.

Output

"Finance and coordinate minerals research"

Efficiency Indicator:

The indicator is a function of the number of projects and administration costs. Costs of administration are rising due to normal indexed increases to wages and supplies. The current trend is for fewer projects that cost more to be funded whilst the matching funds from consolidated revenue available to the Board are declining in real terms.

Effectiveness Indicator – Outcome	2005/2006	2004/2005	2003/2004	2002/2003	2001/2002
% Industry sponsorship achieved.	71%	66%	80%	55%	74%
Target.	65%	65%	65%	65%	65%
Research value	2 546 559	1 623 029	1 200 742	1 052 940	2 079 092

Efficiency Indicator – Output	2005/2006	2004/2005	2003/2004	2002/2003	2001/2002
$ cost per minerals research grant administered	7 922	6 497	4 745	5 172	5 276

Certification of Performance Indicators
for the year ended 30 June 2006

We hereby certify that the performance indicators are based on proper records, are relevant and appropriate for assisting users to assess the Minerals and Energy Research Institute of Western Australia's performance, and fairly represent the performance of the Minerals and Energy Research Institute of Western Australia for the financial year ended 30 June 2006.

A Webster
DIRECTOR AND
CHIEF FINANCE OFFICER

S R Baker
CHAIRMAN,
BOARD OF DIRECTORS

25 September 2006

Opinion of the Auditor General on Performance Indicators for the year ended 30 June, 2006

AUDITOR **GENERAL**

INDEPENDENT AUDIT OPINION

To the Parliament of Western Australia

MINERALS AND ENERGY RESEARCH INSTITUTE OF WESTERN AUSTRALIA
FINANCIAL STATEMENTS AND PERFORMANCE INDICATORS
FOR THE YEAR ENDED 30 JUNE 2006

Audit Opinion
In my opinion,

(i) the financial statements are based on proper accounts and present fairly the financial position of the Minerals and Energy Research Institute of Western Australia at 30 June 2006 and its financial performance and cash flows for the year ended on that date. They are in accordance with applicable Accounting Standards and other mandatory professional reporting requirements in Australia and the Treasurer's Instructions;

(ii) the controls exercised by the Institute provide reasonable assurance that the receipt, expenditure and investment of moneys, the acquisition and disposal of property, and the incurring of liabilities have been in accordance with legislative provisions; and

(iii) the key effectiveness and efficiency performance indicators of the Institute are relevant and appropriate to help users assess the Institute's performance and fairly represent the indicated performance for the year ended 30 June 2006.

Scope
The Board is responsible for keeping proper accounts and maintaining adequate systems of internal control, for preparing the financial statements and performance indicators, and complying with the Financial Administration and Audit Act 1985 (the Act) and other relevant written law.

The financial statements consist of the Income Statement, Balance Sheet, Statement of Changes in Equity, Cash Flow Statement, and the Notes to the Financial Statements.

The performance indicators consist of key indicators of effectiveness and efficiency.

Summary of my Role
As required by the Act, I have independently audited the accounts, financial statements and performance indicators to express an opinion on the financial statements, controls and performance indicators. This was done by testing selected samples of the evidence. Further information on my audit approach is provided in my audit practice statement. Refer "http://www.audit.wa.gov.au/pubs/Audit-Practice-Statement.pdf".

An audit does not guarantee that every amount and disclosure in the financial statements and performance indicators is error free. The term "reasonable assurance" recognises that an audit does not examine all evidence and every transaction. However, my audit procedures should identify errors or omissions significant enough to adversely affect the decisions of users of the financial statements and performance indicators.

D D R PEARSON
AUDITOR GENERAL
22 September 2006

4th Floor Dumas House 2 Havelock Street West Perth 6005 Western Australia Tel: 08 9222 7500 Fax: 08 9322 5664

Income Statement
for the year ended 30 June 2006

	Note	2006	2005
		$	$
COST OF SERVICES			
Expenses			
Research grants	6	2,227,322	1,730,265
Scholarships	7	65,000	29,999
Employee benefits expense	8	115,463	103,520
Board and committee fees and costs	9	40,580	40,258
Administration expenses	10	19,911	30,455
Accommodation expenses	11	14,175	14,175
Capital user charge	12	34,000	34,003
Depreciation expense	13	2,017	1,915
Total Cost of Services		**2,518,468**	**1,984,590**
Income			
Interest Revenue	14	76,244	83,165
Other Revenue	15	3,473	2,765
Revenues from Industry Sponsorship	16	1,815,040	1,226,263
Total income other than income from State Government		**1,894,757**	**1,312,193**
NET COST OF SERVICES		**623,711**	**672,397**
INCOME FROM STATE GOVERNMENT			
Service Appropriation	17	649,000	644,500
Resources received free of charge	18	14,175	14,175
Total income from State Government		663,175	658,675
SURPLUS/(DEFICIT) FOR THE PERIOD		**39,464**	**(13,722)**

The Income Statement should be read in conjunction with the accompanying notes.

Balance Sheet
as at 30 June 2006

	Note	2006	2005
		$	$
ASSETS			
Current Assets			
Cash and cash equivalents	19, 28(a)	25,604	17,502
Restricted cash and cash equivalents	20, 28(a)	1,483,127	1,936,196
Receivables	21	1,503,606	827,180
Other Current Assets	22	212,834	4,081
Total current assets		**3,225,171**	**2,784,959**
Non-current Assets			
Receivables	21	46,000	46,000
Plant and equipment	23	4,774	6,791
Total non-current assets		**50,774**	**52,791**
TOTAL ASSETS		**3,275,945**	**2,837,750**
LIABILITIES			
Current liabilities			
Payables	25	810,036	565,922
Other Current Liabilities	26	196,095	56,478
Total current liabilities		**1,006,131**	**622,400**
Non-current liabilities			
Payables	25	20,000	5,000
Total non-current liabilities		**20,000**	**5,000**
TOTAL LIABILITIES		**1,026,131**	**627,400**
NET ASSETS		**2,249,814**	**2,210,350**
EQUITY			
Accumulated Surplus	27	2,249,814	2,210,350
TOTAL EQUITY		**2,249,814**	**2,210,350**

The Balance Sheet should be read in conjunction with the accompanying notes.

Statement of Changes in Equity
for the year ended 30 June, 2006

	Note	2006	2005
		$	$
Balance of equity at start of period	35	**2,210,350**	**2,224,072**
Accumulated Surplus	27		
Balance at start of period		2,210,350	2,224,072
Surplus/(deficit) for the period		39,464	(13,722)
Balance at end of period		2,249,814	2,210,350
Balance of equity at end of period		**2,249,814**	**2,210,350**
Total income and expense for the period		**39,464**	**(13,722)**

The Statement of Changes in Equity should be read in conjunction with the accompanying notes.

Cash Flow Statement
for the year ended 30 June, 2006

	Note	2006	2005
		$	$
CASH FLOWS FROM STATE GOVERNMENT			
Service appropriation	2(e)	649,000	644,500
Net cash provided by State Government		**649,000**	**644,500**
Utilised as follows:			
CASH FLOWS FROM OPERATING ACTIVITIES			
Payments			
Research Grant payments		(2,262,735)	(1,434,436)
Employee benefits		(117,823)	(98,954)
Capital User Charge		(34,000)	(33,480)
Other Operating Payments		(60,264)	(70,714)
GST Payments on Purchases		(273,355)	(146,116)
GST Payments to Taxation Authority			(26,783)
Receipts			
Receipts from Sponsors		1,288,306	1,377,799
Receipts from Scholarships		-	2,000
Interest received		75,490	82,247
Other receipts		3,474	2,765
GST receipts on sales		160,786	150,393
GST receipts from Taxation Authority		126,154	-
Net cash provided by/(used in) operating activities	28 (b)	**(1,093,967)**	**(195,279)**
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchase on non-current physical assets		-	(3,670)
Net cash provide by/(used in) investing activities		**-**	**(3,670)**
Net increase/(decrease) in cash and cash equivalents		(444,967)	445,551
Cash and cash equivalents at the beginning of period		1,953,698	1,508,147
Cash and cash equivalents at the end of period	28 (a)	**1,508,731**	**1,953,698**

The Cash Flow Statement should be read in conjunction with the accompanying notes.

Notes to the Financial Statements
for the year ended 30 June, 2006

1. First time adoption of Australian equivalents to International Financial Reporting Standards

General

This is the Authority's first published financial statements prepared under Australian equivalents to International Financial Reporting Standards (AIFRS).

Accounting Standard AASB 1 'First-time Adoption of Australian Equivalents to International Financial Reporting Standards' has been applied in preparing these financial statements. Until 30 June 2005, the financial statements of the Authority had been prepared under the previous Australian Generally Accepted Accounting Principles (AGAAP).

The Australian Accounting Standards Board (AASB) adopted the Standards of the International Accounting Standards Board (IASB) for application to reporting periods beginning on or after 1 January 2005 by issuing AIFRS which comprise a Framework for the preparation and Presentation of Financial statements, Australian Accounting Standards and the Urgent Issues Group (UIG) Interpretations.

The UIG Interpretations are adopted through AASB 1048 'Interpretation and Application of Standards' and are classified into those corresponding to IASB Interpretations and those only applicable in Australia.

The AASB has decided to maintain the statements of accounting concepts (SAC 1 and SAC 2) and has continued to revise and maintain accounting standards and the UIG Interpretations that are of particular relevance to the Australian environment, especially those that deal with more specifically with not-for-profit entity issues and/or do not have an equivalent IASB Standard or Interpretation.

In accordance with the option provided by AASB 1 paragraph 36A and exercised by Treasurer's Instruction 1101 'Application of Australian Accounting Standards and Other Pronouncements', financial instrument information prepared under AASB 132 and AASB 139 will apply from 1 July 2005 and consequently comparative information for financial instruments is presented on the previous AGAAP basis. All other comparative information has been prepared under the AIFRS basis.

Early adoption

The Authority cannot adopt an Australian Accounting Standard or UIG Interpretation unless specifically permitted by TI 1101 'Application of Australian Accounting Standards and Other Pronouncements'. This TI requires the early adoption of revised AASB 119 'employee Benefits' as issued in December 2004, AASB 2004-3 'Amendments to Australian Accounting Standards', AASB 2205-3 'Amendments to Australian Accounting Standards [AASB 119] AASB 2205-4 'Amendments to Australian Accounting Standards [AASB 139, AASB 132, AASB 1, AASB 1023, & AASB 1038]' and AASB 2205-6 'Amendments to Australian Accounting Standards [AASB 3]' to the annual reporting period beginning 1 July 2005. AASB 2005-4 amends AASB 139 'Financial Instruments: Recognition and Measurement' so that the ability to designate financial assets and financial liabilities at fair value is restricted. AASB 2005-6 excludes business combinations involving common control from the scope of AASB 3 'Business Combinations'.

Reconciliations explaining the transition to AIFRS as at 1 July 2004 and 30 June 2005 are provided at note 36 'Reconciliations explaining the transition to AIFRS'.

Notes to the Financial Statements for the year ended 30 June, 2006

2. Summary of significant accounting policies

(a) General Statement

The financial statements constitute a general purpose financial report which has been prepared in accordance with Australian Accounting Standards, the Framework, Statements of Accounting Concepts and other authoritative pronouncements of the Australian Accounting Standards Board as applied by the Treasurer's Instructions. Several of these are modified by the Treasurer's Instructions to vary application, disclosure, format and wording.

The Financial Administration and Audit Act and the Treasurer's Instructions are legislative provisions governing the preparation of financial statements and take precedence over the Accounting Standards, the Framework, Statements of Accounting Concepts and other authoritative pronouncements of the Australian Accounting Standards Board.

Where modification is required and has a material or significant financial effect upon the reported results, details of that modification the resulting financial effect are disclosed in individual notes to the financial statements.

Modifications or clarifications to accounting standards through the TI's are to provide certainty and ensure consistency and appropriate reporting across the public sector.

(b) Basis of Preparation

The financial statements have been prepared on the accrual basis of accounting using the historical cost convention.

The accounting policies adopted in the preparation of the financial statements have been consistently applied throughout all periods presented unless otherwise stated.

The financial statements are presented in Australian dollars rounded to the nearest dollar.

The judgements that have been made in the process of applying the Authority's accounting policies that have the most significant effect on the amounts recognised in the financial statements are disclosed in note 3 'Judgements made by management in applying accounting policies'.

The key assumptions made concerning the future, and other key sources of estimation uncertainty at the reporting date that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are disclosed at note 4 'Key sources of estimation uncertainty'.

(c) Reporting Entity

The reporting entity comprises the Authority. There are no related bodies.

(d) Income

Revenue

Revenue is measured at the fair value of consideration received or receivable. Revenue is recognised for the major business activities as follows:

Notes to the Financial Statements
for the year ended 30 June, 2006

Service Appropriations

Service Appropriations are recognised as revenues at nominal value in the period in which the Authority gains control of the appropriated funds. The Authority gains control of appropriated funds at the time those funds are deposited into the Authority's bank account.

Sale of goods

Revenue is recognised from the sale of goods when the significant risks and rewards of ownership control transfer to the purchaser.

Interest

Revenue is recognised as the interest accrues.

Sponsorship Revenue

Sponsorship from Industry is recognised as revenue when the Authority obtains control over the assets comprising the contributions. Control is normally obtained upon signing

(e) Plant and Equipment

Capitalsation/Expensing of assets

Items of plant and equipment costing over $1,000 are recognised as assets and the cost of utilising assets is expensed (depreciated) over their useful lives. Items of plant and equipment costing less than $1,000 are immediately expensed direct to the Income Statement (other than where they form part of a group of similar items which are significant in total).

Initial recognition and measurement

All items of plant and equipment are initially recognised at cost.

Items of plant and equipment acquired at no cost or for nominal consideration are initially recognised at their fair value at the date of acquisition.

Subsequent measurement

After recognition as an asset, the cost models is used for the measurement for plant and equipment and are stated at historical cost less accumulated depreciation and accumulated impairment losses.

Depreciation

All non-current assets having a limited useful life are systematically depreciated over their estimated useful lives in a manner that reflects the consumption of their future economic benefits.

Depreciation is calculated using the straight line method, using rates which are reviewed annually. The expected useful life for plant and equipment is 3 to 7 years.

Notes to the Financial Statements for the year ended 30 June, 2006

(f) Impairment of assets

Plant and equipment assets are tested for any indication of impairment at each reporting date. Where there is an indication of impairment, the recoverable amount is estimated. Where the recoverable amount is less than the carrying amount, the asset is considered impaired and is written down to the recoverable amount and an impairment loss is recognised. As the Authority is a not-for-profit entity, unless an asset has been identified as a surplus asset, the recoverable amount is the higher of an asset's fair value less costs to sell and depreciated replacement cost.

The risk of impairment is generally limited to circumstances where an asset's depreciation is materially understated or where the replacement cost is falling. Each relevant class of assets is reviewed annually to verify that the accumulated depreciation reflects the level of consumption or expiration of asset's future economic benefits and to evaluate any impairment risk from falling replacement costs.

See note 24 'Impairment of assets' for the outcome of impairment reviews and testing.

(g) Financial Instruments

The Authority has two categories of financial instruments:

- Receivables (cash and cash equivalents, receivables); and
- Non-trading financial liabilities (payables)

Initial recognition and measurement of financial instruments is at fair value which normally equates to the transaction cost or the face value. Subsequent measurement is at amortised cost using the effective interest method.

The fair value of short-term receivables and payables is the transaction cost or the face value because there is no interest rate applicable and subsequent measurement is not required as the effect of discounting is not material.

(h) Cash and cash equivalents

For the purpose of the Cash Flow Statement, cash and cash equivalents (and restricted cash and cash equivalents) assets comprise cash on hand and short-term deposits that are readily convertible to a known amount of cash and which are subject to insignificant risk of changes in value, and bank overdrafts.

More specifically, the Authority has Short term investments comprised of term deposits and bank bills invested in such securities as approved by the Treasurer. Interest revenues are recognised as they are accrued.

(i) Receivables

Receivables are recognised and carried at original invoice amount less an allowance for any uncollectible amounts (ie impairment). The collectability of receivables is reviewed on an ongoing basis and any receivables identified as uncollectible are written off. The allowance for uncollectible amounts (doubtful debts) is raised when there is objective evidence that the Authority will not be able to collect the debts. The carrying amount is equivalent to fair value as it is due for settlement within 30 days. See note 1(g) 'Financial Instruments' and note 21 'Receivables'.

Notes to the Financial Statements
for the year ended 30 June, 2006

(j) Payables and Accrued Expenses

Payables including accruals not yet billed are recognised at the amounts payable when the Authority becomes obliged to make future payments as a result of a purchase of assets or services. The carrying amount is equivalent to fair value, as they are generally settled within 30 days. See note 1(g) 'Financial Instruments' and note 21 'Receivables'.

(k) Superannuation

All of the Authority's employees are non-contributory members of the West State Superannuation (WSS) Scheme, an accumulation scheme. The Authority makes concurrent contributions to the Government Employees Superannuation Board on behalf of employees in compliance with the Commonwealth Government's Superannuation Guarantee (Administration) Act 1992. These contributions extinguish all liabilities in respect of the WSS Scheme by payment of employer contributions to the Government Employees Superannuation Board.

(l) Research Grants

All minerals research projects are funded partly by MERIWA grants and partly by Industry sponsorship. Sponsorship is allocated by a company (the sponsor) to a research project, which by agreement, is paid through MERIWA, who on behalf of the sponsor, maintain financial control over the project and progressively advance the funds to the research grantee.

Grants expense is recognised when the Authority becomes obliged to make payment to the grantee. The Institute becomes obliged to make payment when the grantee has met the conditions of the grant agreement, normally on a quarterly basis.

(m) Scholarships

Scholarships represent the Institute's obligation to fund approved scholarships.

Current liabilities include payments expected to be made during the 2005/06 financial year and non current liabilities include payments expected to be made in later years.

(n) Sponsorship Revenue

Sponsorship from Industry is recognised as revenue when the Authority obtains control over the assets comprising the contributions. Control is normally obtained upon signing of the sponsorship agreement.

(o) Resources Received Free of Charge

Resources received free of charge or for a nominal cost that can be reliably measured are recognised as revenues and as assets or expenses as appropriate, at fair value.

(p) Comparative Figures

Comparative figures have been restated on the AIFRS basis except for financial instruments which have been prepared under the previous AGAAP Australian Accounting Standard AAS33 'Presentation and Disclosure of Financial Instruments'. The transition date to AIFRS for financial instruments will be 1 July 2005 in accordance with exemption allowed under AASB 1 paragraph 36A and Treasurer's Instruction 1101.

Notes to the Financial Statements for the year ended 30 June, 2006

3. Judgements made by management in applying accounting policies

The judgements that have been made by management in the process of applying accounting policies will have no significant effect on the amounts recognised in the financial statements other than those disclosed in Note 2.

4. Key sources of estimation uncertainty

There were no key assumptions made concerning the future, and other key sources of estimation uncertainty at the reporting date that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year.

5. Disclosure of changes in Accounting policy and Estimates

Initial application of an Australian Accounting Standard

There were no changes in accounting policies that will have an effect on the current period or any prior period other than that disclosed in Note 2.

Future impact of Australian Accounting Standards not yet operative

The Authority cannot early adopt an Australian Accounting Standard or UIG Interpretation unless specifically permitted by TI 1101 'Application of Australian Accounting Standards and Other Pronouncements'. As referred to in Note 1, TI 1101 has only mandated the early adoption of revised AASB 119, AASB 2004-3, AASB 2005-3, AASB 2005-4 and AASB
2005-6. Consequently, the Authority has not applied the following Australian Accounting Standards and UIG Interpretations that have been issued but are not yet effective. These will be applied from their application date:

1. AASB 7 'Financial Instruments: Disclosures' (including consequential amendments in AASB 2005-10 'Amendments to Australian Accounting Standards [AASB 132, AASB 101, AASB 114, AASB 117, AASB 133, AASB 139, AASB 1, AASB 4, AASB 1023 & AASB 1038]'). This Standard requires new disclosures in relation to financial instruments. The Standard is required to be applied to annual reporting periods beginning on or after 1 January 2007. The Standard is considered to result in increased disclosures of an entity's risks, enhanced disclosure about components of financial position and performance, and changes to the way of presenting financial statements, but otherwise there is no financial impact.

2. AASB 2005-9 'Amendments to Australian Accounting Standards [AASB 4, AASB 1023, AASB 139 & AASB 132]' (Financial guarantee contracts). The amendment deals with the treatment of financial guarantee contracts, credit insurance contracts, letters of credit or credit derivative default contracts as either an "insurance contract" under AASB 4 'Insurance Contracts' or as a "financial guarantee contract" under AASB 139 'Financial Instruments: Recognition and Measurement'. The Authority does not undertake these types of transactions resulting in no financial impact when the Standard is first applied. The Standard is required to be applied to annual reporting periods beginning on or after 1 January 2006.

3. UIG Interpretation 4 'Determining whether an Arrangement Contains a Lease'. This Interpretation deals with arrangements that comprise a transaction or a series of linked transactions that may not involve a legal form of a lease but by their nature are deemed to be leases for the purposes of applying AASB 117 'Leases'. At reporting date, the Authority has not entered into any arrangements as specified in the Interpretation resulting in no impact when the Interpretation is first applied. The Interpretation is required to be applied to annual reporting periods beginning on or after 1 January 2006.

Notes to the Financial Statements for the year ended 30 June, 2006

The following amendments are not applicable to the Authority as they will have no impact:

AASB Amendment	Affected Standards
2005-1	AASB 139 (Cash flow hedge accounting of forecast intragroup transactions).
2005-5	'Amendments to Australian Accounting Standards [AASB 1 & AASB 139]'.
2006-1	AASB 121 (Net investment in foreign operations).
	UIG 5 'Rights to Interests arising from Decommissioning, Restoration and Environmental Rehabilitation Funds'.
	UIG 6 'Liabilities arising from Participating in a Specific Market – Waste Electrical and Electronic Equipment'.
	UIG 7 'Applying the Restatement Approach under AASB 129 Financial Reporting in Hyperinflationary Economies'.

Changes in accounting estimates

There were no changes in accounting estimates that will have an effect on the current period or any prior period.

6. Research Grants

	2006 $	2005 $
Research Grants – MERIWA	638,473	553,179
Research Grants – Industry Sponsorship	1,588,849	1,177,086
	2,227,322	**1,730,265**

7. Scholarships

Scholarships	65,000	29,999
	65,000	**29,999**

8. Employee expenses

Institute Contract Staff fees	105,929	94,049
Superannuation	9,534	9,471
	115,463	**103,520**

9. Board and Committee fees and costs

Board of Director's remuneration	33,800	33,800
Advisory Committee attendance fees	5,940	4,468
Board and Advisory Committee's expenses	840	1,990
	40,580	**40,258**

Notes to the Financial Statements for the year ended 30 June, 2006

10. Administration expenses

Printing and Stationery	2,217	3,384
Advertising	2,159	867
Audit fees	11,000	10,500
Worker's Compensation premium	880	1,943
Contractors	-	11,181
Other	3,655	2,580
	19,911	**30,455**

11. Accommodation expenses

	2006 $	2005 $
Notional rental	14,175	14,175
	14,175	**14,175**

12. Capital user charge

Charge	34,000	34,003
	34,000	**34,003**

The Government applies a levy for the use of its capital for the delivery of services. It is applied at 8% per annum on the net assets of the Authority, excluding exempt assets, and is paid to the Department of Treasury and Finance quarterly.

13. Depreciation expense

Plant and Equipment	2,017	1,915
	2,017	**1,915**

14. Interest Revenue

Interest on Investments – Term Deposits	76,244	83,165
	76,244	**83,165**

15. Other Revenue

Sale of Publications	3,473	2,765
	3,473	**2,765**

16. Revenue from Industry Sponsorship

Sponsorship from Industry	1,815,040	1,226,263
	1,815,040	**1,226,263**

Notes to the Financial Statements for the year ended 30 June, 2006

17. Service Appropriation

	2006 $	2005 $
Appropriation Revenue	649,000	644,500
	649,000	**644,500**

18. Resources received free of charge

Resources received free of charge have been determined on the basis of the following estimates provided by agencies.

Department of Industry and Resources	14,175	14,175
	14,175	**14,175**

19. Cash and cash equivalents

Cash at bank	25,404	17,302
Cash on hand	200	200
	25,604	**17,502**

20. Restricted cash and cash equivalents

Research Grants	1,483,127	1,936,196
	1,483,127	**1,936,196**

Cash held in the account is to be used only for the purpose of providing grants for research and development projects to grantees.

21. Receivables

Current		
Grants Receivable – Sponsorship	1,458,495	790,011
GST Receivable	45,111	37,169
	1,503,606	**827,180**
Non - Current		
Grants Receivable – Sponsorship	46,000	46,000
	46,000	**46,000**

See also note 2(j) 'Receivables' and note 34 'Financial Instruments'

22. Other Current Assets

	2006 $	2005 $
Prepayments of Research Grants	208,000	-
Accrued Interest on Short Term Investments	4,834	4,081
	212,834	**4,081**

Notes to the Financial Statements for the year ended 30 June, 2006

23. Plant and equipment

	2006 $	2005 $
Plant and equipment		
At cost	8,970	8,970
Accumulated depreciation	(4,196)	(2,179)
Accumulated impairment losses	-	-
	4,774	6,791

Reconciliations
2006

	Plant and equipment
Carrying amount at start of year	6,791
Depreciation	(2,017)
Carrying amount at end of year	4,774

24. Impairment of assets

There were no indications of impairment of plant and equipment assets at 30 June 2006.

The Authority held no goodwill or intangible assets at reporting date.

25. Payables

Current		
Grants Payable - Research	770,220	533,422
Grants Payable – Scholarship	39,816	32,500
	810,036	**565,922**
Non - Current		
Grants Payable – Scholarship	20,000	5,000
	20,000	**5,000**

See also note 2(k) ‘Payables, 2(m) ‘Research Grants’, 2(n) ‘Scholarships’ and note 34 ‘Financial Instruments’

26. Other Current Liabilities

Accrued Expenses		
Institute contract staff fees	9,262	10,503
Superannuation	833	1,952
Printing and stationery	227	-
Capital User Charge	9,023	9,023
	19,345	**21,478**
Grants Received in advance		
Grants Received in advance - Sponsorship	176,750	35,000
	196,095	**56,478**

Notes to the Financial Statements for the year ended 30 June, 2006

27. Equity

Equity represents the residual interest in net assets of the Authority. The Government holds the equity interest in the Authority on behalf of the community.

	2006 $	2005 $
Accumulated Surplus		
Balance at start of period	2,210,350	2,224,072
Result for the period	39,464	(13,722)
Balance at end of period	**2,249,814**	**2,210,350**

28. Notes to the Statement of Cash Flows

(a) Reconciliation of Cash

Cash at the end of the financial year as shown in the Cash Flow Statement is reconciled to the related items in the Balance Sheet as follows:

Cash at bank	25,404	17,302
Cash on hand	200	200
Restricted Cash and cash equivalents	1,483,127	1,936,196
	1,508,731	**1,953,698**

(b) Reconciliation of Net Cost of Services to Net Cash Flows Used In Operating Activities

Net cost of services	(623,711)	(672,397)
Non-cash items:		
Resources received free of charge	14,175	14,175
Depreciation	2,017	1,915
(Increase)/Decrease in assets:		
Accrued Interest	(753)	(918)
Grants Receivable – Sponsorship	(668,484)	79,769
Grants Receivable – Scholarship	-	2,000
Prepayments	(208,000)	-
Increase/(Decrease) in liabilities:		
Grants Payable -Research	224,114	332,829
Grants Payable –Scholarship	-	(7,001)
Sponsorship received in advance	176,750	35,000
Accrued expenses	(2,133)	5,089
Net GST payments	13,585	(22,507)
Change in GST in receivables/payables	(21,527)	36,767
Net Cash used in operating activities	**(1,093,967)**	**(195,279)**

29. Commitments for expenditure

At the year end the Authority has $2,126,360 (2005 $2,009,101) of research grant commitments that are not recognised in the Income Statement. The Authority is obliged to make payment when the grantee has met the conditions of grant (see note 2).

Notes to the Financial Statements for the year ended 30 June, 2006

30. Other

The Institute has no contingent liabilities or any related or affiliated bodies and there were no events occurring after reporting date.

31. Remuneration of members of the Accountable Authority and Senior Officers

Remuneration of Members of the Accountable Authority

The number of members of the Accountable Authority whose total of fees, salaries, superannuation, non-monetary benefits and other benefits for the financial year, fall within the following bands are:

			2006	2005
$0	-	$ 10,000	3	4
$10,001	-	$ 20,000	1	1

The total remuneration of the members of the Accountable Authority is:

	2006	2005
	$	$
	33,800	33,800

No amounts were paid or become payable to any superannuation fund for the financial year for any of the members of the Accountable Authority.

No members of the Accountable Authority are members of the Superannuation and Family Benefits Act Scheme.

Remuneration of Senior Officers

The number of Senior Officers other than senior officers reported as members of the Accountable Authority whose total fees, salaries, superannuation, non-monetary benefits and other benefits for the financial year, fall within the following bands are:

			2006	2005
$0	-	$10,000	1	-
$30,001	-	$ 40,000		1
$40,001	-	$ 50,000	1	-

The total remuneration of Senior Officers of the Accountable Authority is:

	2006	2005
	$	$
	49,463	31,991

The total remuneration includes the superannuation expense incurred by the Authority in respect of Senior Officers other than senior officers reported as members of the Accountable Authority.

No Senior Officers presently employed are members of the Superannuation and Family Benefits Act Scheme.

Notes to the Financial Statements for the year ended 30 June, 2006

32. Remuneration of Auditor

Remuneration payable to the Auditor General for the financial year is as follows:

	2006 $	2005 $
Auditing the accounts, financial statements and performance indicators	11,000	10,500
	11,000	**10,500**

The expense is included at note 10 'Administration expenses'

33. Explanatory Statement

Significant variations between estimates and actual results for income and expenses are shown below. Significant variations are considered to be those greater than 10% and $2,000.

(i) Significant variances between estimated and actual result for 2006

	2006 Estimate $	2006 Actual $	Variation $
Research Grants	1,757,000	2,227,322	(470,322)
Scholarships	35,000	65,000	(30,000)
Employee expenses	98,000	115,463	(17,463)
Administration costs	23,000	19,911	3,089
Interest revenue	88,000	76,244	11,756
Revenue from Industry Sponsorship	1,245,000	1,815,040	(570,040)

Research Grants were higher than the estimate due to increased values of research grant applications.

Scholarships were higher than the estimate due to the higher value of scholarships being for a longer duration being awarded than was expected.

Employee expenses were higher than the estimate due to higher project co-ordination costs than expected.

Administration costs were lower than the estimate due to lower than expected costs of printing and stationery and workers compensation premiums.

Interest revenue was lower than the estimate due to commercial interest rates remaining lower than anticipated.

Revenue from Industry Sponsorship was higher than the estimate due to a higher than anticipated number of applications and industry support.

(ii) Significant variances between actual results for 2005 and 2006

	2006 $	2005 $	Variance $
Research Grants	2,227,322	1,730,265	497,057
Scholarships	65,000	29,999	35,001
Employee expenses	115,463	103,520	11,943
Administration costs	19,911	30,455	(10,544)
Revenue from Industry Sponsorship	1,815,040	1,226,263	(588,777)

Notes to the Financial Statements for the year ended 30 June, 2006

33. Explanatory Statement cont'd

Research Grants - the variance is due to a greater value of projects being processed during the year.

Scholarships – the variance is due to a higher value of scholarships being awardedfor a longer duration.

Employee expenses - the variance is due to higher project co-ordination costs.

Board and committee fees and costs – the variance is mainly due to an increase in the Advisory Committee members' attendance fees during the year.

Administration costs – the variance is due to a decrease in the costs such as Workers Compensation premium and other contract fees.

Revenue from Industry Sponsorship – the variance is due to a higher value of projects being processed during the year.

34. Financial Instruments

(a) Financial Risk Management Objectives and Policies

Financial instruments held by the Authority are cash and cash equivalents, receivables and payables. The Authority has limited exposure to financial risks. The Authority's overall risk management program focuses on managing the risks identified below.

Credit risk

The Authority trades only with recognised, creditworthy third parties. The Authority has policies in place to ensure products and services are made to customers with an appropriate credit history. In addition, receivable balances are monitored on an ongoing basis with the result that the Authority's exposure to bad debts is minimal. There are no significant concentrations of credit risk.

Liquidity risk

The Authority has appropriate procedures to manage cash flows including draw downs of appropriations by monitoring forecast flows to ensure that sufficient funds are available to meet commitments.

Cash flow interest rate risk

The Authority's exposure to market risk for changes in interest rates relate primarily to short-term investments comprised of term deposits and bank bills. The risk is managed by the Authority through diversification and variation in maturity dates.

(b) Financial Instrument disclosures

Financial instrument information for the year ended 2005 has been prepared under the previous AGAAP Australian Accounting Standard AAS33 'Presentation and Disclosure of Financial Instruments'. Financial instrument information from 1 July 2005 has been prepared under AASB 132 'Financial Instruments: Presentation' and AASB 139 'Financial Instruments: Recognition and Measurement'. See also note 2 'Comparative figures'.

Notes to the Financial Statements for the year ended 30 June, 2006

Interest Rate Risk Exposure

The following table details the Authority's exposure to interest rate risk as at reporting date:

2006	Weighted average effective interest rate %	Variable Interest Rate $ '000	Non-interest Bearing $ '000	Total $ '000
Financial Assets				
Cash and cash equivalents	3.91	26		26
Restricted cash and cash equivalents	5.88	1,483		1,483
Receivables	-		1,549	1,549
Other assets	-		213	213
Total Financial Assets		**1,509**	**1,762**	**3,271**
Financial Liabilities				
Payables	-	-	810	810
Other liabilities	-	-	196	196
Total Financial Liabilities		**-**	**1,006**	**1,006**

2005				
Financial Assets				
Cash and cash equivalents	3.55	17	-	17
Restricted cash and cash equivalents	5.50	1,936	-	1,936
Receivables	-	-	873	873
Other assets	-	-	4	4
Total Financial Assets		**1,953**	**877**	**2,830**
Financial Liabilities				
Payables		-	571	571
Other liabilities		-	56	56
Total Financial Liabilities		**-**	**627**	**627**

Fair values

The carrying amount of financial assets and financial liabilities recorded in the financial statements are not materially different from their net fair values.

35. Schedule of Income and Expenses by Service

Treasurer's Instruction 1101(9) requires that statutory authorities provide segment information in the form of services.

MERIWA has one main activity or service which is to finance and coordinate minerals and energy research.

No schedule is prepared as this information is already provided in the Income Statement.

Notes to the Financial Statements for the year ended 30 June, 2006

36. Reconciliation explaining the transition to Australian equivalents to International Financial Reporting Standards

The Authority has reviewed the revised reporting standards in adopting the Australian Equivalents to International Financial Reporting Standards; there are no issues that required the financial reports to be amended. Accordingly, there is no change in Total Equity or Surplus/(Deficit) for the period under the previous AGAAP compared to under IFRS.

Certification of Financial Statements
for the year ended 30 June 2006

The accompanying financial statements of the Minerals and Energy Research Institute of Western Australia have been prepared in compliance with the provisions of the Financial Administration and Audit Act, 1985 from proper accounts and records to present fairly the financial transactions for the financial year ending 30 June 2006 and the financial position as at 30 June 2006.

At the date of signing we are not aware of any circumstances which would render any particulars included in the financial statements misleading or inaccurate.

A Webster
DIRECTOR AND
CHIEF FINANCE OFFICER

S R Baker
CHAIRMAN,
BOARD OF DIRECTORS

25 September 2006

Opinion of the Auditor General on Financial Statements for the year ended 30 June, 2006

AUDITOR GENERAL

INDEPENDENT AUDIT OPINION

To the Parliament of Western Australia

MINERALS AND ENERGY RESEARCH INSTITUTE OF WESTERN AUSTRALIA
FINANCIAL STATEMENTS AND PERFORMANCE INDICATORS
FOR THE YEAR ENDED 30 JUNE 2006

Audit Opinion
In my opinion,

(i) the financial statements are based on proper accounts and present fairly the financial position of the Minerals and Energy Research Institute of Western Australia at 30 June 2006 and its financial performance and cash flows for the year ended on that date. They are in accordance with applicable Accounting Standards and other mandatory professional reporting requirements in Australia and the Treasurer's Instructions;

(ii) the controls exercised by the Institute provide reasonable assurance that the receipt, expenditure and investment of moneys, the acquisition and disposal of property, and the incurring of liabilities have been in accordance with legislative provisions; and

(iii) the key effectiveness and efficiency performance indicators of the Institute are relevant and appropriate to help users assess the Institute's performance and fairly represent the indicated performance for the year ended 30 June 2006.

Scope
The Board is responsible for keeping proper accounts and maintaining adequate systems of internal control, for preparing the financial statements and performance indicators, and complying with the Financial Administration and Audit Act 1985 (the Act) and other relevant written law.

The financial statements consist of the Income Statement, Balance Sheet, Statement of Changes in Equity, Cash Flow Statement, and the Notes to the Financial Statements.

The performance indicators consist of key indicators of effectiveness and efficiency.

Summary of my Role
As required by the Act, I have independently audited the accounts, financial statements and performance indicators to express an opinion on the financial statements, controls and performance indicators. This was done by testing selected samples of the evidence. Further information on my audit approach is provided in my audit practice statement. Refer "http://www.audit.wa.gov.au/pubs/Audit-Practice-Statement.pdf".

An audit does not guarantee that every amount and disclosure in the financial statements and performance indicators is error free. The term "reasonable assurance" recognises that an audit does not examine all evidence and every transaction. However, my audit procedures should identify errors or omissions significant enough to adversely affect the decisions of users of the financial statements and performance indicators.

D D R PEARSON
AUDITOR GENERAL
22 September 2006

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MERIWA

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