M E R I W A

MERIWA Annual Report 2004-2005

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 2004-2005

Hon. Alan Carpenter, MLA
Minister for State Development
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 2005, 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

26 August 2005

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 2004/2005 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 2004/2005 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	867

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.

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 under review at year end. On completion all employees will be familiarised with the plan.

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
PRINCIPAL ACCOUNTING OFFICER

S R Baker
CHAIRMAN,
BOARD OF DIRECTORS

26 August 2005

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 -

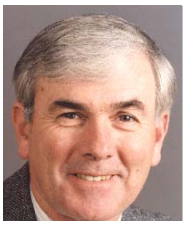
(i) the performance by the Institute of its function; or
(ii) matters relating to minerals research and energy research in general.

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

Structure

MINISTER FOR STATE DEVELOPMENT
THE HON ALAN CARPENTER, MLA

BOARD OF DIRECTORS



MR S R BAKER
CHAIRMAN
(Appointed July 2004)

DR C D BRANCH
PAST CHAIRMAN

MS A WEBSTER
PRINCIPAL ACCOUNTING OFFICER

PROFESSOR B F RONALDS
CHIEF – CSIRO PETROLEUM

MINERALS RESEARCH ADVISORY COMMITTEE
CHAIRMAN: PROFESSOR ODWYN JONES

PROJECT COORDINATOR
DR PAMELA SMITH

EXECUTIVE OFFICER
MR DAVID MILTON

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 2004/2005 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 2004/2005 year.

Overview

MERIWA's financial results and research achievement for 2004/2005 for minerals research are summarised and compared with the results for 2003/2004 in Table 1. Points of note for the year are -

- Total value of new minerals research projects was $1.623 million, a decrease of $0.021 million on the 2003/2004 figure of $1.644 million.
- Industry sponsorship was $1.072 million compared to $1.309 million in 2003/2004. The proportion of industry sponsorship for minerals research was 66% against a target of 65%.
- For every dollar expended by the Government through MERIWA, $2.26 of minerals research was generated.
- Administration costs as a % of the value of research generated were 8.14%.
- MERIWA finished the year increasing the value of net assets by $13,722.

Research Activities

MERIWA's minerals and petroleum research results are identified in Table 4. Seven new research projects were commenced in 2004/2005 for a total value of $1.623 million. This compares with $1.201 million in 2003/2004. It is evident that there is a continuing decrease in mineral processing but an increase in geoscience and mining and engineering which indicates a strengthening of the minerals sector.

TABLE 1: Summary of Results

[The Accumulated Funds for 2003/04 include Alternative Energy grants and appropriations transferred to the Office of Energy at the end of the financial year.]

	2004/05 $'000	2003/04 $'000
FINANCIAL		
ACCUMULATED FUNDS **Opening balance at 1 July**	***2 799**	**2 781**
Plus funds received and sponsorship committed (minerals only)	**1 971	2 370
Less funds expended and committed (minerals only)	***1 985	2 124
ACCUMULATED FUNDS **As at 30 June**	**2 785**	**3 027**
Total value of research commenced	**1 623**	**1 644**
% sponsorship to new research commenced	66%	80%
Ratio of research value to government funds utilised (grants and administration)	2.26	3.41

* **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 $1.072 million, while at year's end the sponsorship vested under MERIWA control was $2 278 141. Industry sponsorship for the year in review was 66% of the research value of projects against a target of 65%.

After accounting for funds resumed from abandoned projects and projects completed below budget the government funds utilised by MERIWA for minerals research including resources received free of charge totalled $807 504 of which $553 179 was applied to research grants and $30 000 to scholarships, with the remainder for administration.

The actual administration cost of $188 408 was 8.14% of the value of research generated. Real expenditure on new applications was $550 766.

Board of Directors' Report (Continued)

TABLE 2: Allocation of Funds

Research categories	No. projects	MERIWA $'000	Industry $'000	Total $'000
Geoscience	5	414	640	1 054
Hydrocarbons	0	0	0	0
Engineering	1	122	432	554
Minerals processing	0	0	0	0
Environmental-rehabilitation	1	15	0	15
Total	**7**	**551**	**1 072**	**1 623**

TABLE 3: Allocation of Mineral Research Funds to Research Organisations

Research Organisation	No. projects	Funding $'000
The University of Western Australia	2	569
Curtin University of Technology	1	224
Murdoch University	0	0
Edith Cowan University	0	0
C.S.I.R.O.	3	710
Other	1	120
Total research	**7**	**1 623**
SCHOLARSHIPS		
The University of Western Australia	1	20
Murdoch University	-	-
Curtin University of Technology	1	10
Edith Cowan University	-	-
Total scholarships	***2**	**30**
Total funding		**1 653**

*** A third scholarship was awarded in 2004/05 but will not commence until 2005/06.**

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.

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

This year nine projects were approved by the Board of which five projects and two carried forward from last year were contracted to receive funding this financial year 2004/05. Again the research activities involved University of Western Australia with two projects, CSIRO with three, Curtin University of Technology with one and Monash University with one. The minerals sector has continued its research resurgence with all of the projects being related to this area.

Projects

The Board approved nine research projects during the year. Four projects relate to the geoscience areas, three to environmental areas, two to mining and engineering. Three of the geoscience projects relate to the continuing focus on the Yilgarn goldfields with the fourth supporting development of an automated core logging system. The environmental projects covered preservation of biodiversity, control of dieback and erosion control in minesite rehabilitation. The focus of the mining and engineering projects was an open pit slope stability and testing of underground rock support systems.

M349A – *Dynamic Testing of Ground Control Systems*

This project follows the successful completion of M349 which saw the construction and commissioning of a test facility at the Western Australian School of Mines in Kalgoorlie. The completion of this extension will lead to the development of practical energy absorption guidelines for the types of reinforcing systems, face restraints and surface support systems used in underground mines in Western Australia. The guidelines will provide quantitative data for the energy absorbed by the re-inforcing and support systems or a fully-integrated ground control scheme; these data could be used by geotechnical engineers to design ground control schemes appropriate for expected rockburst conditions.

This will co-incidentally see the completion of the dynamic testing facility capable of subjecting re-inforcing and support systems to standard impact loadings. A successful outcome of the research will be the development of improved reinforcement systems that will be immediately applicable to the WA mining industry, where prevention of rockfall related injuries and fatalities is a high priority.

The project has nine sponsors and a value of $474,000, with MERIWA's commitment being $139,000 spread over three years.

M366 – *High Resolution Seismic Monitoring in Open Pit Mines*

The Australian Centre for Geomechanics has commenced a comprehensive study on how to apply microseismic monitoring to open pit stability. Seismic monitoring systems will be installed in two open pits in addition to other conventional monitoring programmes and slope stability investigations in order to establish the

potential as well the operating constraints of this new application of seismic monitoring. The study will last for three years, focussing on pit walls that have a high potential for stability problems. The initial part of the programme will be used to design and install the monitoring systems and investigate slope stability issues over a two year monitoring period.

The total commitment by sponsors for this project is $432,263 with MERIWA providing $121,403 over three years.

M371 – *Laterite Geochemical Map of the Western Yilgarn Craton*

This mapping project will use lateritic residuum as the principal medium to produce a geochemical map of the western Yilgarn Craton. As well as having data already available and ease of access, the western Yilgarn harbours the possibility that its apparent lower mineral endowment than the eastern Yilgarn may be an artefact of less rigorous exploration. Though regional geochemical surveys have been routinely undertaken elsewhere in the world to delineate major geochemical trends and patterns, such surveys in Australia have been hampered by the complex regolith and the landscape; together these preclude accessibility and consistent sample media, and coordination between government agencies has also been lacking. The new geochemical map will provide regional background for local exploration, and baseline data for environmental studies. The sampling will be on a 9km triangular grid and samples will comprise mainly lateritic gravel and lateritic duricrust. A suite of 53 elements will be analysed, and results published in two stages, first for the south-western and then the north-western Yilgarn. The researchers carrying out the sampling and mapping are Dr Matthias Cornelius and Assistants of CSIRO/CRC LEME and Dr Paul Morris of the Geological Survey of Western Australia. Their project will continue over three years to January 2007, and receive funding from MERIWA of $100,047. Additional funding is from CRC LEME for $82,000 and GSWA for $70,000.

M372 – *A Physiological and Biochemical Basis for Seed Storage for Biodiversity Conservation and Restoration*

The south-west of Western Australia is an important repository for Australia's unique and invaluable flora resources, and has been recognized as such by its nomination as one of the twenty-five biodiversity hotspots of the world. Currently in Western Australia there are 348 threatened flora species and 2000 more in need of conservation action. For a conservation and restoration program to succeed, the prevention of further gene pool erosion by securing current levels of genetic diversity, as well as maintenance of a source of viable propagules from which to re-establish plant communities in the future, is necessary. However, the mining industry cannot yet effectively store seed for much of the pre-mined vegetation, creating a dependency on wild sources that exceeds some tens of millions of dollars per year in costs to meet an annual seed requirement. Therefore, research into storing seed maintenance-free for long periods, for diverse genetic representation of a wide variety of species, is needed. The research proposed in project M372 will develop an understanding of key aspects of important groups of Australian taxa. The researchers, associate professor David Turner of UWA's Faculty of Agriculture and Dr. Kingsley Dixon, Science Director of the Botanic Gardens and Parks Authority (BG&PA), have as their primary goal the delivery of a scientific basis for effective long-term storage of Australian species that have proven value to conservation and restoration activities. To help progress this strategic initiative, the BG&PA has established the Western Australian Seed Technology Centre and a state-of-the-art seed banking facility to underpin the proposed research program. From their study the researchers will deliver a national framework for effective long-term seed storage. MERIWA is supporting this $628,063 ARC Linkage project with $15,000 over 3 years.

M373 – *Development and Implementation of Advanced Automated Core Logging Technology for Enhanced Mine Feasibility and Development in Western Australia*

The Australian mining industry spends hundreds of millions of dollars on drilling during mine development and exploration, and the drilled core material is logged geologically and mineralogically to improve understanding of the properties and distribution of ore. Recent research by sponsor companies of this proposal and the pmd*CRC, supported in part by MERIWA, has led to new concepts regarding the controls and distribution of ores in Western Australia's eastern goldfields, based on a refined understanding of factors that include geochemistry, fluid flow and metal grades. In parallel, CSIRO research has led to development of imaging technologies, semi-quantitative and semi-automated, that can significantly improve the information content through objectivity and rapidity, derived from drilled cores or chips. This prototype HyLogging system promises to improve greatly on the currently highly subjective and varied core logging

Board of Directors' Report (Continued)

process. It is anticipated that cost and information benefits to the industry and to Western Australia will accrue from the further development of this technology and both the Geological Survey of Western Australia and two exploration companies, to date, will financially support the work. Dr Jonathan Huntington and Dr Lewis Whitbourn, both of CSIRO Exploration & Mining, are leading the research. They will assist companies working in Western Australia to evaluate integration of the existing prototype hardware and software into their operations, and the GSWA to demonstrate value-adding to its growing core collection as well as to develop the next generation of this unique technology. This two-year research effort by a team totalling twenty-five participants has attracted $100,000 each from PlacerDome, Goldfields Australia and MERIWA, along with $60,000 from GSWA to total $360,000.

M375 – *Erosion Resistant Landform Design for Steep Slopes in Rehabilitated Bauxite Mines*

New bauxite mining areas in Western Australia will increasingly include steeper slopes than in the past, and some steep slopes rehabilitated in the past 20 years have seen significant erosion. Non-standard rehabilitation operations have been adopted for steeper slopes due to lack of research. Therefore, this project was proposed with the aims of surveying natural intact landforms and previous steep-area erosion-control techniques, and choosing and calibrating an appropriate existing erosion simulation model. A third aim is to install long-term erosion-monitoring plot trials, and the overall project objective is to develop a proven model and information system to help the sponsors determine the maximum pre-existing slope that can be mined and successfully rehabilitated for a given site. The research is being done at the University of Western Australia's Department of Soil Science and University of Newcastle's School of Geosciences, by Professor Bob Gilkes and Dr Greg Hancock respectively. It is supported by Alcoa World Alumina for $64,000 and Worsley Alumina for $32,000, with MERIWA contributing $48,919, and will run for 15 months.

M376 – *Stratigraphic and Structural Architecture of Late Basin Depositional Systems in the Eastern Goldfields Province, Yilgarn Craton*

Archaean gold terranes world-wide are known to coincide with late sedimentary basins that follow cessation of greenstone volcanism. The basins usually occur on the footwall side of major basin-inverting thrusts, and the gold deposits sit near the basal unconformity of the basin. Yet, with respect to the stratigraphy of the Kalgoorlie area several obvious questions that arise from these known relationships have not been addressed, including the stratigraphic significance of the Black Flag beds and the timing of sedimentation relative to the major compressional deformation. Objectives of this 12-month research project will be to develop 3D maps of sedimentary basins in two Western Australian study areas to understand the sediment provenance, the basin geometry and the depositional and deformational relationships to the bounding faults. This study builds on past AMIRA projects and also dovetails with MERIWA Project M363 which uses seismic data from these hard-rock terranes. The researcher is a post-doctoral research fellow at Monash University, Dr Rick Squires, working with Professor Ray Cas there. Placer Dome Asia Pacific Ltd and Gold Fields Australia are sponsoring the project for $47,500 each with MERIWA giving $25,000.

M377 – *Scale-Integrated, Architecturally, Geodynamically and Geochemically Constrained Targeting Models for Gold Deposits in the Eastern Goldfields Province, Yilgarn Craton*

Proposed by Dr John Walshe of CSIRO/Exploration and Mining, Project M377 builds on the conceptual advances of Project M358 with the aim of building and testing targeting models for Yilgarn gold deposits. Projects will be carried out at gold camps of the industry sponsors, working closely with the companies as well as the pmd*CRC Yilgarn project. Continuing detailed paragenetic and geochemical studies will also be carried out, as at least three "embedded" researchers work over the next two years. The three researchers are Dr Klaus Peterson of the University of Western Australia, Dr John Miller of the University of Melbourne and Dr James Cleverley of James Cook University, who will coordinate their work closely with the company geoscientists. Surpassing the record-breaking MERIWA funding of Project M358, the budget for this project has attracted a total of $1,153,040 from St Ives Gold Mining Company ($371,040), Placer Dome Asia Pacific Ltd ($564,000) and MERIWA ($218,000).

Board of Directors' Report (Continued)

M378 – *Use of Metham Sodium to Eliminate Phytophthora from Roading Gravel*

Native plants in the south-west of Western Australia are susceptible to "dieback" caused by the fungal pathogen *Phytophthora cinnamomi*. The fungus is easily spread through movement of infested soil, which occurs during road construction among other activities, and dieback-free roading gravel is in short supply. The gravel industry is keen to develop methods to treat gravel from *Phytophthora*-infested pits, one means of which may be to fumigate with metham sodium. This chemical is used in intensive horticulture but is not registered for treating gravel. This project therefore will determine the efficiency of metham sodium in killing *Phytophthora*, and whether the needed concentration can be achieved in gravel long enough to make it *Phytophthora*-free. The research is being done at Curtin University's Department of Environmental Biology and Applied Chemistry by Dr Elaine Davison and Dr Ben Warton, over one year. Its sponsors are Nufarm Ltd, B & J Catalano and Main Roads WA ($10,000 each) and MERIWA at $14,390.

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. Fourteen applications were received and it was encouraging to see the continuing high quality of the applications and the diversity and potential of many of the projects being pursued. The selection committee awarded three scholarships, two of which commenced in this financial year: Mr Matthew Helinski of the University of Western Australia and Mr Rhett Hassell of the Western Australian School of Mines, Curtin University of Technology (both commencing February 2005). The third scholarship was awarded to Ms Annika Gillgren of Curtin University of Technology (commencing July 2005).

Matthew Helinski is pursuing a PhD at the University of Western Australia, studying the *"Mechanics of Mine Backfill"* in the Civil and Resource Engineering Department, developing a method to predict barricade loading during filling operations. He is being funded for the final two years of his PhD to investigate the dissipation of pore water pressure as it influences the stability of fill masses in containment structures; this will permit an improvement in calculating barricade loading which currently ignores excess pore water pressure.

Rhett Hassell has been working on MERIWA Project M333 *"Corrosion of Ground Support in Underground Mines"* based at the Western Australian School of Mines (WASM) in Kalgoorlie. Rhett is developing a Corrosivity Classification Scheme with data from eight mine sites. His project outcomes will deliver knowledge about the serviceability of rock reinforcement in various environments which in turn will deliver a significant improvement in operational safety and cost savings to the mining industry. His scholarship is for one year to allow him to complete his PhD.

Annika Gillgren is investigating *"Wireless Transmission for Intelligent Well Monitoring Systems"*. Annika will be funded for three years from July 2005 to pursue this research, based at Curtin University in the Department of Mechanical Engineering. Her project arises from the application of electromagnetic waveguide theory to transmission of down-hole sensor measurements in oil and gas wells. Available radio-frequency transmitters can be used with the well tubing as a waveguide, holding promise of significant advantages over well monitoring systems currently in use. Annika's PhD study will include experiments to confirm the absorption spectra of various fluids and finite element modelling of electromagnetic wave propagation.

Finance

The financial statements for MERIWA for 2004/2005 appear later in the report.

The net assets reflect industry sponsorship yet to be received of $0.786m, contracted for the next 3 years.

Following commencement of the legislation for the transfer of alternative energy research to the Office of Energy, a sum of $445 732 was transferred to the Office of Energy at the end of 2003/04 and MERIWA has no further liability in this respect.

The total cost of services was $1 984 590 ($2 124 043 in 2003-04) of which $1 730 265 was paid for research grants. Revenue of $1 226 263 was received from industry and $85 930 from interest and other income related to services. The net cost of services was thus $672 397 ($398 620 in 2003-04) which was funded by government appropriation and resources free-of-charge of $658 675 ($644 608 in 2003-04). The surplus was added to previous accumulated surplus.

Board of Directors' Report (Continued)

Publications

Eight 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 239, 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 2004/2005 one microfiche, 17 hard copy and 29 CD-ROM format reports were sold, producing revenue of $2 765.

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.

Changes to the Board

As of 1 July 2004, Mr Rex Baker, a Board member of MERIWA since 1993, commenced serving as Chairman, replacing Dr Colin Branch who stepped down after 15 years. Dr Branch continued to serve as a Board member.

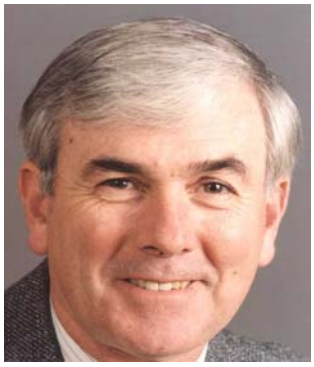
In December 2004, Mr Rowley Butters retired from the Board of Directors. Mr Butters was first appointed to the MERIWA Board in 1988, having been appointed to the WAMPRI Board in August. An oil and gas industry financial consultant, his long-standing commitment to MERIWA's well being as Principal Accounting Officer was greatly appreciated. Mr Butters was replaced by Ms Abigail Webster, Company Secretary at Barrick Gold of Australia, as Board member and Principal Accounting Officer from January 2005.

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.

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



Performance Measures

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. 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. This not only allows a larger volume of research to be supported, but ensures that the key objective of promoting research relevant to industry is more likely to be 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				
	2004-05	**2003-04**	**2002-03**	**2001-02**	**2000-01**
Value of minerals research commenced	1 623	1 201	1 053	2 079	1 442
Scholarships	30	45	30	40	40
Industry sponsored scholarship	- -	- -			30
Total	**1 653**	**1 246**	**1 083**	**2 119**	**1 512**

Performance Measures (Continued)

	2004-05	2003-04	2002-03	2001-02	2000-01
Industry sponsorship achieved	66%	80%	55%	74%	69%
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 239 reports on the research projects it has supported since its inception. CD copies are distributed widely to all relevant technical libraries in Western Australia and to most Australian universities. Reports in microfiche, CD or hard copy format are sold to industry at prices which cover production and distribution costs. The table below shows that 2,302 research project reports have been distributed to industry and technical libraries over the past 5 years.

Synopses of all reports published during 2004/05 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.

Performance Measures

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	2004-2005	2003-2004	2002-2003	2001-2002	2000-2001
Microfiche	1	1	3	8	394
Hard copy	78	95	73	66	73
CD-ROM	364	314	295	527	10
Total	**443**	**410**	**371**	**601**	**477**

Performance Measures (Continued)

Effectiveness

The table below indicates that for every dollar of government funds expended on research in 2004/2005 (excluding scholarships), $2.79 of research was commenced.

	2004-2005	2003-2004	2002-2003	2001-2002	2000-2001
Ratio of research value to government funds utilised	2.26	3.41	2.21	2.60	2.62

Efficiency

MERIWA's overall efficiency decreased in 2004/05 with slightly higher value of research commenced offset by higher administration costs. (Three year moving average).

	2004-2005	2003-2004	2002-2003	2001-2002	2000-2001
Administration cost as a percentage of value of research generated	8.14	8.4	10.97	8.83	9.00

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

Performance Measures

TABLE 4: MERIWA Results

Factors	2004/05	2003/04	2002/03	2001/02	2000/01
PROJECTS					
Applications received	14	12	11	16	10
Projects approved	9	7	8	9	8
Projects completed	8	7	7	4	8
TECHNOLOGY TRANSFER					
No. reports published	8	7	7	13	8
No. microfiche issued or sold	1	1	3	8	394
No. hard copies issued or sold	78	95	73	66	73
No. CD ROM copies issued or sold	364	314	295	527	10
Other publications (Research News)	2	2	3	2	2
FUNDS UTILISED ($'000)					
Budget appropriation	645	631	617	612	611
Interest on cash flow	83	95	87	81	110
Other income	3	2	3	3	2
Transferred from (to) reserves	(14)	(246)	(231)	*(2 130)	(173)
Total Government funds utilised	**717**	**482**	**476**	**(1 434)**	**550**
Less administration costs	188	138	150	137	174
Funds utilised to support research	**529**	**344**	**326**	**(1 571)**	**376**
MERIWA GRANTS					
For research projects	551	335	472	531	480
For scholarship	30	45	30	40	36
Total grants	**581**	**380**	**502**	**571**	**516**
INDUSTRY SPONSORSHIP					
Coordinated through MERIWA	1 072	1 309	581	1 548	962
Coordinated separately	-	-	1 633	-	-
Joe Lord Memorial Scholarship	-	-	-	-	34
Total industry sponsorship	**1 072**	**1 309**	**2 214**	**1 548**	**996**
Total value of new research projects	**1 623**	**1 201**	**1 053**	**2 079**	**1 442**
Value of research generated to government funds utilised	**2.26**	**3.41**	**2.21**	**2.60**	**2.62**
Administration cost to value of research generated**	**8.14%**	**8.4%**	**10.97%**	**8.83%**	**9.00%**

* 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	Strategic Projects Manager – Office of Major Projects
	Mr R J Hart (Deputy Member)	Project Manager - New Business
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 K Spence (Deputy Chairman)	Chief Operating Officer, Woodside Energy Ltd.
	Dr J D Gorter (Deputy Member)	New Ventures Manager Eni Australia Limited

* Member resigned during year.

Minerals Research Advisory Committee

In keeping with past practice my first task is to thank fellow members on the Minerals Research Advisory Committee (MRAC) for their individual and cooperative input over the past twelve months. Their involvement in the assessment and review of research proposals at both the sub-committee and advisory committee stages are at the very heart of the Institute's work.

During the past year nine research projects were recommended to the Board for Institute sponsorship. These included five geoscience, one environmental and one engineering projects, having a total cash value of $1,623,029, of which $550,766 was supplied by MERIWA. This gives a leverage of almost $3 from industry sponsors for every $1 provided by the State Government through MERIWA.

It is also interesting to note that over the past decade MERIWA has received an increasing number of large projects with cash values in the range of $0.5 to $1.00 million which has involved the Institute in increasing its allocation to between $120,000 and $200,000 per project. Many of these projects are of long term strategic value to the State and involve a continuation of funding into subsequent stages of applied research and following are some of the projects in this category:

- Mine Seismicity and Rockbust Risk Management, Phases I and II.
- Australian Rockfall Research, Phases I and II.
- Scale-Integrated Architecturally, Geo-dynamically and Geochemically Constrained Targeting Models fro Gold Deposits in the Eastern Goldfields, Phases I and II.
- Dynamic Testing of Ground Support Elements, Phases I and II.
- Feasibility of Seismic Methods for Exploration of Gold Deposits in WA. (This project has subsequently led to the provision of State Government funds for the establishment of a Centre for Excellence in high definition geophysics).

Hopefully this healthy trend will result in increasing levels of State Government funding for MERIWA's future activities.

It is also important to record the fact that MRAC has in the recent past gained sixteen new members/deputy members in order to fill existing vacancies or replace those who were retiring. I extend my sincere gratitude and my very best wishes to those who have retired after many years of distinguished service, and a very warm welcome to all our new members.

Finally let me on behalf of everyone at MRAC record our thanks to the MERIWA Secretariat for their support and guidance during the past twelve months. In doing so let me emphasise the contributions of the Executive Officer Mr David Milton, Dr Pam Smith the Project Coordinator and Ms Gwen Davies who in more senses than one is the administrative hub of the Institute.

Emeritus Professor Odwyn Jones
Chairman.

Reports Published in 2004/05

M304 GENETIC STRATIGRAPHIC ANALYSIS OF THE HAMERSLEY GROUP

Report No. 231

Grantee: *The University of Western Australia*
Applicants: *A/Prof.M Barley and Dr B Krapez*
Grant Amount: *$180 000*
Duration: *3 years*
Commenced: *May, 1998*
Sponsors: *Hamersley Iron Pty Limited, Robe River Mining Co Pty Ltd.*

This project went ahead on the premise that genetic stratigraphic analysis, in which sequence stratigraphic principles were applied to Hamersley Group BIFs and interbedded rocks, could offer new insights into the genesis of BIFs and ore distribution that numerous, comprehensive lithostratigraphic studies had not so far provided. A conceptual model of hydrothermal deep-sea BIF formation derived from observations on core from the Red Sea was brought to bear on the complementary field studies of Hamersley rocks, which include BIFs that contain original iron oxyhydroxides. The study was focussed on the Brockmann Supersequence only, due to funding limitations. It revealed that all spatial variations in the composition of BIFs can be linked to post- rather than syn-depositional events, from diagenesis to metamorphism and including a regional extensional pulse. This extension was linked to the formation of metamorphic magnetite, and it is suggested that further study of this proto-ore may be warranted.

M338/ M338A CRETACEOUS & NEOGENE REACTIVATION & INVERSION HISTORY OF THE NORTHERN CARNARVON BASIN & THE ROLE OF BASEMENT HIGHS IN THE DISTRIBUTION OF CRETACEOUS & NEOGENE STRAIN IN THE CARNARVON BASIN & BROWSE BASIN/TIMOR SEA

Report No. 239

Grantee: *The University of Western Australia*
Applicant: *Dr M Keep*
Grant Amount: *$213 795 / $46 642*
Duration: *3 years / 1 year*
Commenced: *January, 2001 / January 2004*
Sponsors: *M338: Woodside Energy Ltd, Agip Australia Limited, Santos Ltd.*
M338A: Woodside Energy Ltd.

A single comprehensive final report presents the results from both Project M338 and its separately funded one-year extension, M338A, which focussed on the Swan Graben. The goals of these studies included the following: 1. to investigate the nature, timing and distribution in the northern Carnarvon Basin of inversion and reactivation events in the Cretaceous and Neogene, 2. to examine the effects of structural highs on Neogene deformation in the outer margins of both the Carnarvon and the Browse Basins, 3. to characterise the architecture in the central Browse Basin created by Neogene deformation, 4. to develop a robust kinematic model of Neogene deformation through the Browse-Bonaparte boundary, and 5. to relate timing and distribution of Neogene deformation to the evolution of Australia's collisional boundary. Outcomes of these investigations included an improved understanding of the role basement highs in the continental margin have played in partitioning strain, the cumulative effects of superposed inversion events, and elucidation of some accommodation zone features in the basins. Some of the work was carried out in conjunction with the University of Adelaide as well as at the Grantee institution.

Results of the four years of work suggest that depocentres in this margin were largely fixed in location since Permian time and are flanked by basement highs that flex upward, and thus produce normal fault regimes, in this contractional tectonic setting. In the Swan Graben extension project, mechanisms and effects of salt diapirism were illuminated, since their interplay has in some cases led to breaches of trap seals; the report presents results of stress analyses constrained by borehole data that have been used to assess the risk of fault reactivation. Conclusions reached were that Neogene tectonism on the margin amplified pre-existing basement relief, and that Neogene deformation and deposition do not reflect thin-skinned detachment, or penetrative strike-slip deformation, involving basement underlying these basins. Models are presented showing that Neogene to Recent deformation of the Timor Sea/Browse Basin area constitutes elastic flexure of the Australian Plate at wavelengths of approximately 600km, and that in the North West Cape region the Australian Plate behaves as an articulated body, the Pilbara and Kimberley blocks moving independently of each other.

Reports Published in 2004/05

M340 XMML – ONLINE DATA TRANSFER FOR THE EXPLORATION AND MINING INDUSTRY

Report No. 240

Grantee: *CSIRO – Exploration and Mining*
Applicant: *Dr S Cox*
Grant Amount: *$285 000*
Duration: *1½ years*
Commenced: *December, 2000*
Sponsors: *Fractal Graphics, Snowden Technologies Pty Ltd, WMC Resources Ltd, Placer Dome Asia Pacific, British Geological Survey, U.K., Geoscience Australia, Geological Survey of Victoria, Geological Survey of Western Australia, NSW Dept. of Mineral Resources, SA Office of Minerals & Energy Resources, Tas Dept. of Infrastructure, Energy and Resources, NT Dept. of Mines and Energy, Qld Dept. of Natural Resources and Mines.*

In the exploration industry there has long been a perceived need for computer-based ways of accessing, transferring, and combining many different types of data and many geoscientific data sets. This project accomplished the development of eXploration and Mining Markup Language to facilitate this access and transfer, using the World Wide Web. The multitude of sponsors desired web-based exchange of their data and models, as well as download of data directly from open file and multi-client data bases and upload of statutory reporting direct to mines departmental data bases. It was also an objective of the project to align within standard specifications, so the work was done in consultation with the ISO as well as the Open-GIS Consortium. A high-risk aspect of the project was the expectation that XMML would have a broad, even worldwide uptake as the standard where others had failed, and it is rewarding to see that indeed, less than 5 years later XMML has become one of two acknowledged standards world-wide for exchange of geoscientific datasets, and is spreading in use among regulators and software vendors as well as data-providers and -users. Numerous follow-on projects have developed naturally since M340 was completed in July 2004. The final report for the project consists of explanatory pages interspersed with screen print-outs of the XMML modules as they existed at 30 June 2004. The XMML code is freely available from the web-site: http://www.seegrid.csiro.au/xmml.

M345 AUTOMATED MEASUREMENT OF PHASE BEHAVIOUR IN NORTH WEST SHELF PETROLEUM AND NATURAL GAS FLUIDS USING ADVANCED MICROWAVE TECHNOLOGY

Report No. 236

Grantee: *The University of Western Australia*
Applicant: *A/Prof T Edwards and Dr A Mann*
Grant Amount: *$295 000*
Duration: *2 years*
Commenced: *June, 2001*
Sponsors: *Woodside Energy Ltd, Vision Reservoir Management Technologies.*

There were two principal aims in this research. The first was to develop a variable volume microwave resonator for automated measurement of phase behaviour in gas condensate fluids, and was accomplished in the second year of the program. The second aim was to verify microwave equivalence of conventional measurements of pressure, volume and temperature (PVT) to those from commercial oil service laboratories. In the course of obtaining these comparison results, it was observed that the variable volume sensor (VVS) was highly sensitive to the details of the equilibration process.

These results are important for the design of subsequent commercial instruments. The VVS was developed from a constant volume sensor made in the early stage of the project, by incorporating a bellows onto the microwave cavity. The results showing the VVS' sensitivity led to more study of the phase separation relaxation times, rather than tests over a wide range of sample compositions. The VVS allows faster, cheaper and more accurate laboratory PVT measurements, to help maximise hydrocarbon recovery.

Efforts were focussed next on development of a field instrument for in-situ measurements, to be made eventually down-hole.

Reports Published in 2004/05 (Continued)

M346 UPPER CRUSTAL STRUCTURE OF THE LAVERTON TECTONIC ZONE ADJACENT TO MAJOR GOLD DEPOSITS FROM SEISMIC REFLECTION PROFILING

Report No. 246

Grantee: *The University of Western Australia*
Applicant: *A/Prof M Dentith and Dr B Goleby*
Grant Amount: *$215 000*
Duration: *1 year*
Commenced: *August, 2001*
Sponsors: *AngloGold Australasia Limited, Placer (Granny Smith) Pty Limited.*

It has been observed for some time that the locations of world-class gold deposits in the Eastern Goldfields of Western Australia are spatially associated with the positions of several major shear zones. Deep seismic reflection data acquired by Geoscience Australia (formerly AGSO) in 1991 and 1999 around Kalgoorlie had helped to delineate the three-dimensional geometry of these shear zones, and had led to a mapped interpretation of the granite-greenstone succession as compartmentalised in shear-zone bounded domains. Project M346 was set up to acquire a second regional seismic transect in an area of the Eastern Goldfields outside the Kalgoorlie locale; the line location selected by the project sponsors was between the Laverton and Leonora mineral fields, where gold deposits are associated with the major shear zones.

Questions the project aimed to resolve were: 1. What structures control this mineralisation? 2. What is the internal structure of the mineralised zones? and 3. Do these zones have a similar crustal structure to that of the Kalgoorlie region? This processed seismic transect, when tied with surface-mapped geology and integrated with other geophysical data, has led to models on the sub-greenstone belt scale that are proving valuable for exploration companies' decision-making. The project report includes detailed seismic interpretations of the regional sub-surface granite-greenstone body geometries, tied to surface geologic data sets.

M347 TRACE FOSSILS & THEIR APPLICATION TO HIGH RESOLUTION SEQUENCE STRATIGRAPHY & ASSOCIATED CEMENT DISTRIBUTION: MIDDLE JURASSIC TO LOWER CRETACEOUS INTERVAL, NORTH WEST SHELF

Report No 241

Grantee: *The University of Western Australia*
Applicant: *Drs F Burns and A George*
Grant Amount: *$183 558*
Duration: *2 years*
Commenced: *April, 2002*
Sponsors: *Agip Australia Limited (now Eni) Apache Energy Limited, ChevronTexaco Australia Pty Ltd, ConocoPhillips Petroleum Australia, Woodside Energy Limited.*

Following on from Project M335, the researchers assembled a broader sponsor base to continue ichnological and sedimentological interpretations of core, from the Timor Sea (Bayu-Undan and Jahal-Laminaria) and the Carnarvon Basin (Saladin-Roller). The Bathonian-Callovian interval in the Timor Sea and the Barrow Group and Mardie Greensand farther south in the Carnarvon Basin were analysed for both ichnofacies and, in the Mardie, carbonate cement formation to better understand reservoir rock development. The study aims included identification using ichnology of major stratal surfaces previously overlooked, construction of high-resolution sequence stratigraphic frameworks for reservoir intervals, and production of an atlas of ichnofabrics to display key recurring trace fossil types. The cementation studies were undertaken by a visiting researcher. From the hierarchy of stratal surfaces identified, a framework emerged in which lateral continuity of genetically related facies can be interpolated among wells, appropriate for reservoir modelling. The ichnofacies atlas is available as a MERIWA report. The cementation studies of siderite contributed to identifying possible basin-wide hiatuses significant for exploration, and indicated that a basin-wide study of the Mardie Greensand would contribute to better discrimination among mechanisms that formed the hiatuses.

Reports Published in 2004/05 (Continued)

M348 DEVELOPMENT OF TANTALUM-SILICON PHOTOVOLTAIC DEVICES

Report No 250

Grantee: *The University of Western Australia*
Applicant: *Drs J Livingstone and J Henry*
Grant Amount: *$23 000*
Duration: *3 years*
Commenced: *January, 2002*
Sponsors: *Sons of Gwalia Ltd.*

Tantalum's physical and electronic properties are known to give the metal high potential in optoelectronic device roles. This three-year project entailed studies of the metal's use in layered structures on silicon substrates operating in photovoltaic configurations. Used in thin layers in this configuration, tantalum was found to form excellent photovoltaic optoelectronic sensors that provide very precise positional accuracy. Such position sensitive detectors, or PSDs, generate an electrical signal that varies linearly with the position of a light spot incident on a semiconductor junction or interface. A range for the optimal thickness of tantalum film in such devices is 50Å - 2000Å, with better than 10µm spatial resolution achieved. Further optimisation resulted through alteration of the thickness and resistivity of the silicon substrates. Tantalum compared favourably with titanium and aluminium in tests of performance of thin films, and its very high melting point appears to contribute to its stability and long life as part of a layered device. A further result of the study was that solar cells containing tantalum could not compare well with standard doped junction solar cells.

M357A A SAMPLING STRATEGY FOR *PHYTOPHTHORA* FOR "DIFFICULT" SITES

Report No 243

Grantee: *Curtin University of Technology*
Applicant: *Dr E Davison*
Grant Amount: *$16 100*
Duration: *9 months*
Commenced: *October, 2003*
Sponsors: *Iluka Resources Limited,*
Tiwest Joint Venture,
Worsley Alumina Pty Ltd.

An extension to Project M357 was sought to make a systematic survey of the boundary of eight *Phytophthora* infested areas in the southwest of Western Australia, to determine isolation frequency of several *Phytophthora* species. Soil and fine root samples were collected and the soil samples double-baited in the laboratory. Double-baiting increased the recovery of *P.cinnamomi* by 17%. The proportion of samples not yielding *Phytophthora* was used to estimate the number of samples from within 5m of a dieback front that must be tested which, if all proved negative, would indicate an absence of *Phytophthora*. The numbers of samples necessary for *P.cinnamomi* and for all *Phytophthora* species are given in the report, along with details of the method and the connection to M357 results.

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦

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.

MERIWA will accept applications throughout the year for financial assistance for such projects. 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 2005

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
M328	Mine seismicity and rockburst risk management	Prof Y Potvin A/Prof R Jewell	ACG	3½	747 000	1 087 000
M331	Shallow water tow-out issues in WA-based construction of concrete gravity structures for offshore oil and gas production	Dr K P Thiagarajan Dr B F Ronalds	UWA	2	97 567	97 567
M332	Management of *Rumex vesicarius* L. on rehabilitated mine sites in the goldfields of Western Australia	A/Prof J Osborne Dr A Schatral	Curtin	2	77 000	112 600
M333	Corrosion of rock reinforcement in underground excavations	Prof E Villaescusa	WASM	3	350 000	620 511
M349	Dynamic testing of ground support elements	Prof E Villaescusa Dr A Thompson	WASM	2	238 689	280 654
M349A	Dynamic testing of ground control systems	Prof E Villaescusa Dr A Thompson	WASM	3	474 000	627 900
M350	Selective herbivory by kangaroos in mined land	Prof B Lamont	Curtin	3½	126 011	345 011
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
M356	Structural and stratigraphic architecture of the Agnew-Wiluna Belt	A/Prof M Barley Dr B Stone	UWA	2	53 153	53 153
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	109 000	966 000
M360	Australian rockfall research – phase II	Prof Y Potvin	UWA/ACG	1½	185 000	215 000
M361	The development of a new molecular method for the detection of Phytophthora cinnamomi	Dr P O'Brien Miss N Anderson	Murdoch	¼	12 000	96 876

Projects in Progress: 30 June 2005 (Continued)

No.	Project Title	Applicants	Institute	Term (yrs)	Cash Cost ($)	Notional Value ($)
M363	Feasibility of seismic methods for exploration of gold deposits in Western Australia	Dr M Urosevic 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
M367	Industrial applications using improved measurements of particle surface charge	Dr V Patrick	Central Chemical Consulting	1	203 000	203 000
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
M370	Regolith, geology and alteration mineral maps from new generation airborne and satellite remote sensing technologies	Dr T Cudahy	CRC LEME/ CSIRO	1	250 000	392 000
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
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	1 218 880	1 831 880
M378	Use of metham sodium to eliminate *Phytophthora* from roading gravel	Dr E Davison Dr B Warton	Curtin	1	44 390	44 390

Reports not yet Published as at 30 June 2005

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	To be published on CD-ROM
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
248	M362	Innovative techniques for promoting fauna return to rehabilitated sites following mining	K Brennan J Majer O Nichols	To be published on CD-ROM

Financial Assistance from Industry

The following list is of companies and organisations which provided financial sponsorship in 2004/05 for projects in progress. The Board of Directors thanks these groups for their sponsorship and support.

MINERALS RESEARCH

Agnico-Eagle division Laronde (Canada)
Alcoa World Alumina Australia
Barrick Gold of Australia Ltd
BHP Billiton Cannington
BHP Billiton Petroleum Pty Ltd
Black Swan Nickel Pty Ltd
Central Chemical Consulting Pty Ltd
CSIRO/CRC LEME
Geological Survey of Western Australia
Goldfields – St Ives Gold Mining Company Pty Ltd
Harmony - Big Bell Gold Operations Pty Ltd
Kanowna Belle Gold Mines Limited
Kalgoorlie Consolidated Gold Mines Pty Ltd
Lightning Nickel Pty Ltd
Perilya Broken Hill Limited
Placer Dome Asia Pacific Pty Ltd
Rio Tinto Technical Services
Tiwest Joint Venture
WA School of Mines – Curtin University
Whiteman Park
WMC Resources Ltd – Mt Keith Operations
Woodside Energy Ltd
Woodside Petroleum Ltd
Worsley Alumina Pty Ltd

Audited Statements

Performance Indicators
for the year ended 30 June 2005

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 2004/2005 was 66% 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. Fourteen applications were processed and three scholarships awarded.

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	2004/2005	2003/2004	2002/2003	2001/2002	2000/2001
% Industry sponsorship achieved.	66%	80%	55%	74%	69%
Target.	65%	65%	65%	65%	65%
Research value	1 623 029	1 200 742	1 052 940	2 079 092	1 441 539

Efficiency Indicator – Output	2004/2005	2003/2004	2002/2003	2001/2002	2000/2001
$ cost per minerals research grant administered	6 497	4 745	5 172	5 276	8 285

Certification of Performance Indicators
for the year ended 30 June 2005

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 2005.

A Webster
DIRECTOR AND
PRINCIPAL ACCOUNTING OFFICER

S R Baker
CHAIRMAN,
BOARD OF DIRECTORS

26 August 2005

Opinion of the Auditor General on Performance Indicators for the year ended 30 June, 2005

AUDITOR GENERAL

INDEPENDENT AUDIT OPINION

To the Parliament of Western Australia

MINERALS AND ENERGY RESEARCH INSTITUTE OF WESTERN AUSTRALIA PERFORMANCE INDICATORS FOR THE YEAR ENDED JUNE 30, 2003

Audit Opinion
In my opinion, the key effectiveness and efficiency performance indicators of the Minerals and Energy Research Institute of Western Australia are relevant and appropriate to help users assess the Institute's performance and fairly represent the indicated performance for the year ended June 30, 2003.

Scope
The Board's Role
The Board is responsible for developing and maintaining proper records and systems for preparing performance indicators.

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

Summary of my Role
As required by the Financial Administration and Audit Act 1985, I have independently audited the performance indicators to express an opinion on them. This was done by looking at a sample of the evidence.

An audit does not guarantee that every amount and disclosure in the performance indicators is error free, nor does it 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 performance indicators.

D D R PEARSON
AUDITOR GENERAL
November 18, 2003

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

Statement of Financial Performance
for the year ended 30 June, 2005

	Note	2005	2004
		$	$
COST OF SERVICES			
Expenses from ordinary activities			
Research Grants	2	1,730,265	2,095,458
Scholarships	3	29,999	45,000
Employee expenses	4	103,520	88,675
Board and committee fees and costs	5	40,258	36,233
Administration expenses	6	30,455	7,103
Accommodation expenses	7	14,175	13,608
Capital User Charge	8	34,003	34,000
Depreciation expense	9	1,915	264
Sponsorship revenue written back		-	35,680
Total Cost of Services		1,984,590	2,356,021
Revenues from ordinary activities			
Interest Revenue	10	83,165	94,552
Other Revenue	11	2,765	1,907
Revenues from Industry Sponsorship	12	1,226,263	1,628,964
Total Revenues from ordinary activities		**1,312,193**	**1,725,423**
NET COST OF SERVICES		**672,397**	**630,598**
REVENUES FROM STATE GOVERNMENT			
Service Appropriation	13	644,500	901,000
Resources received free of charge	14	14,175	13,608
Total revenues from State Government		658,675	914,608
CHANGE IN NET ASSETS		**13,722**	**284,010**
Total changes in equity other than those resulting from transactions with WA State Government as owners		**13,722**	**284,010**

The Statement of Financial Performance should be read in conjunction with the accompanying notes.

Statement of Financial Position
for the year ended 30 June, 2005

	Note	2005	2004
		$	$
CURRENT ASSETS			
Cash Assets	15, 21(a)	17,502	17,334
Restricted Cash Assets	16, 21(a)	1,936,196	1,490,813
Grants receivable – Sponsorship	1(f)	790,011	928,547
Grants receivable – Scholarship	1(f)	-	2,000
Accrued Interest on Short Term Investments	1(g)	4,081	3,163
Receivable	17	37,169	
Total current assets		**2,784,959**	**2,441,857**
NON-CURRENT ASSETS			
Grants receivable - Sponsorship	1(f)	46,000	24,000
Plant and equipment	18	6,791	5,036
Total non-current assets		**52,791**	**29,036**
Total Assets		**2,837,750**	**2,470,893**
CURRENT LIABILITIES			
Accrued Expenses	19	21,478	16,389
Grants Payable – Research	1(j)	533,422	152,100
Grants Payable – Scholarship	1(k)	32,500	29,501
Grants received in advance -sponsorship		35,000	-
Payables	20	-	33,831
Total current liabilities		**622,400**	**231,821**
NON-CURRENT LIABILITIES			
Grants Payable – Scholarship	1(k)	5,000	15,000
Total non-current liabilities		**5,000**	**15,000**
Total Liabilities		**627,400**	**246,821**
NET ASSETS		**2,210,350**	**2,224,072**
EQUITY			
Accumulated Surplus	21	2,210,350	2,224,072
Total Equity		**2,210,350**	**2,224,072**

The Statement of Financial Position should be read in conjunction with the accompanying notes.

Statement of Cash Flows
for the year ended 30 June, 2005

	Note	2005	2004
		$	$
CASH FLOWS FROM STATE GOVERNMENT			
Service appropriation	1(a)	644,500	901,000
Distribution to owner		-	(445,732)
Net cash provided by State Government		**644,500**	**455,268**
Utilised as follows:			
CASH FLOWS FROM OPERATING ACTIVITIES			
Payments			
Payment for Research Grants		(1,434,436)	(2,056,599)
Payment for Employee Costs		(98,954)	(80,994)
Capital User Charge		(33,480)	(25,500)
Other Payments		(70,714)	(50,626)
GST Payments on Purchases		(146,116)	(204,989)
GST Payments to Taxation Authority		(26,783)	-
Receipts			
Receipts from Sponsors		1,377,799	1,536,501
Receipts from Scholarships		2,000	2,000
Interest received		82,247	96,768
Other receipts		2,765	1,907
GST receipts on sales		150,393	138,669
GST receipts from Taxation Authority		-	54,255
Net cash used in operating activities	22(b)	**(195,279)**	**(588,608)**
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchase on non-current physical assets		(3,670)	(5,300)
Net cash used in investing activities		**(3,670)**	**(5,300)**
Net decrease in cash held		445,551	(138,640)
Cash assets at the beginning of the financial year		1,508,147	1,646,787
Cash assets at the end of the financial year	22(a)	**1,953,698**	**1,508,147**

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

Notes to the Financial Statements
for the year ended 30 June, 2005

1. Significant accounting policies

The following accounting policies have been adopted in the preparation of the financial statements. Unless otherwise stated these policies are consistent with those adopted in the previous year.

General Statement

The financial statements constitute a general purpose financial report which has been prepared in accordance with Accounting Standards, Statements of Accounting Concepts and other authoritative pronouncements of the Australian Accounting Standards Board, and Urgent Issues Group (UIG) Consensus Views 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 Accounting Standards, Statements of Accounting Concepts and other authoritative pronouncements of the Australian Accounting Standards Board, and UIG Consensus Views. The modifications are intended to fulfill the requirements of general application to the public sector, together with the need for greater disclosure and also to satisfy accountability requirements.

If any such modification has a material or significant financial effect upon the reported results, details of that modification and where practicable, the resulting financial effect, are disclosed in individual notes to these financial statements.

Basis of Accounting

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

(a) Service Appropriations

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

(b) Revenue Recognition

Revenue from the sale of goods and the rendering of services is recognised when the Institute has passed control of the goods or delivery of the service to the customer.

(c) Acquisitions of assets

The cost method of accounting is used for all acquisitions of assets. Cost is measured as fair value of the assets given up or liabilities undertaken at the date of acquisition plus incidental costs directly attributable to the acquisition. Assets costing less than $1,000 are expensed in the year of acquisition.

(d) Depreciation of non-current assets

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

Depreciation is calculated on the straight line basis 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, 2005

(e) Cash

For the purpose of the Statement of Cash Flows, cash includes cash assets and restricted cash assets net of outstanding overdrafts. These include short-term deposits that are readily convertible to cash on hand and are subject to insignificant risk of changes in value.

(f) Receivables

Receivables are recognised at the amounts receivable as they are due for settlement no more than 30 days from the date of recognition.

Collectability of receivables is reviewed on an ongoing basis. Debts which are known to be uncollectable are written off. A provision for doubtful debts is raised where some doubts as to collection exists.

(g) Investments

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

(h) Payables and Accrued Expenses

Payables including accruals not yet billed are recognised when the Institute becomes obliged to make future payments as a result of services provided and are generally settled within 30 days.

(i) Superannuation

All Institute staff are non-contributory members of the West State Superannuation Scheme, an accumulation fund. The Institute contributes to this accumulation fund in compliance with the Commonwealth Government's Superannuation Guarantee (Administration) Act 1992. This scheme is administered by the Government Employees Superannuation Board.

The liability for superannuation charges under the West State Superannuation Scheme is extinguished by payment of employer contributions to the Government Employees Superannuation Board.

(j) 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 Institute 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.

(k) 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.

Notes to the Financial Statements for the year ended 30 June, 2005

(l) Capital User Charge

A Capital user charge rate of 8% has been set by the Government for 2004/2005 and represents the opportunity cost of capital invested in the net assets of the Institute used in the provision of outputs. The charge is calculated on the net assets, and payments are made to the Department of Treasury and Finance on a quarterly basis.

(m) Sponsorship Revenue

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

(n) Resources Received Free of Charge

Resources received free of charge are recognised as revenues and expenses as appropriate at fair value.

(o) Comparative Figures

Comparative figures are, where appropriate, reclassified so as to be comparable with the figures presented in the current financial year.

(p) Rounding of amounts

Amounts in the financial statements have been rounded to the nearest dollar.

(q) Restructuring of the Alternative Energy Development Board (AEDB)

As a consequence of the Energy Legislation Amendment Act 2003, the Minister for State Development approved in June 2004, the transfer of all financial aspects of the AEDB to the Office of Energy - Sustainable Energy Development Office. Consequently all attendant assets and liabilities were transferred effective from that date.

This being a non reciprocal and non discretionary arrangement, the net transfer of assets was deemed a distribution to owners and was taken directly to Equity - Accumulated Surplus in the Statement of Financial Position.

(r) Contributed Equity

Under UIG 38 “Contributions by Owners Made to Wholly-Owned Public Sector Entities” transfers in the nature of equity contributions must be designated by the Government (owners) as contributions by /or distributions to owners (at the time of, or prior to transfer) before such transfers can be recognised as equity contributions or distributions in the financial statements. Non discretionary transfers of net assets to other agencies have been designated as distribution to owners and have been debited directly to Contributed Equity in the Statement of Financial Position.

Notes to the Financial Statements for the year ended 30 June, 2005

2. Research Grants

	2005 $	2004 $
Research Grants – MERIWA	553,179	752,106
Research Grants – Industry Sponsorship	1,177,086	1,343,352
	1,730,265	**2,095,458**

3. Scholarships

Scholarships	29,999	45,000
	29,999	**45,000**

4. Employee expenses

Institute Contract Staff fees	94,049	81,353
Superannuation	9,471	7,322
	103,520	**88,675**

5. Board and Committee fees and costs

	2005 $	2004 $
Board of Director's remuneration	33,800	33,800
Advisory Committee attendance fees	4,468	1,896
Board and Advisory Committee's expenses	1,990	537
	40,258	**36,233**

6. Administration expenses

Printing and Stationery	3,384	3,066
Advertising	867	829
Audit fees	10,500	-
Worker's Compensation premium	1,943	2,106
Contractors	11,181	-
Bank Charges and fees	692	526
Other	1,888	576
	30,455	**7,103**

Notes to the Financial Statements
for the year ended 30 June, 2005

7. Accommodation expenses

Notional rental	14,175	13,608
	14,175	**13,608**

8. Capital User Charge

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

9. Depreciation expense

Plant and Equipment	1,915	264
	1,915	**264**

10. Interest Revenue

Interest on Investments – Term Deposits	83,165	94,552
	83,165	**94,552**

11. Other Revenue

	2005 $	**2004 $**
Sale of Publications	2,765	1,907
	2,765	**1,907**

12. Revenue from Industry Sponsorship

Sponsorship from Industry	1,226,263	1,628,964
	1,226,263	**1,628,964**

13. Service Appropriation

Appropriation Revenue	644,500	901,000
	644,500	**901,000**

Notes to the Financial Statements for the year ended 30 June, 2005

14. 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	13,608
	14,175	**13,608**

15. Cash Assets

Cash at bank	17,302	17,134
Cash on hand	200	200
	17,502	**17,334**

16. Restricted Cash Assets

Research Grants	1,936,196	1,490,813
	1,936,196	**1,490,813**

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

17. Receivables

GST Receivable	37,169	-
	37,169	**-**

18. Plant and equipment

	2005 $	**2004 $**
Plant and equipment		
At cost	8,970	5,300
Accumulated depreciation	(2,179)	(264)
	6,791	5,036

Reconciliations
2005

	Plant and equipment
Carrying amount at start of year	5,036
Additions	3,670
Depreciation	(1,915)
Carrying amount at end of year	6,791

Notes to the Financial Statements for the year ended 30 June, 2005

19. Accrued Expenses

Institute contract staff fees	10,503	7,238
Superannuation	1,952	651
Capital User Charge	9,023	8,500
	21,478	**16,389**

20. Payables

GST Payable	-	33,831
	-	**33,831**

21. Equity

Accumulated Surplus		
Opening Balance	2,224,072	2,385,794
Change in Net Assets	(13,722)	284,010
Contributions/(Distribution) to owners	-	(445,732)
Closing Balance	**2,210,350**	**2,224,072**

22. Notes to the Statement of Cash Flows

(a) Reconciliation of Cash

Cash at the end of the financial year as shown in the Statement of Cash Flows is reconciled to the related items in the Statement of Financial Position as follows:

	2005 $	2004 $
Cash at bank	17,302	17,334
Cash on hand	200	200
Restricted Cash Assets	1,936,196	1,490,813
	1,953,698	**1,508,347**

Notes to the Financial Statements for the year ended 30 June, 2005

22. Notes to the Statement of Cash Flows cont'd

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

Net cost of services	(672,397)	(630,598)
Non-cash items:		
Resources received free of charge	14,175	13,608
Depreciation	1,915	264
(Increase)/Decrease in assets:		
Accrued Interest	(918)	2,217
Grants Receivable – Sponsorship	116,536	(69,253)
Grants Receivable – Scholarship	2,000	2,000
Increase/(Decrease) in liabilities:		
Grants Payable -Research	(7,001)	83,100
Grants Payable –Scholarship	381,322	760
Sponsorship received in advance	35,000	-
Accrued expenses	5,089	8,890
Net GST payments	(22,507)	(12,065)
Change in GST in receivables	(48,493)	12,469
Net Cash used in operating activities	**(195,279)**	**(588,608)**

23. Commitments for expenditure

At the year end the Institute has $2,009,101 (2004 $1,542,344) of research grant commitmernts that are not recognised in the Statement of Financial Performance. The Institute is obliged to make payment when the grantee has net the conditions of grant (see note 2).

24. Other

The Institute has no contingent liabilities, nor any related or affiliated bodies and there were no events occurring after reporting date.

25. Remuneration of Auditor

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

	2005 $	2004 $
Auditing the accounts, financial statements and performance indicators	11,000	10,500
	11,000	**10,500**

Notes to the Financial Statements for the year ended 30 June, 2005

26. 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 and other benefits received or due and receivable for the financial year, fall within the following bands are:

			2005	2004
$0	-	$ 10,000	4	3
$10,001	-	$ 20,000	1	1

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

	$	$
	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 and other benefits received or due and receivable for the financial year, fall within the following bands are:

			2005	2004
$20,001	-	$ 30,000		1
$30,001	-	$ 40,000	1	

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

	$	$
	31,991	21,807

The superannuation included here represents the superannuation expense incurred by the Accountable 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, 2005

27. Explanatory Statement

(i) Significant variations between estimates and actual results for the financial year

Details and reasons for significant variations between estimates and actual results are detailed below. Significant variations are considered to be those greater than 10% and $2,000.

	Estimate 2005 $	Actual 2005 $	Variance $
Research Grants	1,491,000	1,730,265	(239,265)
Administration costs	51,000	30,455	20,545
Interest revenue	100,000	83,165	16,835
Other revenue	9,000	2,765	6,235
Sponsorship Revenue	1,000,000	1,226,263	(226,263)

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

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

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

Other revenue was below the estimate due to lower than expected sales of publications.

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

(ii) Significant variations between actual revenues and expenditures for the financial year and revenues and expenditures for the immediately preceding financial year.

Details and reasons for significant variations between actual results with the corresponding items of the preceding year are detailed below. Significant variations are considered to be those greater than 10% and $2,000.

	2005 $	2004 $	Variance $
Research Grants	1,730,265	2,095,458	(365,193)
Scholarships	29,999	45,000	(15,001)
Employee expenses	103,520	88,675	14,845
Board and Committee fees and costs	40,258	36,233	4,025
Administration costs	30,455	7,103	23,352
Sponsorship revenue written back	-	35,680	(35,680)
Interest revenue	83,165	94,552	(11,387)
Sponsorship Revenue	1,226,263	1,628,964	(402,701)
Service Appropriation	644,500	901,000	(256,500)

Notes to the Financial Statements for the year ended 30 June, 2005

27. Explanatory Statement cont'd

(ii) Significant variations between actual revenues and expenditures for the financial year and revenues and expenditures for the immediately preceding financial year (continued).

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

Scholarships – the variance is due to a decrease in the number of scholarships being awarded during the year.

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 an increase in the costs such as Audit fees and other contract fees.

Sponsorship written back – the variance is due to nil projects requiring to be written back during the year.

Interest revenue – the variance is due to a lower amount of funds being available for investment, in particular with the funds transfer of the Alternative Energy Development Board to the Office of Energy – Sustainable Energy Development Office.

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

Service Appropriation – the variance is due to the restructure of the Alternative Energy Development Board whereby all financial aspects were transferred to the Office of Energy – Sustainable Energy Development Office.

28. Financial Instruments

(a) Interest Rate Risk Exposure

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

30 June 2005	Weighted average effective interest rate %	Variable Interest Rate $ '000	Non-interest Bearing $ '000	Total $ '000
Financial Assets				
Cash Assets	3.55	17	-	17
Restricted Cash Assets	5.50	1,936	-	1,936
Grants Receivable – Sponsorship	-	-	836	836
Accrued Interest on Investments	-	-	4	4
Total Financial Assets		**1,953**	**840**	**2,793**

Notes to the Financial Statements for the year ended 30 June, 2005

28. Financial Instruments cont'd

30 June 2005	Weighted average effective interest rate %	Variable Interest Rate $ '000	Non-interest Bearing $ '000	Total $ '000
Financial Liabilities				
Grants Payable – Research		-	533	533
Grants Payable - Scholarships		-	38	38
Grants received in advance			35	35
Accrued Expenses		-	21	21
Total Financial Liabilities		**-**	**627**	**627**

30 June 2004	Weighted average effective interest rate %	Variable Interest Rate $ '000	Non-interest Bearing $ '000	Total $ '000
Financial Assets				
Cash Assets	3.66	17	-	17
Restricted Cash Assets	5.31	1,491	-	1,491
Grants Receivable – Sponsorship	-	-	953	953
Grants Receivable - Scholarships	-	-	2	2
Accrued Interest on Investments	-	-	3	3
Total Financial Assets		**1,508**	**958**	**2,466**
Financial Liabilities				
Grants Payable – Research		-	152	152
Grants Payable - Scholarships		-	45	45
Accrued Expenses		-	16	16
Payables			34	34
Total Financial Liabilities		**-**	**247**	**247**

(b) Credit Risk Exposure

The carrying amount of financial assets recorded in the financial statements, net of any provisions for losses, represents the Institute's maximum exposure to credit risk.

(c) Net fair value

The carrying amount of financial assets and financial liabilities recorded in the financial statements are not materially different from their net fair values, determined in accordance with the accounting policies disclosed in note 1 of the financial statements.

Notes to the Financial Statements for the year ended 30 June, 2005

29. Services Delivered

Treasurer's Instruction 1101(4) requires that statutory authorities provide segment information in the form of services.

MERIWA has one main activity or service and that is to finance and coordinate minerals and energy research [see note 1(q)].

	Minerals		Energy		Total	
	2005	2004	2005	2004	2005	2004
Cost of Services						
Expenses from ordinary activities:						
Research Grants	1,730,265	1,863,480	0	231,978	1,730,265	2,095,458
Scholarships	29,999	45,000	0	0	29,999	45,000
Employee Expenses	103,520	88,675			103,520	88,675
Board and committee fees and costs	40,258	36,233	0	0	40,258	36,233
Administration expenses	30,455	7,103			30,455	7,103
Accommodation expenses	14,175	13,608			14,175	13,608
Capital User Charge	34,003	34,000	0	0	34,003	34,000
Depreciation	1,915	264	0	0	1,915	264
Sponsorship revenue written back	0	35,680	0	0	0	35,680
Total Cost of service	**1,984,590**	**2,124,043**	**0**	**231,978**	**1,984,590**	**2,356,021**
Revenues from ordinary activities:						
Interest Revenue	83,165	94,552	0	0	83,165	94,552
Other	2,765	1,907	0	0	2,765	1,907
Revenues from Industry Sponsorship	1,226,263	1,628,964	0	0	1,226,263	1,628,964
Total Revenues from ordinary activities	**1,312,193**	**1,725,423**	**0**	**0**	**1,312,193**	**1,725,423**
Net Cost of Services	**672,397**	**398,620**	**0**	**231,978**	**672,397**	**630,598**
Revenues from State Government						
Output appropriation	644,500	631,000	0	270,000	644,500	901,000
Resources free of charge	14,175	13,608	0	0	14,175	13,608
Total Revenues from State Government	**658,675**	**644,608**	**0**	**270,000**	**658,675**	**914,608**
Change in net assets	**(13,722)**	**245,988**	**0**	**38,022**	**(13,722)**	**284,010**

Notes to the Financial Statements for the year ended 30 June, 2005

30. The impact of Adopting Australian Equivalents to IFRS

In respect of financial reports for annual reporting periods ending on or after 30 June 2005, an agency shall disclose in its financial report any known information about the impacts on the financial report had it been prepared using the Australian Equivalents to International Financial Reporting Standards.

The Institute has reviewed the revised standards to determine the impact of adopting Australian Equivalents to International Financial Reporting Standards, at present there are no issues that require the financial reports to be amended. Accordingly, there is no material 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 2005

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 2005 and the financial position as at 30 June 2005.

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
PRINCIPAL ACCOUNTING OFFICER

S R Baker
CHAIRMAN,
BOARD OF DIRECTORS

26 August 2005

Opinion of the Auditor General on Financial Statements for the year ended 30 June, 2005

AUDITOR GENERAL

INDEPENDENT AUDIT OPINION

To the Parliament of Western Australia

MINERALS AND ENERGY RESEARCH INSTITUTE OF WESTERN AUSTRALIA FINANCIAL STATEMENTS FOR THE YEAR ENDED 30 JUNE 2005

Audit Opinion
In my opinion,

(i) the controls exercised by the Minerals and Energy Research Institute of Western Australia 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

(ii) the financial statements are based on proper accounts and present fairly in accordance with applicable Accounting Standards and other mandatory professional reporting requirements in Australia and the Treasurer's Instructions, the financial position of the Institute at 30 June 2005 and its financial performance and cash flows for the year ended on that date.

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

The financial statements consist of the Statement of Financial Performance, Statement of Financial Position, Statement of Cash Flows and the Notes to the Financial Statements.

Summary of my Role
As required by the Act, I have independently audited the accounts and financial statements to express an opinion on the controls and financial statements. This was done by looking at a sample of the evidence.

An audit does not guarantee that every amount and disclosure in the financial statements 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.

D D R PEARSON
AUDITOR GENERAL
20 October 2005

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

MERIWA

INERALS AND ENERGY RESEARCH INSTITUTE OF WESTERN AUSTRALIA
Mineral House, 100 Plain Street, East Perth WA 6004
ISSN 1032-111X