MERIWA

MERIWA Annual Report 2002-2003

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 2002-2003

Hon. Clive Brown, 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 2003, 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, the members of which have contributed their time and assistance in an honorary capacity.

C D Branch
Chairman
Board of Directors

21 August, 2003

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 (No. 89 of 1987) to carry out the functions as set out in Section 5 of that Act.

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 the following relevant written laws:

- 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

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 2002/2003 year.

Compliance Statements

Advertising and Sponsorship

Expenditure incurred by the Minerals and Energy Research Institute of Western Australia during 2002/2003 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	797

Statement of Compliance with Relevant Written Law

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

The Institute participates with the Department of Industry and Resources paper recycling program.

Customer Group Outcomes

At this stage specific plans for women, family and domestic violence, equal employment opportunities, language, cultural diversity and youth are not applicable to the activities of the Institute.

Information Systems and Services

In accordance with the State Records Act of 2000 a record keeping plan is being developed for submission to the Libraries Board in 2003/2004.

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.

R E Butters
DIRECTOR AND
PRINCIPAL ACCOUNTING OFFICER

C D Branch
CHAIRMAN,
BOARD OF DIRECTORS

21 August, 2003

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 Institute's function as defined by the Act is to encourage the development of the minerals and petroleum industries within the State by fostering and promoting all aspects of minerals 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 within the State and elsewhere;

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

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

(j) promoting public awareness of matters relating to minerals research, informing the public concerning the latest developments in the fields of minerals 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 in general.

Structure

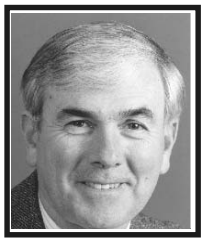
MINISTER FOR STATE DEVELOPMENT
THE HON CLIVE BROWN, MLA

BOARD OF DIRECTORS

DR C D BRANCH
CHAIRMAN

EMERITUS PROFESSOR A R BILLINGS
THE UNIVERSITY OF WESTERN AUSTRALIA

MR R E BUTTERS
COMPANY SECRETARY/CONSULTANT



MR S R BAKER
CONSULTANT

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 Petroleum 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 2002/2003 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 2002/2003 year.

Overview

MERIWA's financial results and research achievement for 2002/2003 for minerals research are summarised and compared with the results for 2001/2002 in Table 1. Points of note for the year are -

- Total value of new minerals research projects was $1.053 million, a decrease of $1.026 million on the 2001/2002 figure of $2.079 million.
- Industry sponsorship was $0.581 million compared to $1.548 million in 2001/2002. The proportion of industry sponsorship for minerals research was 55% against a target of 65%.
- For every dollar expended by the Government through MERIWA, $2.21 of minerals research was generated.
- Administration costs as a % of the value of research generated were 10.97%
- MERIWA finished the year increasing the value of net assets by $231,454.

As part of the Government policy to review all statutory authorities, Chris Fitzhardinge was appointed by Minister Clive Brown to review MERIWA. It is pleasing to note that the report recommended MERIWA remain a statutory authority, but before a final decision is made the relationships with the Resources Institute and Australian Resources Research Centre (ARRC) will be considered.

The compilation of MERIWA's history to celebrate 21 years of operation has been published as a book titled "The MERIWA Effect" authored by Jasmina Brankovich, John McIlwraith and Dr Ken Spillman through the UWA Press. The Minister Hon Clive Brown launched the book in March 2003 and copies have been widely distributed to organisations and individuals associated with MERIWA and general research.

TABLE 1: Summary of Results (Minerals Research only)

	2002/03 $'000	2001/02 $'000
FINANCIAL		
ACCUMULATED FUNDS		
Opening balance at 1 July	**2 550**	**300**
COST OF SERVICES		
Total operating expenses	672	796
Less other revenues	89	84
Net cost of services	**583**	**712**
REVENUE FROM GOVERNMENT		
Total revenues government & industry	1 694	4 031
Less research grants – ind. sponsorship	880	1 069
Net revenue from government	**814**	**2 962 ***
Change in net assets from operations	**231**	**2 250**
Closing balance of accumulated surplus	**2 781****	**2 550**
RESEARCH ACHIEVEMENT		
RESEARCH GRANTS		
• Minerals Research	472	531
INDUSTRY SPONSORSHIP		
• Coordinated through MERIWA	581	1 548
• Handled separately	1 633	-
Total industry sponsorship	**2 214**	**1 548**
Total value of research commenced	**1 053**	**2 079**
% sponsorship to new research commenced (minerals only)	55%	74%
Ratio of research value (minerals) to government funds utilised (grants and administration)	2.21	2.60

*** Reflects accounting standard change, see note 8 of Accounts.**
**** Accumulated surplus reflects funds held in trust or yet to be collected from Industry sponsors for committed research activities over the next 3 years.**

Transfer of Alternative Energy Research

Alternative energy research activities were transferred to the Sustainable Energy Development Office (SEDO) (formerly the Alternative Energy Development Board) on July 1, 1995. Because the legislative changes

Board of Directors' Report (Continued)

TABLE 2: Allocation of Funds (Minerals Research)

Research categories	No. projects	MERIWA $'000	Industry $'000	Total $'000
MINERALS				
Geoscience	3	207	355	562
Hydrocarbons	1	60	63	123
Engineering	1	50	135	185
Minerals processing	1	109	-	109
Environmental-rehabilitation	3	46	28	74
Total	**9**	**472**	**581**	**1 053**

TABLE 3: Allocation of Mineral Research Funds to Research Organisations

Research Organisation	No. projects	Funding $'000
MINERALS		
The University of Western Australia	3	242
Curtin University of Technology	3	185
Murdoch University	2	121
Edith Cowan University	-	-
Other	1	505
Total research	**9**	**1 053**
SCHOLARSHIPS		
The University of Western Australia	-	5
Murdoch University	-	-
Curtin University of Technology	1	15
Edith Cowan University	1	10
Total scholarships	**2**	**30**
Total funding		**1 083**

required for the SEDO to operate autonomously within the Office of Energy are not yet in place, alternative energy research funding is included in the financial statements given later in this report. As alternative energy research will be reported separately by the Office of Energy, all comments in this report are restricted to minerals and petroleum research.

Minerals Research Activities

MERIWA's minerals and petroleum research results are identified separately in Table 4. Nine new research projects were commenced in 2002/2003 for a total value of $1.053 million. This compares with $2.079 million in 2001/2002. It is evident that there is a decrease in mining and engineering but an increase in geoscience research which indicates a strengthening of the minerals sector.

New industry sponsorship coordinated through MERIWA for the year was $0.581 million, while at year's end the sponsorship vested under MERIWA control was $3 337 559. Industry sponsorship for the year in review was 55% 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 $937 984 of which $688 293 were applied to research grants and $30 000 to scholarships, with the remainder for administration. The actual administration cost of $150 466 was 10.97% of the value of research generated. Real expenditure on new applications was $472 000.

The prognosis for 2002/2003 that MERIWA's revenue and hence outputs could reduce compared to the previous years because of the problems facing the resources industries unfortunately proved correct with lower levels of research investments by industry.

The forecast for the coming year is cautious but may be stimulated by an improvement in the petroleum sector and the strengthening of mineral commodity prices.

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 we have funded nine projects, three each from geoscience and environmental areas and one from engineering, hydrocarbons and mineral processing, again demonstrating the wide interests of minerals and energy research. Again the research activities involved University of Western Australia and Curtin University of Technology in three projects each, Murdoch University in two and the CSIRO in one. The minerals sector has continued its research resurgence with eight of the projects being related to this area.

Board of Directors' Report (Continued)

The two principal geoscience projects have focussed on gold and nickel research and continue to demonstrate the collaborative efforts required by companies with strong academic schools and practical researchers like the CSIRO to provide new and innovative methods of exploring. The UWA continues to have the majority of involvement academically while the majority of company involvement is from those operating in the Yilgarn Block. Particularly exciting is the work with Project M358 "Scale-Integrated, Architectural and Geodynamic Controls on Alteration and Geochemistry of Gold Systems in the Eastern Goldfields Province, Yilgarn Craton". This work is based on the concept that large tonnage, high-grade deposits result from sustaining both fluid flow and contrasting thermo-chemical conditions at the site of mineral deposition. The fluid history of the system is reflected by the thermo-chemical gradients, and therefore research on alteration and geochemistry of gold systems combined with research on architecture and dynamics can enhance the ability of explorationists to predict large tonnage, high-grade gold occurrences.

Similarly M356 "Structural and Stratigraphic Architecture of the Agnew Wiluna Belt" will lead to better understanding of how the komatiite Agnew-Wiluna Belt was formed and the reconstruction of the tectonic setting at the time of NiS emplacement as project objectives. MERIWA support is specifically for the SHRIMP and TIMS analyses, leading to a geochronology for the stratigraphic framework. The Board also provided additional funding to Professor Peter Cawood to complete the work originally undertaken but unfinished at the untimely death of Professor Chris Powell on Project M282, the "Resolution of the Subsurface Structure of the Hamersley Province by Multi-Channel Seismic Reflection".

Continuing benefit of research into environmental matters particularly with respect to the detection of the soil-borne disease *Phytophthora cinnamomi* or "dieback", will contribute to mining companies managing this rapacious disease. Branded as a "key threatening process to Australia's biodiversity" by the Commonwealth Environment Protection and Biodiversity Act of 1999, management of *P.cinnamomi* is heavily reliant on detecting the pathogen directly in soil and plant samples and early reliable detection is crucial. The funding of two complementary projects, one, Project M357, with the aim of determining and improving on the sampling and isolation methods, is intended to result in a statistically significant analysis method for soils which in some cases could certify the absence of this pathogen. The second, Project M361, is based on a recent development at Murdoch University in collaboration with Dutch scientists that use molecular technology to enable faster detection of multiple pathogen species. This micro-array analysis method has enormous potential to reduce processing time, and increase sensitivity and specificity. In Project M362 "Innovative Techniques for Promoting Fauna Return to Native Ecosystems Established Following Mine Rehabilitation", the pressing need in rehabilitation to promote the return of fauna to re- established native ecosystems will be addressed through the documentation of best practices. Such findings will be synthesized using a three-stage approach. An initial, comprehensive survey will be conducted second, an accounting of the success, cost and practicality of the techniques will be taken, and finally, the findings from the first two stages will be incorporated into a set of practical recommendations.

Mineral processing research in Project M359 "Improved Anode and Cathode Processes in the Electrowinning of Basemetals" is in collaboration with AMIRA through the A J Parker Centre for Hydrometallurgy, at Murdoch University. The electrowinning phase of the base metals refining process is undergoing studies to improve operating costs and final product quality. The project is being run in two modules with the first to identify and demonstrate options to extend the life of, reduce operating potential of, and minimise impurities from current anode materials. The second will focus on ways to consistently produce cathodes with the desired physical characteristics for product quality and plant throughout, initially for copper and zinc but extending to nickel and cobalt.

In the engineeering field the Australian Centre for Geomechanics in Project M360 "Australian Rockfall Research – Phase II" will be continuing to enlarge on their earlier project. M360 will further these efforts by continuing to gather and analyse critical rockfall information from Australian metalliferous mines, focusing on the two types of rockfalls identified in M341, with the goal of developing for the industry practical solutions to reduce the incidence of rockfall related injuries and fatalities. The research will determine the circumstances leading to injuries, and the stage of the processes at which injuries occurred. These results will give operators the basic understanding necessary to establish optimum control of rockfalls.

Board of Directors' Report
(Continued)

In the hydrocarbon field, Project M351 "Effect of Seismic Anisotropy on Amplitude-Based Reservoir Characterisation" is investigating the significant issue in seismic data gathering and processing for the North West Shelf of seismic anisotropy of its shales and hydrocarbon reservoirs. Anisotropy affects the quality of seismic imaging and therefore the interpretation of data from oil/gas fields in the Shelf. The project is planned to determine the extent of this effect, and to examine the cost/benefit ratio of isotropic *vs* anisotropic seismic technology in quantifying seismic data. In the research plan are laboratory experiments to define elastic properties of anisotropic rocks, a comparison of Ocean Bottom Cable surveying with conventional data acquisition, and application of the theory of fluid substitution. The project results will give operators tactics for their choices in seismic data acquisition and processing in anisotropic strata.

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. Thirteen 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 two scholarships, one to Ms Cindy Barber and one to Mr Scott Thompson.

Cindy Barber - Curtin University of Technology

The Perth Basin has been the site of recent oil discoveries and the Canning Basin has produced oil discoveries over recent decades. In Cindy's project, oils and their source rocks from both basins are being analysed with new molecular and compound specific isotope techniques, to establish source rock correlations and shed light on the palaeoenvironments. In the Perth Basin, new biomarkers not previously reported from Australia have been found to be distributed between Triassic and Permian rocks in a way that readily distinguishes the two ages. Cindy's Perth Basin research focuses in part on isotopic characteristics that would help identify biological precursors of the biomarker components. Additional studies will apply analyses for novel chemical features to new core for source rock layers. The Canning Basin exhibits changes in oxygen levels in the palaeoenvironment throughout Late Devonian, the age of shallow water reefs in the basin. Cindy's research in this area is intended to establish correlations between oils and source rocks that are now found in different hemispheres, but were contiguous in the Devonian. She will analyse biomarkers in these oils and source rocks that characterise oxygen-rich and oxygen-depleted conditions. Her work will lead to an integrated palaeoenvironment reconstruction of these Western Australian basins.

Scott Thompson – Edith Cowan University

An environmental science/environmental management PhD candidate at Edith Cowan University, Scott Thompson has undertaken a project on rehabilitation completion criteria using lizard communities as an indicator group through the Centre for Ecosystem Management. It is still the case that, although completion criteria are important to both regulators and industry in determining when rehabilitation is complete, such criteria are poorly defined. Mining companies striving for best practice environment management seek more objective criteria than the current ones to assess rehabilitation progress and success. These will allow regulators to answer the question, when can a mining company be released from its obligation to manage a site? The goal of land rehabilitation programs has shifted from the revegetating of an area towards developing a functional ecosystem, which has led to some studies of invertebrates in monitoring ecosystem restoration programs, and now to using vertebrates as in this study of lizards. Scott has so far completed two years' field sampling, and has begun developing a rehabilitation index and sampling protocol, that allow a quantitative approach to evaluating a rehabilitated ecosystem's functionality.

Finance

The financial statements for MERIWA for 2002/2003 appear later in the report. As the legislation for the transfer of alternative energy research is still not in place, the financial results for alternative energy and minerals research have to be consolidated. However, the results associated with minerals and petroleum research are identified separately.

Board of Directors' Report (Continued)

During the year a review with the Office of the Auditor General (OAG) of the accounting standards used by MERIWA, resulted in adoption of new standards. This has resulted in a change in the reporting of the assets and liabilities in a revised format. In order to make the changes, transfers in the accounts have been made which affect the reports of cost of services, assets and liabilities. These are one-off book transfers and have not affected the financial situation or the performance of MERIWA. The net assets now reflect industry sponsorship yet to be received of $1.237m but contracted for the next 3 years.

For minerals research, the budget appropriation was $617 000, and total revenues from services were $89 421 comprising mainly interest. The net cost of services rose from ($1 620 485) in 2001/2002 to $408 776, while net revenues from government rose by $10 730 to $640 230, resulting in a surplus for the year of $231 454. The accumulated surplus carried forward is $2 780 794 .

Publications

Seven 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 224, 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 2002/2003, three microfiche, 14 hard copy and 16 CD-ROM format reports were sold, producing revenue of $2 481.

Reports are now produced on CD-ROM and not microfiche, as well as in hard copy format for archival purposes.

Office Services

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

Code of Conduct for Government Boards and Committees

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

Staff and Committees

The Board again acknowledges the valuable assistance that has been provided to the Institute by the Minerals Research Advisory Committee under the able Chairmanship of Professor Odwyn Jones. Both the members and deputy members met on a regular basis during the year, in sub-committee or in committee, to assess the research proposals received, and to advise the Board of their suitability and technical merit before grants were approved. This takes considerable time, and as the great majority is provided on an honorary basis, MERIWA is most appreciative of this contribution.

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.

C D Branch
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 developments are also made on the quality and costs of supporting services such as infrastructure but also in the more downstream processing orientated industries 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 levels 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				
	2002-03	**2001-02**	**2000-01**	**1999-2000**	**1998-99**
Value of minerals research commenced	1 053	2 079	1 442	1 436	2 721
Scholarships	30	40	40	35	25
Industry sponsored scholarship	-	-	30	-	-
Total	**1 083**	**2 119**	**1 512**	**1 471**	**2 746**

Performance Measures (Continued)

	2002-03	2001-02	2000-01	1999-2000	1998-99
Industry sponsorship achieved	55%	74%	69%	68%	82%
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 all university, 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 now published 224 reports on the various research projects it has supported since its inception. CD-ROM copies are distributed widely to all relevant technical libraries in Western Australia and to most Australian universities. Reports in microfiche, CD-ROM or hard copy format are sold to industry at prices which cover production and distribution costs. The table below shows that 2 421 research project reports have been distributed to industry and technical libraries over the past 5 years.

Synopses of all reports published during 2002/03 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.

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	2002-2003	2001-2002	2000-2001	1999-2000	1998-99
Microfiche	3	8	394	250	511
Hard copy	73	66	73	55	135
CD-ROM	295	527	10	19	2
Total	**371**	**601**	**477**	**324**	**648**

Performance Measures (Continued)

Effectiveness

The table below indicates that for every dollar of government funds expended on research in 2002/2003 (excluding scholarships), $2.21 of research was commenced.

	2002-2003	2001-2002	2000-2001	1999-2000	1998-99
Ratio of research value to government funds utilised	2.21	2.60	2.62	2.67	4.11

Efficiency

MERIWA's overall efficiency decreased in 2002/03 due to reduced value of research commenced and increased administration costs.

	2002-2003	2001-2002	2000-2001	1999-2000	1998-99
Administration cost as a percentage of value of research generated	10.97	8.83	9.00	7.32	6.06

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

Performance Measures

TABLE 4: MERIWA results (Minerals research)

Factors	2002/03	2001/02	2000/01	1999/00	1998/99
PROJECTS					
Applications received	11	16	10	7	11
Projects commenced	8	9	8	7	12
Projects completed	7	4	8	18	14
TECHNOLOGY TRANSFER					
No. reports published	7	13	8	5	10
No. microfiche issued or sold	3	8	394	250	511
No. hard copies issued or sold	73	66	73	55	135
No. CD ROM copies issued or sold	295	527	10	19	2
Other publications (Research News)	3	2	2	2	2
FUNDS UTILISED ($'000)					
Budget appropriation	617	612	611	606	583
Interest on cash flow	87	81	110	90	75
Other income	3	3	2	2	2
Transferred from (to) reserves	(231)	*(2 130)	(173)	(164)	2
Total Government funds utilised	**476**	**(1 434)**	**550**	**534**	**662**
Less administration costs	150	137	174	165	141
Funds utilised to support research	**326**	**(1 571)**	**376**	**369**	**521**
MERIWA GRANTS					
For research projects	472	531	480	453	496
For scholarship	30	40	36	35	25
Total grants	**502**	**571**	**516**	**488**	**521**
INDUSTRY SPONSORSHIP					
Coordinated through MERIWA	581	1 548	962	983	1 443
Coordinated separately	1 633	-	-	-	782
Joe Lord Memorial Scholarship	-	-	34	-	-
Total industry sponsorship	**2 214**	**1 548**	**996**	**983**	**2 225**
Total value of new research projects	**1 053**	**2 079**	**1 442**	**1 436**	**2 721**
Value of research generated to government funds utilised	**2.21**	**2.60**	**2.62**	**2.67**	**4.11**
Administration cost to value of research generated**	**10.97%**	**8.83%**	**9.00%**	**7.32%**	**6.06%**

* 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 Bagshaw	Australian Mineral Industries Research Association
	Mr P Lockyer (Deputy Member)	Consulting Mining Engineer
	Dr R Blanks	Principal Metallurgist, Metskill Australia
	Mr P Baillie (Deputy Member)	Project Development Manager, Nopec International Pty Ltd
	Professor P Garnett	Executive Dean, Faculty of Communications Health & Science, Edith Cowan University
	Assoc Professor J Cross (Deputy Member)	Director, International & Commercial, Faculty of Communications Health & Science, Edith Cowan University
Nominated by: Department of Resources Development	Dr D Martin	Project Manager - South West Division,
	Mr R Hart (Deputy Member)	Project Manager - New Business
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Dr A Ord	Project Manager, Division of Exploration & Mining
	Dr C Butt (Deputy Member)	Group Leader Regolith and Environmental Geoscience
The University of Western Australia	Position Vacant	
	Professor R J Gilkes (Deputy Member)	Department of Soil Science & Plant Nutrition School of Agriculture
Murdoch University	Position Vacant	
	Position Vacant (Deputy Member)	
Curtin University of Technology	Professor J McDonald	Department of Exploration Geophysics
	Professor R T Pidgeon (Deputy Member)	School of Applied Geology
Chamber of Commerce and Industry of WA	Mr R Watsford	Technical Manager, WMC Nickel Business Unit
	Mr W S Sashegyi (Deputy Member)	Manager, Industry & Energy Development
Chamber of Minerals and Energy of WA (Inc.)	Position Vacant	
	Position Vacant (Deputy Member)	
Australian Petroleum Production and Exploration Association	Mr K Spence (Deputy Chairman)	General Manager, Northern Business Unit, Woodside Energy Ltd.
	Dr J Gorter (Deputy Member)	Senior Explorationist, Agip Australia Limited

Minerals Research Advisory Committee

In many respects this year has been one of the more interesting periods in the 22 year history of MERIWA. Perhaps the most significant event during the year was the launching of MERIWA's 20 year history from 1981 - 2001 by the Hon Minister, Clive Brown MLA on 27 March 2003. Its title is very appropriately named "The MERIWA Effect" since this Statutory Authority has had a considerable effect on all sectors of the minerals industry since its inception. It has brought new technologies to the State and ensured that researchers in our universities, industries and other research organisations have been able to pursue research projects of direct benefit to Western Australia. In all of this perhaps the most pleasing end result has been the close collaboration and cooperation MERIWA has received from its academic and industry partners.

As Chairman of MERIWA's Minerals Research Advisory Committee (MRAC) I have to once again thank my colleagues for their dedication and commitment to the work of the committee and its sub-committees. During the year we met as a committee on five occasions in order to consider and recommend nine projects for the Board's approval. Following are the fields of study and the funding associated with these projects:

Field of Study	No. Projects	MERIWA $'000	Industry $'000
Geoscience	3	207	355
Hydrocarbons	1	60	63
Engineering	1	50	135
Mineral Processing	1	109	-
Environmental	3	46	28
TOTAL	**9**	**472**	**581**

Due to the State Government's review of all Statutory Authorities the precise future direction of the Institute is unknown and consequently all appointments needing renewal have been confirmed for one year only at this stage.

In keeping with past practice applications for MERIWA scholarships were sought from researchers pursuing their doctoral studies in relevant fields of study in WA. On this occasion the two successful applicants were Cindy Barber from the Centre for Petroleum and Environmental Organic Geochemistry at Curtin University of Technology who is researching the "Geochemistry of the Perth and Canning Basins" and Scott Thompson from the Centre for Ecosystem Management at Edith Cowan University who is developing a "Rehabilitation Completion Criteria for the Cawse Nickel Minesite".

Finally let me once again thank the Board of Directors, my MRAC colleagues and our academic and industry partners for the harmonious and collaborative manner in which we continue to achieve research outcomes of considerable benefit to the minerals industry in this State. Special mention should also be made to the excellent work of MERIWA's part-time administrative staff which includes, David Milton, Executive Officer, Dr Pam Smith, Project Coordinator and Gwen Davies, Secretary.

Prof I O Jones
Chairman.

Reports Published in 2002/03

M262 POST MINING RESTORATION OF SPINIFEX SPECIES IN AN ARID TROPICAL ZONE AT THE ARGYLE DIAMOND MINE

Report No. 200

Grantee: *Kings Park and Botanic Garden*
Applicant: *Dr K Dixon*
Grant Amount: *$89,000*
Duration: *2 years*
Commenced: *September, 1995*
Sponsor: *Argyle Diamond Mines Pty Ltd*

Two spinifex species, *Plectrachne* and *Triodia*, are the most dominant elements in the Kimberley landscape understorey and thus are crucial in the maintenance of stable and sustainable ecosystems. In most instances, including the Argyle Diamond mine site in the Kimberley, spinifex species are reluctant colonisers of post-mined sites and failed to respond to conventional seed or greenstock production methods. This research into the cardinal factors influencing the failure of tropical spinifex species to regenerate at the Argyle site also tackled the problem of developing effective and efficient means for large-scale reinstatement of these species, post-mining.

The restoration ecology strategy thus developed has two major themes. First, the characteristics of the life history, genetic diversity, morphology and physiology of the two spinifex species were identified, which affect successional population growth and individual species maintenance. Then, protocols for restoration of species to disturbed habitats were derived, implemented and evaluated. Soil seed banks are triggered to germinate by the passage of fires. Further examination of post-fire seedling recruitment suggested that removing mature vegetation provides the main germination stimulus and can be enhanced by such effects as nutrient influx and smoke residue. The evaluation showed that a substantial number of plants may be generated from greenstock of *Plectrachne bynoei* and *P.pungens*, for restoration of disturbed systems, but no method had capacity to produce sufficient greenstock for restoration of *Triodia intermedia*. Additional implications were that orders of magnitude more viable seed than the desired density of plants needs to be applied, and that there are advantages to sowing seed at depth rather than at the soil surface. A recommendation based on findings on the effect of fire on spinifex was that the distribution of disturbance vulnerability in the Western Australian flora is an urgent field for future research.

M281/ AMIRA THE CHARACTERISATION AND METALLOGENIC SIGNIFICANCE OF ARCHAEAN GRANITOIDS OF THE YILGARN CRATON, WESTERN AUSTRALIA

Report No 222

Grantee: *The University of Western Australia*
Applicant: *Dr K Cassidy and Dr N McNaughton*
Grant Amount: *$435,000*
Duration: *3 years*
Commenced: *March, 1997*

In the early 1990's a number of researchers invoked granitoids as an important component in the development of large-scale hydrothermal systems, that produced lode-gold mineralisation in the late Archaean Yilgarn Craton. Although several lines of evidence supported an indirect magmatic contribution, a direct genetic relationship between granitoids and the generation of large-scale hydrothermal systems had not been established. This project undertook to evaluate such a causal connection. Its aims were to establish the craton-scale variation in granitoid geology, geochemistry and geochronology, in order to develop a better understanding of the role of granitoids in terrane evolution, and form an improved understanding of the relationship between granitoids and hydrothermal mineral deposits. Research objectives thus included: (1) define the craton-scale variations by characterising the late Archaean granitoids of the Yilgarn, (2) constrain the spatial, temporal genetic relationship between individual granitoid suites and hydrothermal mineral deposits, (3) develop a tectonic framework for the late Archaean Yilgarn in which to formulate holistic models for hydrothermal mineral systems, and (4) establish criteria to test the role of granitoids in forming hydrothermal mineral systems. Numerous observations from the work undertaken suggest the following metallogenic significance of granitoids in the Yilgarn: (1) only the low–Ca and syenitic granite groups are contemporaneous with the major orogenic gold mineralising event at 2.64 – 2.63 Ga, and the Low-Ca group with >20% a real occurrence of the granites may underlie a significant part of the greenstones in the Eastern Goldfields Province. (2) as there is no example of gold mineralisation in the granitoids it is not certain that the granitoids are actually the source of the Au. (3) some Low-Ca granitoids show fluid release structures, and fluid inclusions with many similarities to fluids in the majority of orogenic gold deposits and (4) some members of the Mafic granitoid group host the most significant mineralisation present in granitoids.

Reports Published in 2002/03

M282 RESOLUTION OF THE SUBSURFACE STRUCTURE OF THE HAMERSLEY PROVINCE BY MULTI-CHANNEL SEISMIC REFLECTION

Report No. 228

Grantee: *The University of Western Australia*
Applicant: *Prof C Powell, Dr P Cawood and Dr M Dentith*
Grant Amount: *$384,266*
Duration: *3 years*
Commenced: *April, 1997*
Sponsors: *BHP Iron Ore Pty Ltd, Robe River Iron Associates.*

Deep crustal seismic data acquired at the start of this project were intended for integration with subsurface mapping and gravity measurements, to yield a better understanding of 3-dimensional structural relationships within the Hamersley Province. The province contains one of the best exposed late Archaean to Palaeoproterozoic successions known and hosts world-class iron-ore deposits. These are generally found within a north-verging fold-and-thrust-belt formed during the Palaeoproterozoic. It was hoped a clearer picture would show if surface iron ore mineralisation is related to structural features in the subsurface. The two deep crustal seismic profiles were acquired in the southern Hamersley Province , across or near iron ore deposits, and gravity measurements were acquired along them as well. Overall the seismic data were of poor quality, due to surficial geology, with limited areas of good quality, including the Sylvania Inlier at the southeast edge of the Hamersley. Detailed surface mapping was carried out along an approximately 10 Km wide transect along both seismic lines. The structural mapping outlined five deformational events. These all occurred during either the Ophthalmian or Capricorn orogenies, with the second event being the most dominant and producing discrete east-west shear zones in basement and widespread folding in the cover sequence. Characteristics of this deformation are indicative of fault-propagation and fault-bend folding linked to a sub-horizontal buried detachment, which is inferred to terminate toward the north ends of both seismic profiles. The gravity data indicate that structural models based on the mapping and the seismic profiles are permissible.

M313 LATE TRIASSIC PALYNOLOGY OF THE NORTHERN CARNARVON BASIN

Report No. 226

Grantee: *The University of Western Australia*
Applicant: *Assoc Prof D Haig*
Grant Amount: *$292,000*
Duration: *2 years*
Commenced: *February, 1999*
Sponsors: *Woodside Energy Pty Ltd, BP Developments Australia Ltd, Chevron Asiatic Ltd, BHP Petroleum (North West Shelf) P/L Shell Development (Australia) Pty Ltd, Japan Australia LNG (MIMI) Pty Ltd, Apache Energy Ltd.*

This project was developed to meet a perceived need to synthesize the work of several palynologists and formalise a zonal scheme specific to the Northern Carnarvon Basin. This basin hosts some of the largest natural resources developments in Australia, and in particular the Late Triassic gas reservoir tapped by the North Rankin A and Goodwyn A production platforms. A series of formal subzones was developed for the Northern Carnarvon Basin, and high-resolution correlation was demonstrated for wells on the Rankin Trend. The project included a taxonomic review and preparation of an atlas of Late Triassic polynomorph species, and resulted in establishment of biostratigraphic age ranges for key species in the Basin. Biostratigraphy provides age control for sequence stratigraphic boundaries that are independent of lithology, and mark chronostratigraphic surfaces. In the report, a series of high resolution subzones is established on the Rankin Trend using closely spaced bio-events, each of which is interpreted to represent a chronostratigraphic horizon. Fourteen of these range between the top of the A.reducta spore-pollen zone and the base of the H.balmei microplankton zone. At lower stratigraphic levels broad units similar to these are recognized. Across the Northern Carnarvon Basin five major bio-events are applied with considerable confidence. Chrono-stratigraphic correlation of important reservoir intervals was thus provided, revealing stratigraphic thickness continuity across a wide area and supporting the view that the area was tectonically stable during the latest Traissic. More detailed palaeogeography for the area was thus made possible, enhancing the exploration and production potential.

Reports Published in 2002/03 (Continued)

M321 SOMATIC EMBRYOGENESIS AND SYNTHETIC SEED TECHNOLOGY FOR THE PRODUCTION OF AUSTRALIAN PLANTS FOR MINING RESTORATION WITH SPECIAL EMPHASIS ON NATIVE HEATHS (EPACRIDACEAE)

Report No. 227

Grantee: *Kings Park and Botanic Garden*
Applicant: *Dr K Dixon*
Grant Amount: *$256,768*
Duration: *3 years*
Commenced: *October, 1998*
Sponsors: *RGC Mineral Sands Limited, Alcoa of Australia Limited.*

This project was conceived to address foreseen challenges in propagation techniques for a broad range of Western Australian species essential to post-mining rehabilitation. Having brought somatic embryogenic (SE) technology to Australia, the research group in Kings Park and Botanic Garden undertook to research and develop an effective method for mass propagation of native species for production of field-ready plant propagules. Certain Australian native species are known to be recalcitrant to conventional methods of propagation. Key groups in this study were Restionaceae/Cyperaceae and Epacridaceae, which are recalcitrant and are major understorey components in mining rehabilitation programs. The project resulted in the first production of somatic embryos for the Australian native species belonging to these three families, a very significant achievement in mass propagation techniques in the land restoration industries. Using the model system *Baloskion tetraphyllum*, embryogenic calli and somatic embryos were induced from excised coleoptiles, and a broad and extensive range of growth regulator treatments were evaluated. Calli from many growth regulator treatment combinations developed into plantlets in ½ strength Murashige & Skoog medium, and were successfully transferred to soil with 100% survival. Direct SE was successfully achieved from leaf basal portions of *Loxocarya cinerea* in a range of thidiazuron and 2,4-D plant growth regulator concentrations. Another segment of the study focussed on SE and synthetic seed technology as propagation methods for Epacridaceae using *Astroloma xerophyllum* and *Leucopogon verticillatus* as model systems. SE was achieved for these and four other species, and was found to be more efficient in the growth period than in the semi-dormant period for three of the six species. The final report for this work documents experiments and results in considerable detail and sets out protocols for SE propagation of some of the recalcitrant species.

M335 APPLICATION OF TRACE FOSSIL STUDIES TO DEPOSITIONAL FACIES ANALYSIS AND STRATAL SURFACE IDENTIFICATION: MIDDLE JURASSIC-LOWER CRETACEOUS DELTAIC, ESTUARINE AND SHALLOW MARINE SYSTEMS, NORTH WEST SHELF

Report No 229

Grantee: *The University of Western Australia*
Applicant: *Dr A George and D F Burns*
Grant Amount: *$141,724*
Duration: *18 months*
Commenced: *June, 2000*
Sponsors: *Woodside Energy Ltd, Chevron Australia Pty Ltd, Apache Energy Ltd, British-Borneo Australia Ltd.*

The application of trace fossil analysis was undertaken in this project, to improve existing interpretations of depositional facies and facies stacking patterns within select areas of the Northern Carnarvon Basin. Its primary objective was to characterise and document the diverse trace fossil assemblages within the deltaic, estuarine, and shallow marine, Middle/?Upper Jurassic and Lower Cretaceous sediments in the Basin to produce a comprehensive trace fossil atlas. The trace fossils are in effect "fossil behaviour", and include tracks, trails, burrows, borings, faecal pellets and other traces. They offer much information on environment and environment change because the organisms' behaviour is strongly controlled by the prevailing environment. The usefulness of this type of paleoecological study comes from its integration with applied high-resolution sequence stratigraphy to establish chronostratigraphic surfaces and intervals that may then be widely correlated. Trace fossil classification may be based on any of several aspects; behavioural, or ethological, classification is considered the simplest and most important classification scheme, because the behaviour of organisms is dictated by pre-genetic adaptations as well as the surrounding environment. The trace fossils are grouped into ichnofacies or distinctive, recurrent associations. Ichnofabric analysis then deciphers the record of the primary sedimentary conditions, original endobenthic community structure, and subsequent taphonomic history of one or more phases of biogenic activity in the sedimentary sequence under study. In the report, brief text accompanies the Atlas to provide information on the value of trace fossils, the way they are classified by characteristics, and how these can be used to interpret stratal surfaces. A dictionary of trace fossils follows giving descriptions of the species illustrated throughout the Atlas.

Reports Published in 2002/03 (Continued)

M344 NUTRIENT ABSORPTION CAPACITY OF NEUTRALISED ACID EFFLUENT AND BLENDS

Report No 230

Grantee: *C.S.I.R.O. Environmental Projects Office*
Applicant: *B McLoughlin and D von Horn*
Grant Amount: *$53,634*
Duration: *6 months*
Commenced: *September, 2001*
Sponsors: *Iluka Resources Limited*
Tiwest Joint Venture

The scope of this industry-initiated work required CSIRO Land and Water to investigate the various physico-chemical properties of the neutralised acid effluent (NAE) and NAE/iron oxide and blends, in order to determine aspects of the behaviour of phosphorous and nitrogen adsorbed by NAE and NAE/iron oxide blends. The NAE is formed when sulfuric acid effluent from the leaching of rutile is neutralised with quicklime, following production of synthetic rutile from ilmenite. The research plan in three stages included (1) project formulation and refinement, (2) laboratory experimental program, and (3) addition/field validation. In stage 1, a slightly modified proposed experimental program was agreed on that addressed the following needs: evaluation of NAE and derivatives as at soil conditioner, inexpensive and expedient initial assessments, and examination of NAE nutrient retention capacity at several pH levels, to simulate different soil types. In stage 2, a literature review suggested that properties of NAE and NAE/oxides might enhance the physical characteristics of sandy agricultural soils, pending the addressing of several issues, including assessment of nutrient availability to determine utility as slow release fertilisers, and determination of the potential for soil acidification if applied to agricultural soils. Stage 2 and 3 research results included the expected classification for agricultural use of NAE and blends, a high absorption capacity for phosphorous and heavy metals by NAE, and a high yield of dry plant matter from acid sandy soil amended with NAE derived material as compared with soil treated with triple super phosphate fertiliser.

Recommendations for further research included better definition of the size and mobility of the colloidal fraction of associated nutrients and metals, and a study of the effect of competing cations and anions on nutrient and metal sorption by these materials.

Projects in Progress: 30 June, 2003

No.	Project Title	Applicants	Institute	Term (years)	Cash Cost ($)	Notional Value ($)
M288	Development of an electrochemical corrosion probe for use in oil and gas flowlines	Dr S Bailey Mr B Kinsella	Curtin	3	253 986	437 244
M289	Radiographic silicosis and lung cancer in Kalgoorlie miners	Dr N de Klerk Prof A Musk	UWA/ Sir Charles Gairdner Hospital	2	74 363	106 437
M304	Genetic stratigraphic analysis of the Hamersley Group	A/Prof M Barley Dr B Krapez	UWA	2	180 000	402 596
M328	Mine seismicity and rockburst risk management	Prof Y Potvin A/Prof R Jewell	ACG	3½	747 000	1 087 000
M329	Stress measurements from cored rock	Prof E Villaescusa	WASM	2	229 000	474 000
M331	Shallow water tow-out issues in WA-based construction of concrete gravity structures for offshore oil and gas production	Dr K P Thiagarajar Dr B F Ronalds	UWA	2	102 757	102 757
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	79 000	114 600
M333	Corrosion of rock reinforcement in underground excavations	Prof E Villaescusa	WASM	3	368 000	638 511
M336	Molecular stratigraphy research for oil-source rock correlation	Prof R Alexander Prof R Kagi	Curtin	2	220 900	254 300
M338	Cretaceous and Neogene reactivation and inversion history of the Northern Carnarvon Basin and the role of basement highs in the distribution of Cretaceous and Neogene strain in the Carnarvon Basin and Browse Basin/Timor Sea.	Dr M Keep	UWA	3	213 795	266 458
M339	Using seismic anisotropy to characterize seal and reservoir properties in the NW Shelf of WA	Dr P Okoye Mr M Urosevic	Curtin	2	113 000	180 000
M340	XMML – online data transfer for the exploration and mining industry	Dr S Cox	CSIRO	1½	285 000	380 000
M342	Development of a new seismic fracture mapping technique	Dr B Evans Mr M Luo	Curtin	2	146 344	179 904
M345	Automated measurement of phase behaviour in North West Shelf petroleum and natural gas fluids using advanced microwave technology	A/Prof T Edwards Dr T Mann	UWA	2	310 000	355 000

Projects in Progress: 30 June 2003 (Continued)

No.	Project Title	Applicants	Institute	Term (yrs	Cash Cost ($)	Notional Value ($)
M346	Upper crustal structure of the Laverton Tectonic Zone adjacent to major gold deposits from seismic reflection profiling	A/Prof M Dentith Dr B Goleby	UWA	1	215 000	260 000
M347	Trace fossils and their application to high resolution sequence stratigraphy and associated cement distribution: Middle Jurassic to Lower Cretaceous Interval, North West Shelf	Dr F Burns Dr A George	UWA	2	183 558	213 693
M348	Development of tantalum-silicon photovoltaic devices	Dr J Livingstone Dr J Henry	UWA	3	23 000	53 000
M349	Dynamic testing of ground support elements	Prof E Villaescusa	WASM	2	230 000	271 965
M350	Selective herbivory by kangaroos in mined land	Prof B Lamont	Curtin	3½	126 000	347 876
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	160 300	181 300
M355	Mine seismicity and rockburst risk management – Phase II	Prof Y Potvin Mr M Hudyma	ACG	3	720 600	1 095 600
M356	Structural and stratigraphic architecture of the Agnew-Wiluna Belt	A/Prof M Barley Dr B Stone	UWA	2	53 153	53 153
M357	A sampling strategy for *Phytophthora* for "difficult" sites	Dr E Davison	Curtin	1	42 375	42 375
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	505 000	1 051 320
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
M362	Innovative techniques for promoting fauna return to native ecosystems established following mine rehabilitation	Prof J Majer	Curtin	½	19 229	57 229

Reports not yet Published as at 30 June 2003

Report No.	Project No.	Project Title	Author	Status
210	M255	Investigations at the atomic level of interactions between gibbsite and sodium oxalate in the Bayer process	M Reyhani et al.	To be published on CD-ROM
211	M255A	Investigations at the atomic level of interactions between gibbsite and sodium oxalate in the Bayer process	M Reyhani et al.	To be published on CD-ROM
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

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: david.milton@doir.wa.gov.au
Website: www.doir.wa.gov.au/meriwa

Financial Assistance from Industry

The following list is of companies and organisations which provided financial sponsorship in 2002/03 for projects in progress. The Board of Directors thanks these groups for their sponsorship and support.

MINERALS RESEARCH

Agip Australia Limited
Alcoa World Alumina Australia
AngloGold Australasia Limited
Apache Energy Limited
Argyle Diamond Mines Pty Limited
Barrick Gold of Australia Ltd
ChevronTexaco Australia Pty Ltd
Curtin Reservoir Geophysics Consortium
Eastern Metropolitan Regional Council
Fatzer AG, Geobrugg Protection Systems (Switzerland)
Fractal Graphics
Gold Fields – St Ives Gold Mining Company Pty Ltd
Grinaker-LTA Mining Products (South Africa)
Homestake Gold of Australia Ltd
Iluka Resources Limited
Kanowna Belle Gold Mines Limited
Kalgoorlie Consolidated Gold Mines Pty Ltd
Kundana Gold Pty Limited
MBT (Australia) Pty Limited
Mount Isa Mines Limited
New Hampton Goldfields Limited
Newmont Australia
Phillips Petroleum Company Australia Pty Ltd
Placer Dome Asia Pacific
Rio Tinto Technical Services
Rock Engineering (Australia) Pty Ltd
Santos Ltd
Sons of Gwalia Ltd
St Ives Gold Mining Company (Pty) Limited
Strata Control Systems
Tiwest Joint Venture
Vision Reservoir Management Technologies
WA School of Mines – Curtin University
Whiteman Park
WMC Resources Ltd – Olympic Dam Project
Woodside Energy Ltd
Woodside Petroleum Ltd
Worsley Alumina Pty Ltd

JOE LORD MEMORIAL SCHOLARSHIP

- WA School of Mines
- Mining Project Investors [Black Swan Nickel Pty Ltd]
- Newmont Australia [*formerly* Normandy Mining Limited]
- Wesfarmers Premier Coal Limited
- Placer Dome Asia Pacific [*formerly* AurionGold]

Audited Statements

Performance Indicators
for the year ended 30 June 2003

Minerals Research Program

Outcome 1

"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 2002/2003 was 55% 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. Thirteen applications were processed and two scholarships awarded.

Output 1

"Finance and coordinate minerals research"

Efficiency Indicator:

The decreased cost is due to higher numbers of projects currently administered.

	2002/03	2001/02	2000/01	1999/00	1998/99
$ cost per minerals research grant administered	5 172	5 276	8 285	6 107	4 386

Alternative Energy Research Program

Outcome 2

"Promote all aspects of research and development of alternative energy"

Alternative energy research activities were transferred to the Sustainable Energy Development Office (SEDO) formerly the Alternative Energy Development Board of the Office of Energy on 1 July, 1995. However, alternative energy funding still forms a part of the MERIWA recurrent appropriation from government. Other than ratifying the recommendations of the SEDO in respect to grant applications and making research grant claim payments approved by the SEDO, MERIWA no longer has any input into the alternative energy research area. Details of activities will be reported separately by the Office of Energy.

Alternative energy is an emerging technology that requires additional support to that which can be provided by the small local industry to allow effective research and development to be undertaken in Western Australia. No industry sponsorship is sought for alternative energy research grants.

Requests for grants for alternative energy research, development and demonstration are received by the Office of Energy, and assessed and approved by the SEDO which, in turn, requests payment from its component of the MERIWA grant funds.

The SEDO has, as a major initiative, increased the promotion of alternative energy research, and the development and application of these technologies.

Effectiveness Indicator – Outcome 1	2002/2003	2001/2002	2000/2001	1999/2000	1998/1999
% Industry sponsorship achieved.	55%	74%	69%	68%	82%
Target.	65%	65%	65%	65%	65%
Research value	1 052 940	2 079 092	1 441 539	1 435 724	1 957 005

Performance Indicators (Continued) for the year ended 30 June 2003

Effectiveness Indicator

Promotion of research in the field of alternative energy is effected via provision of grants approved by SEDO.

Research organisations include universities (and affiliated Cooperative Research Centres or CRCs) and private industry groups. Applications received are assessed by an advisory committee within SEDO, including a thorough review of the applicants' facilities and resources.

Three major broad areas of research work were undertaken and supported in 2002/2003.

Conclusions and outcomes will ultimately be measured by the effectiveness of the research over time and reported by the Office of Energy.

Output 2

"Finance and coordinate alternative energy research and development"

Efficiency Indicator:

The major component of administration of these projects is borne by the SEDO within the Office of Energy. MERIWA merely receives the SEDO proportion of the budget appropriation and pays invoices approved by the SEDO.

	2002-2003	2001-2002
Cost per research grant administered for alternative energy research	$33	$27

Effectiveness Indicator – Outcome 2	2002-2003		2001-2002	
Solar Energy	0%	$0	19%	$45 400
Desalination	0%	$0	0%	0
Control and Monitoring Systems	81%	$147 737	10%	$23 290
Remote Area Power Supply	17%	$30 935	19%	$45 000
Other	2%	$4 500	52%	$120 493

Certification of Performance Indicators for the year ended 30 June, 2003

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, 2003.

R E Butters
DIRECTOR AND
PRINCIPAL ACCOUNTING OFFICER

C D Branch
CHAIRMAN,
BOARD OF DIRECTORS

21 August, 2003

Opinion of the Auditor General on Performance Indicators
for the year ended 30 June, 2003

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 2003

	Note	2003	2002
		$	$
COST OF SERVICES			
Expenses from ordinary activities			
Research Grants - MERIWA	1(h)	688,293	884,412
Research Grants – Industry Sponsorship	1(h)	879,972	1,069,162
Scholarships – MERIWA	1(i)	30,000	40,000
Superannuation Contributions		8,433	7,879
Board of Director's Remuneration		33,800	33,800
Advisory Committees attendance fees		3,476	3,081
Institute Contract Staff Fees		93,695	97,388
Board and Advisory Committee's Expenses		731	1,007
Printing and Stationery		14,134	3,785
Advertising		797	819
Capital User Charge	2	34,500	34,019
Sponsorship revenue written back		125,190	-
Other expenses from ordinary activities		30,125	72,770
Total Cost of Services		1,943,146	2,248,122
Revenues from ordinary activities			
Interest Revenue		86,785	81,465
Other		2,636	2,637
Revenues from Industry:			
Sponsorship	1(b)	784,267	944,234
Grant Commitments written back		0	2,457,353
Total Revenues from ordinary activities		**873,688**	**3,485,689**
NET (REVENUES FROM) / COST OF SERVICES		**1,069,458**	**(1,237,567)**
REVENUES FROM STATE GOVERNMENT			
Output Appropriation		882,000	875,000
Resources received free of charge	3	23,230	17,500
Total revenues from State Government		905,230	892,500
CHANGE IN NET ASSETS		**(164,228)**	**2,130,067**
Total changes in equity other than those resulting from transactions with WA State Government as owners		**(164,228)**	**2,130,067**

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

Statement of Financial Position
for the year ended 30 June 2003

	Note	2003	2002
		$	$
CURRENT ASSETS			
Cash Assets	4, 7(a)	56,399	90,991
Short Term Investments	7(a)	1,590,388	1,630,457
Grants receivable – Sponsorship	1(e)	619,350	685,263
Grants receivable – Scholarship	1(e)	4,000	14,668
Receivables	5	8,917	22,278
Accrued Interest on Short Term Investments		5,380	7,710
Total current assets		**2,284,434**	**2,451,367**
NON-CURRENT ASSETS			
Grants receivable - Sponsorship	1(e)	221,600	280,000
Total non-current assets		221,600	280,000
Total Assets		**2,506,034**	**2,731,367**
CURRENT LIABILITIES			
Accrued Expenses	1(g)	7,499	9,552
Grants Payable – Research	1(h)	69,000	98,501
Grants Payable – Scholarship	1(i)	37,741	63,292
Total current liabilities		**114,240**	**171,345**
NON-CURRENT LIABILITIES			
Grants Payable – Scholarship	1(i)	6,000	10,000
Total non-current liabilities		**6,000**	**10,000**
Total Liabilities		**120,240**	**181,345**
NET ASSETS		**2,385,794**	**2,550,022**
EQUITY			
Accumulated Surplus	6	2,385,794	2,550,022
Total Equity		**2,385,794**	**2,550,022**

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

Statement of Cash Flows
for the year ended 30 June, 2003

	Note	2003	2002
		$	$
CASH FLOWS FROM STATE GOVERNMENT			
Output appropriation	1(a)	882,000	875,000
Net cash provided by State Government		**882,000**	**875,000**
Utilised as follows:			
CASH FLOWS FROM OPERATING ACTIVITIES			
Payment			
Payment for Research Grants		(1,657,317)	(1,855,074)
Payment to Employees		(95,579)	(88,624)
Capital User Charge		(34,500)	(34,019)
Other Payments		(68,435)	(104,852)
GST Payments on Purchase		(160,158)	(183,880)
Receipts			
Receipts from Sponsors		783,390	1,126,620
Receipts from Scholarships		10,668	8,666
Interest received		89,116	82,388
Other receipts		2,636	2,637
GST receipts on sales		91,763	75,221
GST receipts from Taxation Authority		81,755	73,883
Net cash used in operating activities	7(b)	**(956,661)**	**(897,034)**
Net decrease in cash held		(74,661)	(22,034)
Cash assets at the beginning of the financial year		1,721,448	1,743,482
Cash assets at the end of the financial year	7(a)	**1,646,787**	**1,721,448**

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, 2003

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) Output Appropriations

Output 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) Sponsorship and Scholarship Revenue

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

(c) 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.

(d) Cash

For the purpose of the Statement of Cash Flows, cash includes cash on hand and in banks, net of outstanding overdrafts, and investments in money market instruments.

Notes to the Financial Statements for the year ended 30 June, 2003

(e) 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.

(f) 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.

(g) Accrued Expenses

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.

(h) 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.

(i) Scholarships

Scholarships represent the Institute's obligation to fund approved scholarships. Current liabilities include payments expected to be made during the 2002/03 financial year and non current liabilities include payments expected to be made in later years.

(j) Superannuation

All Institute staff are non-contributory members of the West State Superannuation Scheme, an accumulation fund complying 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.

(k) Resources Received Free of Charge

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

(l) Comparative Figures

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

Notes to the Financial Statements for the year ended 30 June, 2003

(m) Rounding of amounts

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

2. Capital User Charge

A Capital user charge rate of 8% has been set by the Government for 2002/2003 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.

3. Resources received free of charge

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

	2003 $	2002 $
Office of the Auditor General	10,000	6,500
Department of Industry and Resources	13,230	11,000
	23,230	**17,500**

4. Cash Assets

Cash at bank	56,199	90,791
Cash on hand	200	200
	56,399	**90,991**

5. Receivables

GST Receivable	8,917	22,278
	8,917	**22,278**

6. Equity

Accumulated Surplus		
Opening Balance	2,550,022	419,955
Change in Net Assets	(164,228)	2,130,067
Closing Balance	**2,385,794**	**2,550,022**

Notes to the Financial Statements for the year ended 30 June, 2003

7. 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:

	2003 $	2002 $
Cash at bank	56,199	90,791
Cash on hand	200	200
Investments – short term	1,590,388	1,630,457
	1,646,787	**1,721,448**

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

	2003 $	2002 $
Net Revenue from / (cost of services)	(1,069,458)	1,237,567
Non-cash items:		
Resources received free of charge	23,230	17,500
(Increase)/Decrease in assets:		
Accrued Interest	2,330	923
Grants Receivable – Sponsorship	141,835	149,527
Grants Receivable – Scholarship	10,668	8,666
Increase/(Decrease) in liabilities:		
Grants Payable -Research	(29,500)	(2,315,646)
Grants Payable –Scholarship	(29,551)	(3,208)
Accrued expenses	(2,053)	9,553
Net GST payments	13,360	(34,776)
Change in GST in receivables	(17,522)	32,860
Net Cash used in operating activities	**(956,661)**	**(897,034)**

8. Commitments for expenditure

Grant commitments are payable as follows:

	2003 $	2002 $
Within 1 year	69,000	98,500
Later than 1 year and not later than 5 years	2,329,284	2,103,593
	2,398,284	**2,202,093**

Notes to the Financial Statements for the year ended 30 June, 2003

9. Other

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

10. Remuneration of Auditor

No fees are due and payable to the Office of the Auditor General for the 2002/03 financial year. However a notional fee for service provided free of charge is detailed in note 3.

11. 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.

	Actual 2003 $ '000	Estimate 2003 $ '000	Variance $ '000
Research Grants (including Scholarships)	1,598	1,679	(81)
Superannuation Contributions	8	12	(4)
Staff Salaries	94	120	(26)
Printing and Stationery	14	10	4
Other	36	31	5
Resources received free of charge	23	18	5

Research Grants (including Scholarships) was below the estimate because of decreased research grant applications.

Superannuation Contributions are lower than the estimate due to reduced staff salaries costs for the year.

Staff Salaries was below the estimate due to lower than expected project co-ordination costs.

Printing and Stationery was higher than the estimate due to an increase in costs associated with producing publications than planned.

Other expenses were above the estimate due to higher administrative costs than expected.

Resources received free of charge was higher than the estimate due to increases on the notional fees for audit and accommodation services.

Notes to the Financial Statements for the year ended 30 June, 2003

11. Explanatory Statement (con't)

(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.

	2003 $'000	2002 $'000	Variance $'000
Research Grants – MERIWA	688	884	(196)
Scholarships – MERIWA	30	40	(10)
Printing and stationery	14	4	10
Other expenses	30	73	(43)
Sponsorship Revenue	784	994	110
Resources received free of charge	23	18	5

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

(ii) Scholarships –MERIWA – the variance is due to a reduced number of scholarships being awarded during the year.

(iii) Printing and stationery – the variance is due to higher costs associated with producing publications.

(iv) Other Expenses – the variance is due to no administrative fee being charged by the Sustainable Energy Development Office.

(v) Sponsorship Revenue – the variance is due to delays by industry sponsors in signing contracts.

(vi) Resources received free of charge - the variance is due to increases on the notional fees for audit and accommodation services.

12. Financial Instruments

(a) Interest Rate Risk Exposure

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

Notes to the Financial Statements for the year ended 30 June, 2003

	Weighted average effective interest rate %	Fixed Interest rate maturities 1 year or less $ '000	Non-interest Bearing $ '000	Total $ '000
30 June 2003				
Financial Assets				
Cash Assets			56	56
Short Term Investments	4.66	1,590		1,590
Grants Receivable – Sponsorship		-	841	841
Grants Receivable - Scholarships		-	4	4
Receivables		-	9	9
Accrued Interest on Investments		-	5	5
Total Financial Assets		**1,590**	**915**	**2,505**
Financial Liabilities				
Grants Payable – Research		-	69	69
Grants Payable - Scholarships		-	44	44
Accrued Expenses		-	7	7
Total Financial Liabilities		**-**	**120**	**120**
30 June 2002				
Financial Assets				
Cash Assets			91	91
Short Term Investments	4.78	1,630		1,630
Grants Receivable – Sponsorship		-	965	965
Grants Receivable - Scholarships		-	15	15
Receivables		-	22	22
Accrued Interest on Investments		-	58	8
Total Financial Assets		**1,630**	**1,101**	**2,731**
Financial Liabilities				
Grants Payable – Research		-	98	98
Grants Payable - Scholarships		-	73	73
Accrued Expenses		-	10	10
Total Financial Liabilities		**-**	**181**	**181**

(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, 2003

13. 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:

			2003	2002
$0	-	$ 10,000	3	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:

			2003	2002
$20,001	-	$ 30,000	1	1

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

$	$
25,108	25,515

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, 2003

14. Output Information

	Minerals		Energy		Total	
	2003 $	2002 $	2003 $	2002 $	2003 $	2002 $
Cost of Services						
Expenses from ordinary activities:						
Research Grants – MERIWA	422,611	533,922	265,682	350,490	688,293	884,412
Research Grants – Industry Sponsorship	879,972	1,069,162	0	0	879,972	1,069,162
Scholarships – MERIWA	30,000	40,000	0	0	30,000	40,000
Superannuation Contributions	8,433	7,879	0	0	8,433	7,879
Board of Director's remuneration	33,800	33,800	0	0	33,800	33,800
Advisory Committee attendance fees	3,476	3,081	0	0	3,476	3,081
Institute contract staff fees	93,695	97,388	0	0	93,695	97,388
Board and Advisory Committee's Expenses	731	1,007	0	0	731	1,007
Printing and Stationery	14,134	3,785	0	0	14,134	3,785
Advertising	797	819	0	0	797	819
Capital User Charge	34,500	34,019	0	0	34,500	34,019
Sponsorship revenue	125,190	0	0	0	125,190	0
Other	30,125	40,342	0	32,428	30,125	72,770
Total Cost of service	**1,677,464**	**1,865,204**	**265,682**	**382,918**	**1,943,146**	**2,248,122**
Revenues from ordinary activities:						
Interest Revenue	86,785	81,465	0	0	86,785	81,465
Other	2,636	2,637	0	0	2,636	2,637
Revenues from Industry:						
Sponsorship	784,267	944,234	0	0	784,267	944,234
Grant Commitments written back	0	2,457,353	0	0	0	2,457,353
Total Revenues from ordinary activities	**873,688**	**3,485,689**	**0**	**0**	**873,688**	**3,485,689**
Net (Revenue from) / Cost of Services	**408,776**	**(1,620,485)**	**265,682**	**382,918**	**1,069,458**	**(1,237,567)**
Revenues from State Government						
Output appropriation	617,000	612,000	265,000	263,000	882,000	875,000
Resources free of charge	23,230	17,500	0	0	23,230	17,500
Total Revenues from State Government	**640,230**	**629,500**	**265,000**	**263,000**	**905,230**	**892,500**
Change in net assets	**(163,546)**	**2,249,985**	**(682)**	**(119,918)**	**(164,228)**	**2,130,067**

Certification of Financial Statements
for the year ended 30 June, 2003

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 year ending 30 June, 2003, and the financial position as at 30 June, 2003.

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

R E Butters
DIRECTOR AND
PRINCIPAL ACCOUNTING OFFICER

C D Branch
CHAIRMAN,
BOARD OF DIRECTORS

21 August, 2003

Opinion of the Auditor General on Financial Statements
for the year ended 30 June, 2003

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 JUNE 30, 2003

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 June 30, 2003 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
November 18, 2003

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

MERIWA

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