



# MINERAL RESOURCES TASMANIA

DEPARTMENT *of* INFRASTRUCTURE, ENERGY *and* RESOURCES

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A Division of the Department *of* Infrastructure,  
Energy *and* Resources

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# Annual Review

## 1999/2000

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## Mineral Resources Tasmania

Mineral Resources Tasmania serves the people of Tasmania by the provision of services to the mineral exploration, mining, quarrying and mineral processing industries, and the provision of geoscientific information to all levels of government and the private sector.

### — Mission —

- To provide the necessary information and tenement infrastructure to foster responsible mineral resource development and land management for the benefit of the Tasmanian community.

### — Objectives —

- To increase the investment in exploration for, and development of, minerals and petroleum in Tasmania and offshore waters;
- To provide geoscientific information essential for the development of the State's mineral resources and for responsible land management;
- To ensure a fair and sustainable return to the community when petroleum and mineral resources are developed;
- To give effect to government policy in relation to mineral and petroleum resources and improve Mineral Resources Tasmania's operational performance.

### — Activities —

Activities within the Division include:

- Collection, integration, interpretation, publication and presentation of information on Tasmania's mineral wealth and geoscientific nature;
- Representation of wider community interests in land stability, underground water and waste disposal measures;
- Regulation of mineral and petroleum exploration in Tasmania, including off-shore waters administered by the State, and the promotion of vacant areas available for onshore and offshore exploration;
- Setting and monitoring of standards for both the performance of exploration activities and the technical reporting of exploration records and case histories;
- Environmental appraisal and monitoring and management of mining heritage and land-access issues; and
- The issue of legal titles to mining tenements, collation and recording of statistics relating to mining production, collection of fees and rentals, management of royalty regimes, and recording of mining tenements.

### — Major Issues and Initiatives for 2000/2001 —

- Continuation of the development and implementation of TIGER (Tasmanian Information on Geoscientific and Exploration Resources);
- Continuation of data acquisition and interpretation as part of the Western Tasmanian Regional Minerals Program;
- Continued expansion of geoscientific digital data for use by the minerals industry in assessing the mineral potential of Tasmania;
- Continued promotion of Tasmania's mineral and petroleum potential; and
- Ongoing assessment of royalties to ensure compliance with the *Mineral Resources Development Act 1995*.



## Mineral Resources Tasmania — Divisional Overview, 1999/2000

During the 1999/2000 financial year Mineral Resources Tasmania (MRT) continued to consolidate its geoscientific data into digital format, interact with end users of our information and expertise, and to further integrate its operations as part of the Department of Infrastructure, Energy and Resources (DIER).

Under current Government legislation and policy, MRT is responsible for:

- the acquisition of geoscientific data to enhance mineral and petroleum exploration and responsible land management within Tasmania;
- encouraging and assisting the mining sector to make better use of Tasmania's resources by exploration, market research and improvement in environmental performance;
- the regulation and environmental monitoring of the Tasmanian mineral exploration and mining industry; and
- continuing regional assessment of geohazards, including land stability, underground water delineation and quality, and waste disposal locations in relation to pollution of underground water supplies.

Growth in mineral exploration activity is essential for the future development of the mineral sector and for the economic well being of Tasmania. Exploration activity has, sadly, remained at a low level due to a number of factors including the world-wide downturn in exploration, and the very low availability of risk capital that the market is presently willing to put into mineral exploration.

Mining and mineral processing still account for over 40% of Tasmania's export capacity. MRT, by acquiring, synthesising and promoting geoscientific information on areas of high mineral and hydrocarbon resource potential in Tasmania, is actively working to encourage private sector exploration which will lead to new operations coming on stream as the economic life of existing operations declines. By ensuring an adequate return from our mineral resources, all Tasmanians can share the benefits of our mineral wealth whilst achieving a high standard of environmental care.

The major issues affecting Mineral Resources Tasmania in 1999/2000 included:

- completion of Phase Three of Project TIGER, within the given time frame and budget;
- addressing the shortage of storage space at the exploration drill core library, by extending available space and by implementing an efficient storage system;
- the provision of an appropriate level of resources for environmental monitoring of exploration and mining tenements; and
- the regional assessment of geohazards.

### Collection, integration, interpretation, publication and presentation of data

The data integration stage of Project TIGER Phase 3 has been completed with the implementation of a new tenement management system to integrate a number of isolated applications and systems. The only task remaining under Phase 3 is the installation of software for replication of data between MRT and The LIST (Land Information System Tasmania). Joint funding by MRT and the Department of Primary Industries, water and Environment (DPIWE) has developed the common components of a system to enable deployment of data and services via The LIST. This includes enhancements to The LIST to display mineral tenement information in combination with property titles and a wide variety of other map themes.

Work has commenced on Project TIGER Phase 4. This phase of the project will develop MRT Internet services to allow data to be made available via the MRT web site (<http://www.mrt.tas.gov.au>). The Internet-ready data management system

implemented by Phase 3 of the project will underlie the enhanced features of the new MRT web site.

The collection and presentation of information on Tasmania's mineral wealth and geoscientific nature also continued. Fourteen 1:25 000 scale geological maps were prepared for digital capture, compared with the target of twelve. Primary geoscientific data acquisition totalled 550 square kilometres, well in excess of the performance criterion of 200 square kilometres. This was a result of good access to the areas covered and exceptionally favourable weather conditions.

Five 1:50 000 scale digital maps, covering an area in central northern Tasmania, were produced for the Tasmanian Regional Drought Initiative Project funded by National Heritage Trust. A 1:500 000 scale digital map of the groundwater prospectivity of Tasmania was also completed.

As part of a National Geoscience Mapping Accord Project, the Australian Geological Survey Organisation (AGSO) flew an airborne geophysical survey over two areas in Central Tasmania in early 1999. Aeromagnetic, radiometric and digital terrain data were acquired along east-west lines spaced 200 m apart, with the processed data being released by AGSO in November 1999. The datasets are of high quality and can be used to resolve previously obscured structures within dolerite-covered areas.

Indexing, and precise levelling where required, of airborne geophysical datasets has continued throughout the year. A total of 101 datasets are held by MRT in open or closed file and all have now been levelled and indexed. A number of open file images have been produced from these datasets for presentation at various scales. These images highlight the number of small datasets of varying qualities and vintages comprising the Tasmanian aeromagnetic database and the need for a consistent high quality dataset.

### Special initiative — Core Library

The *Mineral Resources Development Act 1995* requires the Tasmanian Government to maintain a library of drill core from exploration, mining and construction projects undertaken in Tasmania. This service is essential to document the geology and mineral deposits of Tasmania and to attract new mineral exploration projects. At the beginning of the 1999/2000 year the existing core storage facility at Mornington was at capacity. Mineral Resources Tasmania examined various options and concluded that the most cost-effective option was to convert to a system of high-density storage on the present site, with future expansion to be accommodated by adding storage modules on an as-needed basis.

A total of \$422,000 was provided in the 1999/2000 Tasmanian State Budget for the expansion of the Mornington core library, with a further \$270,000 guaranteed for 2000/2001. During the year a module was constructed to house 450 kilometres of core and was opened by the Deputy Premier on 10 May 2000. Core is being progressively transferred into the new module. Funds in 2000/2001 will be dedicated to providing an effective core inspection facility and to increasing the capacity of storage for MRT's reference rock and mineral collection.

### Western Tasmania Regional Minerals Program (WTRMP)

The first phase of the Western Tasmania Regional Minerals Program (WTRMP), which was jointly funded by the Tasmanian and Commonwealth Governments and the mining industry (through the Tasmanian Minerals Council), was completed in late 1999. The aims of the project were to:

- propose a regional development plan for up to 15 years to identify the infrastructure needed to support an expanded industrial base in Tasmania;
- make existing mining and mineral processing operations more cost effective by recommending solutions to common problems, such as infrastructure and energy limitations;

- ❑ lower the development cost of new projects;
- ❑ determine what remote sensing and ground data are needed to facilitate exploration for minerals, oil and gas; and
- ❑ recommend actions and priorities to government and industry to implement the plan, including a broad timetable.

Reports titled *Guide for Industry Development* and *Final Regional Development Plan* were compiled by consultants AGC Woodward-Clyde Pty Ltd. Copies of these reports are available from the MRT web site or from MRT. The implementation of the findings of the report will begin in the second half of the calendar year 2000, using a special, one-off grant allocated by the Commonwealth for this purpose.

### **Promotion of mineral and petroleum potential**

In August 1999 the Minister for Mines, the Hon. Paul Lennon MHA, visited eight mineral exploration companies in Perth, Western Australia and hosted a function attended by twelve other companies. MRT participated in the 'Australian Pavilion' at the Prospectors and Developers Association of Canada (PDAC) meeting in Toronto in March 2000. Following PDAC, the Minister, the CEO and Director of Mines attended the first 'World Mining Ministers Forum', a two-day forum which was also held in Toronto. During the visit to Canada, the Manager of the Metallic Minerals and Geochemistry Branch, as part of an Australian delegation, visited five mining/exploration companies in Vancouver in late February, prior to PDAC, and six more in Toronto, following the PDAC meeting.

One offshore petroleum area was released for bidding in 2000. This area, on the eastern margin of the Bass Basin, was actively promoted at the American Association of Petroleum Geologists Conference in New Orleans (USA) and at the Australian Petroleum Producers and Exploration Association conference in Brisbane, Queensland.

MRT presented a paper on the prospectivity of Tasmania to the Second Tasmanian Exploration and Mining Conference in Hobart in May 2000 and a paper on Tasmania's prospectivity and mineral exploration climate was published in *Australia's Mining Monthly* in June 2000.

### **Setting and monitoring of standards for exploration activities**

MRT is responsible for ensuring that all exploration activity in Tasmania achieves the highest environmental standards and complies with the *Mineral Resources Development Act 1995* and the requirements of other legislation which protects such things as threatened species and cultural heritage. The fourth edition of the *Mineral Exploration Code of Practice* outlines the current requirements, the approvals process, and the controls and monitoring procedures that MRT has in place.

To comply with the Regional Forest Agreement, Mineral Resources Tasmania has developed a system to spatially record exploration activity and attributes that chart the process of approval of individual work programs. All work programs, whether on Crown Land, State Forest or private property, are entered on this system to give a complete record of all the environmental information relating to exploration. The system has also been designed to provide ongoing information on the outcomes of rehabilitation of exploration activity.

Compliance auditing of this system requires verification that the agreed approval process is adhered to and that derived statistics reflect the RFA agreement and the recommendations of the Resource Planning and Development Commission. Mineral Resources Tasmania will conduct a trial audit of the system in early 2000/2001.

MRT received and assessed 155 reports detailing mineral exploration activities undertaken by companies exploring within Tasmania. As part of a national agreement to move to digital lodgement of exploration data, MRT has adapted the

guidelines for the digital lodgement of mineral exploration reports and data developed by the Government Geologists Information Policy Advisory Committee for use by Tasmanian explorers and miners. It is planned to phase the digital reporting standards in over the year commencing 1 October 2000.

### **Rehabilitation of Mining Lands Trust Fund**

This Administered Payment represents the Tasmanian Government's contribution towards rehabilitation of abandoned mining lands. The level of funding was originally to be set by reference to the amount of revenue arising from the implementation of a specific component of the new royalty regime. The amount allocated for 1999/2000 was \$350,000.

Major works were carried out in the Rossarden–Storys Creek area. A large component of this work involved the relocation and capping of the acid-producing precipitate dam away from Storys Creek. Work continued on making abandoned mine sites safe, with capping and fencing of shafts at Golden Ridge, Orieco, Golden Mara and Great Republic.

Maintenance of the erosion control works in the northeast tinfields continued and the clean up of the exploration camps south of Macquarie Harbour was completed. Rehabilitation of an open cut and old mullock dumps was undertaken at Queen Hill in joint venture with Aberfoyle/Western Metals.

### **Royalty assessment**

During the financial year the royalty audit program concentrated on the larger metallic mines and was successful in ensuring full compliance with the regulations. Mineral royalties totalling \$12 million were collected during 1999/2000 compared to \$9.5 million in the previous financial year. Improved commodity prices for some operations, combined with improvements in production levels, have helped boost royalty collections. The wind-up of operations at the Hellyer mine will result in some decline in royalty collections in 2000/2001.

### **Centre for Ore Deposit Research (Codes-SRC)**

Funding of \$68,000 was provided to the Centre for Ore Deposit Research, Special Research Centre (CODES-SRC) at the University of Tasmania. The funding, which takes the form of Tasmanian Government Mining Scholarships, allows post-graduate research to be undertaken on projects of significance. Such projects will increase the understanding of the prospectivity of Tasmania, or will improve the geoscientific understanding of Tasmania with respect to areas for which MRT has responsibility.

### **MRT Staff**

Again, during 1999/2000, as in previous years, the staff of MRT is to be congratulated on their continuing professional approach and attitudes. To them I extend my personal thanks, as without their efforts MRT would not be able to provide the high level of support and products that it does to all MRT clients, be they individuals, private or public companies or other governmental institutions, thus achieving two of the Government's Budget Outcomes.

#### **Dr AV Brown**

*Director of Mines and State Chief Geologist  
Mineral Resources Tasmania*

## Financial Performance

Detailed financial information on the operations of MRT is published in the Department of Infrastructure, Energy and Resources Annual Report to Parliament.

The 1999/2000 consolidated fund appropriation to MRT was \$4.848 million, which was a 2 per cent increase over the 1998/1999 appropriation. This increase basically represented funding to cover salary indexation, and the transfer of rental funding to the Division. In real terms MRT endured a further decrease in operational funding. The appropriation funds the salaries for 53 Full-Time Equivalent positions and associated operating costs required to undertake the outputs outlined below.

Administered payments included the \$350,000 funding for the Rehabilitation of Degraded Mining Lands program, as well as a \$68,000 grant for the Tasmanian Government Mining Scholarships at the University of Tasmania CODES-SRC unit.

The Capital Investment Program included funding of \$422,000 in 1999/2000 for the commencement of expansion of the drill core library. A total of \$693,000 will be allocated over two years for this project.

### Outputs — Application of Funds, 1999/2000

	\$'000
1. Minerals Exploration and Land Management	2,742
2. Tenement Management of the Exploration and Minerals Industry	2,106
Administered Payments	418
Capital Investment Program	422
<b>Total</b>	<b>5,688</b>

### Descriptions of Outputs and Outcomes, 1999/2000

#### 1. Minerals and hydrocarbon investigations, dissemination and promotion of Tasmania's geoscientific information and mineral endowment.

This output covers:

- the provision of geoscientific data and resource information on Tasmania's metallic, industrial, and hydrocarbon mineral endowment;
- promotion of mineral potential for the stimulation of exploration for metallic and industrial minerals and hydrocarbons; and
- geoscientific database development, maintenance, output and marketing, including the production of digital geoscientific maps and associated databases.

This will have the resultant outcome of dynamic minerals exploration and land management for Tasmania and offshore waters

#### 2. Land, tenement, environment and royalty management and administration of the Tasmanian minerals industry.

This output provides for:

- the provision of geoscientific information essential for the effective and sustainable management of land and mineral resources;
- provision of advice to all levels of government and the public on land management issues;
- administration of mining legislation, including the issue of legal titles for mineral tenements;
- collation and recording of statistics relating to mining production and exploration; and
- the demand and monitoring of the collection of fees, rentals and royalties.

This will have the resultant outcome of effective and efficient tenement management of the exploration and minerals industry.

## Mineral royalties and Departmental fees and charges

MRT collects royalties and rents and fees from mineral lands, which are forwarded directly to consolidated revenue.

Mineral royalties totalling \$12 million were collected during the financial year compared to \$9.5 million in the previous financial year. Improved realised commodity prices for some operations, combined with improvements in production levels, have helped boost royalty collections.

Royalty collections for 2000/2001 have been budgeted at \$12 million. The wind-up of operations at the Hellyer mine will reduce collections, although other operations are expecting improved results. Hellyer has contributed significantly to royalty revenue over the life of the mine.

Rents and Fees from Mineral Lands raised \$0.838 million in 1999/2000, which was an increase from the previous year. The additional revenue is a result of higher average licence size and higher retention rate activity.

	<i>Target</i> 1999/2000	<i>Actual</i> 1999/2000	<i>Target</i> 2000/2001
Rents & Fees (\$,000)	695	838	770
Royalties (\$,000)	10,000	11,989	12,000
Sales of Maps and Publications (\$,000)	25	20	25

## Royalty regime

In Tasmania a sales and profit-based royalty applies to metallic mineral and coal mines, whilst a production-based royalty is payable on non-metallic materials. The two-tiered metallic and coal royalty consists of an ad valorem percentage payable on net sales, and a formula-based percentage of profits.

Following negotiations with the mining industry, new royalty rates were approved in August 1997, with the new regime taking effect from 1 July 1997. Non-metallic rates increased from \$1.00 per tonne to \$1.20 per tonne, while it was agreed that metallic minerals and coal royalties would be increased incrementally over a number of years.

The final increment for the royalty regime will occur from 1 July 2000 with the profit calculation component increasing. This increment will not have a large impact on royalty revenue.

From 1 July 1999 the ad valorem component of royalty increased from 1.5% of net sales to 1.6%. This was the final increase for the net sales component which has risen over a number of years from 1.0%. The exponential factor used to calculate the profit component will move from 0.35% to 0.40% from 1 July 2000. This represents the final increment under the current regime. There is a maximum amount of royalty payable at 5% of net sales.

Mining companies that expand into downstream processing to produce a metal receive an automatic 20% rebate on royalties payable. Companies that produce gold doré receive a 10% rebate on royalties. The Minister has the discretion to increase the gold doré rebate to 20%, depending on criteria such as the level of investment undertaken.

## Major contracts awarded (over \$50,000)

<i>Contractor</i>	<i>Contract</i>	<i>Reason for Contract</i>	<i>Cost (\$)</i>
KMR Drilling P/L	Tasmanian Regional Drought Initiative Program	Drilling	90,000
Becketts Heavy Plant P/L	Storys Creek	Dam relocation	250,000
R J Welsh & Son P/L	Drill Core Library	Construction	265,000
GBS Pty Ltd	Project Tiger Phase 3	Completion of Tiger Phase 3	185,000

## 1999/2000 Performance Indicators

Growth in mineral exploration activity is essential for future development of the mineral sector and for the economic well being of Tasmania. Mining and mineral processing accounts for over 40 per cent of Tasmania's export capacity. Based on industry estimates, approximately \$26.4 million was paid to the Tasmanian and local governments in charges, fees and taxes during 1999/2000, including \$12 million in royalties.

Exploration activity is underpinned by updating and providing quality geoscientific data relating to Tasmania's mineral resources. The activities of MRT are directed at the capture, storage and promotion of such information. Enhancement of geohazard information is also of high importance to stakeholders of MRT, as is the effective administration of MRT's regulatory framework.

### Achievement against internal targets

<i>Action</i>	<i>Target</i>	<i>Result</i>
Provide new data in areas with inadequate geoscientific coverage	<ol style="list-style-type: none"> <li>1. Collection of at least 200 km<sup>2</sup> of primary digital geoscientific coverage per year</li> <li>2. Production of digital geoscientific coverage of ten 1:25 000 scale map equivalents per year.</li> </ol>	<ol style="list-style-type: none"> <li>1. Primary digital geoscientific coverage totalled 550 km<sup>2</sup> for the year</li> <li>2. Six 1:25 000 scale maps and one special area 1:25 000 scale map produced. Work on seamless 1:25 000 scale coverage of Tasmania commenced</li> </ol>
Research and promotion of exploration of Tasmanian petroleum basins	Promote one offshore area per year	Three offshore areas released and promoted at the APPEA and AAPG conferences
Promote the geoscientific and mineral endowment aspects of Tasmania at various shows, industry conferences, press conferences, open days and other events	Successful and timely presentation of promotional material at appropriate venues	Direct promotional visits were made to companies in Western Australia and Canada. PDAC conference attended in Canada and Mining 2000 conference attended in Hobart
Prioritise and organise rehabilitation works on abandoned mining lands in compliance with the operation of the Abandoned Mining Lands Rehabilitation Trust Fund	One major program to be completed each year	Storys Creek precipitate dam relocation project and clean up of exploration camps within South West Conservation Area completed
Monitor environmental performance on exploration and mining tenements	Field inspections as required.	Regular field inspections conducted. Compliance auditing system developed.
Digital geoscientific coverage of Tasmania's geohazards	Completion of one map per year	Capture of landslip data commenced during year
Digital geoscientific coverage of Tasmania's groundwater resources	Completion of one map per year	A groundwater prospectivity map of Tasmania produced and five maps produced for Tasmanian Regional Drought Initiative project

## Achievement against external targets

<i>Target</i>	<i>1999/2000 result</i>	<i>1998/1999</i>
Increase exploration expenditure and maintain level at 2% of total Australian exploration expenditure	Exploration expenditure in Tasmania declined both in terms of percentage share (1.29%) and absolute expenditure (\$8.7 million). This decline reflects the continuing international decrease in expenditure on mineral exploration which has resulted in levels of expenditure falling in all Australian States since 1996/1997. The decline in percentage share reflects the conclusion of several on-site exploration projects.	1.42%
Increase level of exploration expenditure to a minimum of \$30 million per financial year		\$11.9 million
Obtain an increase in the area held under Exploration Licence	Area held under All Minerals and Non-metallic Exploration Licences increased to 11 446 km <sup>2</sup> . A further 30 356 km <sup>2</sup> is held for onshore oil exploration.	8955 km <sup>2</sup>
Obtain an increase in the number of Exploration Licences granted	The number of Exploration Licences held increased to 129.	124
Obtain an increase in the metres of exploration drilling completed	Exploration drilling declined to 28 040 metres, reflecting the decline in mineral exploration in Australia and the conclusion of several on-site exploration projects.	43 859
Obtain an increase in the percentage of Strategic Prospectivity Zones (SPZ) held under EL's	The percentage of land in SPZ areas held under EL's increased to 43.3%, reflecting the large increase in land held in the North East SPZ.	28.9%

## **Mineral Resources Tasmania — Legislation and Committees**

### **Legislation Administered**

- ❑ Mineral Resources Development Act 1995
- ❑ Mining (Strategic Prospectivity Zones) Act 1993
- ❑ Petroleum (Submerged Lands) Act 1982
- ❑ Iron Ore (Savage River) Deed of Variation Act 1990

### **Legislation repealed in 1999/2000**

- ❑ Ground Water Act 1985
- ❑ Mt Read and Rosebery Mines Limited Leases Act 1917

### **Statutory bodies**

- ❑ Nomenclature Board

### **Non statutory bodies**

- ❑ Australian and New Zealand Minerals and Energy Council (ANZMEC)
- ❑ ANZMEC — Land Access/ Environment Task Force
- ❑ ANZMEC — Technical Environment Task Force
- ❑ ANZMEC — Upstream Petroleum Subcommittee
- ❑ ANZMEC — Minerals Legislation Subcommittee
- ❑ ANZMEC — Taxation Review Working Group
- ❑ ANZMEC — Native Title Working Group
- ❑ ANZMEC — Australasian Chief Government Geologists' Conference
- ❑ ANZMEC — Government Geologists Information Policy Advisory Committee
- ❑ CODES-SRC Advisory Board
- ❑ Evaluation of Australian Geological Survey Organisation's Geoscience Survey and Research Activities
- ❑ Land Information Coordinating Committee (LICC)
- ❑ LICC Sub-committee — The List Steering Committee
- ❑ Project TIGER Steering Committee
- ❑ Australian Society of Exploration Geophysicists Data Standards Committee
- ❑ Mineral Resources Industry Advisory Panel
- ❑ ABS Mining Statistics User Advisory Group
- ❑ Tasmanian Statistical Advisory Committee
- ❑ National Groundwater Committee
- ❑ DPIWE Application Assessment Panel
- ❑ Australian Urban Regional Information Systems Association (AURISA)
- ❑ Mining Heritage Committee
- ❑ Mineral Exploration Working Group
- ❑ Gas Approvals Working Group



## **Mineral Resources Tasmania**

### **— Branch Activities, 1999/2000**

During 1999/2000 Mineral Resources Tasmania consisted of six branches: Metallic Minerals and Geochemistry; Industrial Minerals, Environment and Tenement Management; Geographical Information Systems & Geophysics; Engineering Geology and Groundwater; Data Management; and Royalty, Finance and Administration.

Because of the integrated nature of the branches, outputs provided under the banner of the Tasmanian Geological Survey are contributed to by staff of most, if not all, branches.

### **Metallic Minerals and Geochemistry**

The Metallic Minerals and Geochemistry Branch has been involved in a number of projects and programs.

#### **Regional Forest Agreement**

Comments were made on various drafts of a Cabinet submission on recommended land tenure of Comprehensive, Adequate and Representative (CAR) reserves to be created under the Regional Forest Agreement.

#### **Geoscientific data generation**

Primary geological data acquisition for the Gog, Exeter, Harford and West Frankford 1:25 000 scale geological map sheets was completed. Mapping of the Sheffield sheet, in the Mount Read Strategic Prospectivity Zone, was started.

Ten geological map sheets (Livingstone, Meredith, Sarah, Albina, Stringer, Parsons, Beaumaris, Dublin Town, Falmouth and the Hibbs special compilation sheet 3) were prepared for digital capture.

A report on gold in the Weld River area was completed.

Preparation commenced for the Geological Society of Australia Specialist Group in Tectonics and Structural Geology meeting and associated field excursion to be held in Ulverstone in February 2001, and for two Tasmanian excursions related to the international Minerals and Museums conference to be held in December 2000.

Papers on the gold mineralisation at Cygnet, the Proterozoic geology of northwest Tasmania and the deformation of rock units in the Badger Head–Beaconsfield area were prepared for presentation at the 15<sup>th</sup> Australian Geological Convention to be held in Sydney in July 2000.

A Senior Geologist attended the Australian Geological Survey Organisation open days in December.

#### **Database development**

Considerable time was spent developing a common rock unit database to enable a seamless 1:250 000 scale geological coverage of Tasmania and a start was made on the seamless 1:25 000 scale coverage. The structural symbol database was updated during the year.

Members of the Branch contributed to the process mapping of geological databases, testing of the REGIS tenement database and development of a web delivery system for Project TIGER.

A contractor worked on capture of the company stream-sediment geochemistry database throughout the year.

## Promotion of Tasmania's exploration potential

A paper was presented at the very successful Australian Journal of Mining Second Tasmanian Mineral Exploration and Investment Conference held in Hobart in May.

The Deputy Premier led a highly successful promotional visit to nine mineral exploration companies and hosted a promotional function in Perth in August.

The Prospectors and Developers Association of Canada annual meeting was attended in late February and early March and a display promoting Tasmania was attended as part of an Australian display. During the visit eleven mining companies were visited in Toronto and Vancouver with the Australian delegation.

Articles and information on mineral prospectivity and exploration activities in Tasmania were prepared for various specialist mining journals.

## Core library

The first stage of the Mornington core library expansion was completed during the year and opened by the Deputy Premier on 10 May 2000.

The successful architectural tender involved construction of a module with a greater capacity than originally envisaged.

The work planned in 2000/2001 will involve upgrading of the core inspection facility to contemporary standards and an increase in rock sample archival capacity.

A total of 81 visits were made during the year to inspect drill core, the vast majority by mineral exploration company personnel.

## Petrological and lapidary laboratories

The lapidary and petrology laboratories provided a total of \$50,105 worth of analyses and services to both government (\$25,665) and external clients (\$24,440). Most of this external work cannot be otherwise conducted within Tasmania.

The lapidary laboratory prepared 927 standard thin sections, 63 polished thin sections and 54 other sections, making a total throughput of 1044 samples.

The technical officer for petrological services processed 439 samples by X-ray diffraction, including 100 quantitative dust analyses, and also conducted 49 soil and sizing tests and 81 optical asbestos identifications, for a total of 569 samples processed valued at \$26,045. About half of his time was spent preparing samples for, and operating, the XRF for the geochemistry section.

A total of 542 external samples were received for investigation, mostly by X-ray diffraction. These samples include 294 for occupational health clients, 13 crushed aggregates, 78 soils and 157 samples (mostly rocks) for other paying customers. This external work came from a wide range of external sources, including the University of Tasmania, HEC and various other Government departments; various mining, mineral processing and mineral exploration companies, the general public and miscellaneous businesses.

Samples studied include geological materials (construction materials, mineral concentrates, ore samples, rocks, soil, sand, and clay) and anthropogenic materials (including concrete, asbestos sheeting, industrial materials, dust, etc.).

Extensive maintenance was conducted on the lapidary equipment and petrographic microscopes. Work was done on a hazardous substances register for the laboratories, and some reprogramming of the XRD was undertaken.

Investigations were conducted into gold prospects near Glovers Bluff and Cygnet in southeast Tasmania, and a report was published on the genesis of the geologically enigmatic Forster gold-zinc-nickel prospect in the upper Huon district. A paper on the Cygnet work is in preparation for outside publication. Some work was conducted on various geological samples from the Beaconsfield and Mt Careless areas. A study of gold mineralisation in the Cethana area has commenced.

Data gathered during the NETGOLD project is being recompiled for outside publication.

Field studies were essentially completed on the copper deposits in the Balfour–Temma area, and have continued on mineral resource studies in the Cethana area. Some work previously conducted on blueschist and amphibolite from the Corinna area was prepared for outside publication. Some assistance was given on the Taroona landslip project. A report into the mineral potential (platinoids, nickel, copper, gold and other commodities) of the ultramafic complexes of Tasmania is in preparation, as are reports on heavy minerals and other commodities.

Some construction material studies continued, as a part of the Tasmanian alkali-aggregate reactivity research project (TAARRP) in conjunction with the HEC, DIER, Concrete Institute and various companies. The work has been produced as consultant reports with most of the costs being covered by individual sponsors. The project is investigating the concretes and aggregates used in major structures (bridges, dams, etc.) in Tasmania, in regard to the form of deterioration known as alkali-aggregate reactivity.

Curatorial work has included the updating of rock collection and storage databases, preparation of displays and supervision of the rock store. The computer database is being updated for later integration with TIGER and TASROCK.

The petrologist is preparing a talk and a field trip around Tasmania for an international mineral museums conference in December 2000. A paper (in conjunction with the museum curator) is in preparation on the Tasmania Museum and Art Gallery's mineral collections. The catalogue of minerals of Tasmania is being updated, and this work is now substantially complete. A talk on the minerals of Mt Lyell was given at a national mineralogical symposium in Broken Hill, NSW, and an Australian Mining Heritage Conference was attended. Numerous public and commercial enquiries on all manner of mineral, mining and rock-related matters were handled.

The TASROCK database for MRT rock samples is being maintained. There are currently about 2000 entries on the old TASROCK system while over 6000 new entries have been input into Excel files. The TASROCK database will be integrated with the ROKSTR database, which contains information on over 2000 trays of rocks held in our rock storage area, as part of Project TIGER.

## Geochemical laboratory

The laboratory is staffed by a senior chemist and a technical officer. A geologist/geochemist and another technical officer provided part-time assistance.

The laboratory supplies analyses necessary to maintain MRT databases. A total of 1270 samples were assayed for 20,552 separate chemical determinations. This enabled the backlog of 4429 determinations to be brought up to date. A total of 1159 samples for 16,123 individual determinations were submitted for analysis during the year. This compares with 807 samples in the previous year. These samples comprised 277 water samples, 392 rock samples and 490 minerals and products.

An interface board update of the Spectra AA300, allowing PC control, was a significant improvement for the laboratory.

A further improvement made to the laboratory was the acquisition of a sample introduction system (SIPS). This complements the Spectra AA300 update by eliminating the task of multiple standard preparation while providing fast, accurate on-line dilution of over-range samples. Another benefit gained from SIPS is an extended linear dynamic range for flame AA, approaching that of ICP.

A faster method of powder pellet preparation for X-ray fluorescence analysis has successfully been established. This has allowed a substantial time saving in sample preparation.

Another improvement to the sample preparation area during the year was the purchase of a 25 cfm three-phase air compressor. The additional capacity of the new compressor is now sufficient to simultaneously meet the needs of both the core store and the sample preparation laboratory.

### On-going activities

Mineral exploration report and exploration performance assessments were carried out as required, as was preparation of material for Exploration Tender Area promotional leaflets.

Numerous meetings were held with industry and requests for information were answered promptly. Presentations were given to the Tasmanian Minerals Council Exploration Group meetings.

A meeting of the Australian and New Zealand Minerals and Energy Council Land Access (Native Title) Task Force was attended in Sydney in February.

A meeting on developing strategies to revitalise the Australian mineral exploration and mining industries was attended in Brisbane in February.

## Industrial Minerals, Environment and Tenement Management

This branch is mainly responsible for the investigation and promotion of industrial minerals, including coal and hydrocarbons, the management of mineral tenements, land access issues and environmental control of exploration activity, and the protection of mining heritage.

### Petroleum exploration

Six offshore permits are currently held for oil and gas exploration in Tasmanian waters. A retention licence over the Yolla gas/condensate field is held by a consortium headed by Origin Energy Resources Ltd (formerly Boral) and AWE Petroleum Ltd. Feasibility studies continue on the development of the Yolla and nearby White Ibis fields.

The Barramundi-1 exploration well was drilled by Globex Far East in permit T/27P in October 1999.

In 1999 Origin Energy Resources Ltd took out an 80% interest in T/30P, west of King Island. A 3D seismic survey was shot in this permit between December 1999 and February 2000. Completion of the survey was delayed by poor weather and equipment failure. Origin had planned a subsequent 3D seismic survey in T/25P in the Bass Basin, using the same vessel, but the problems experienced in T/30P resulted in a postponement of this survey until the summer of 2000/2001. The term of Permit T/25P was accordingly extended for seven months.

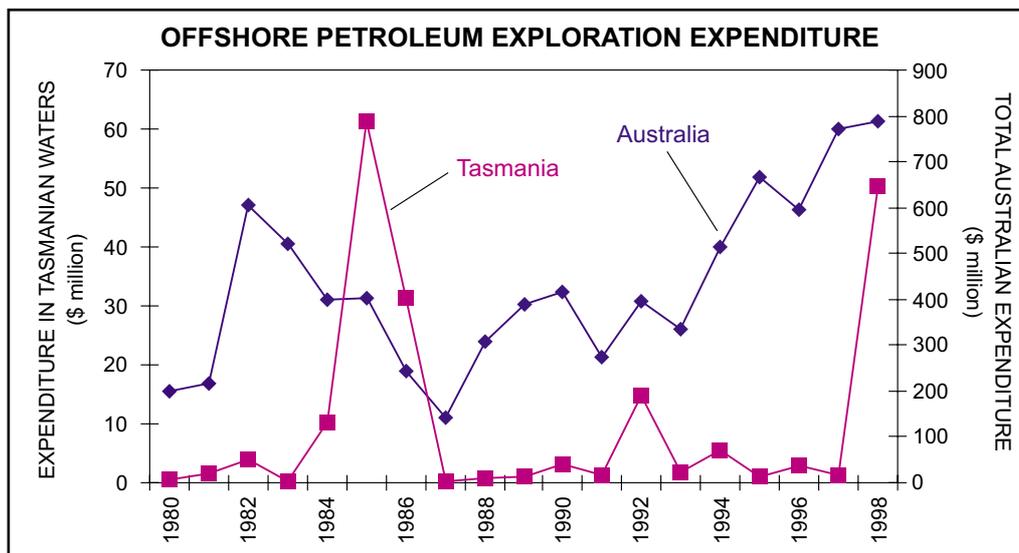
Permit T/28P, operated by Tasgas Energy P/L, was cancelled in June 2000 because of non-fulfilment of work program commitments.

In December 1999/January 2000, the French oceanographic research vessel *L'Atalante*, commissioned by the Federal Government, undertook seismic and other geophysical surveys along Tasmania's western, southern and eastern continental margins. A geologist from MRT participated in this survey.

Three vacant offshore areas in the western part of the Bass Basin were gazetted for work program bidding in 1999, but no bids were received. Following newly agreed protocols for work program bidding, these areas were re-released for two months early in 2000, but again no bids were received. An area east of Flinders Island, on the southern platform of the Gippsland Basin, was released for work program bidding in May 2000. Bids close in May 2001.

In August 1999 a number of powers from the Commonwealth *Petroleum (Submerged Lands) Act 1967* formerly residing with the Joint Authorities (i.e. the relevant State or Territory Minister and the Commonwealth Minister) were delegated to the States. This will assist in ensuring a more efficient administration of the Act.

Over the last twenty years, an annual average of \$10.1 million has been spent on offshore petroleum exploration in Tasmanian waters, which is 2.44% of the total Australian expenditure over this time. Major peaks in the pattern of expenditure are determined by the drilling of wells, by far the largest expense in offshore exploration.



Onshore, Great Southland Minerals Ltd holds Special Exploration Licence 13/98 for petroleum, covering most of the Tasmania Basin. Preparations are continuing for a seismic program.

In March 2000, MRT published a Bulletin entitled *The petroleum potential of onshore Tasmania: a review*. This is the first comprehensive review of Tasmania's onshore petroleum prospectivity to be undertaken by the Tasmanian Government in over eighty years.

### Industrial minerals

Tasmania Magnesite NL (previously Crest Magnesium NL) continued resource definition drilling of the Arthur River magnesite deposit in conjunction with proposals to develop a magnesium refinery. The proposed site of the open cut presents complexities because of the immediate proximity of the Keith River and potential hydrology and slope stability problems. The company has been seeking a partner to help develop the mine and associated refinery.

Golden Triangle Resources NL withdrew from the Main Creek magnesite project during the year.

### Beach sands

The proposal to develop a heavy minerals mine at Naracoopa on King Island restarted with a new company, Tasmanian Titanium Pty Ltd, assuming the assets of the previous developer, Australian Titanium Minerals. An updated Development Plan and Environmental Management Plan has been submitted to the King Island Council.

### Coal

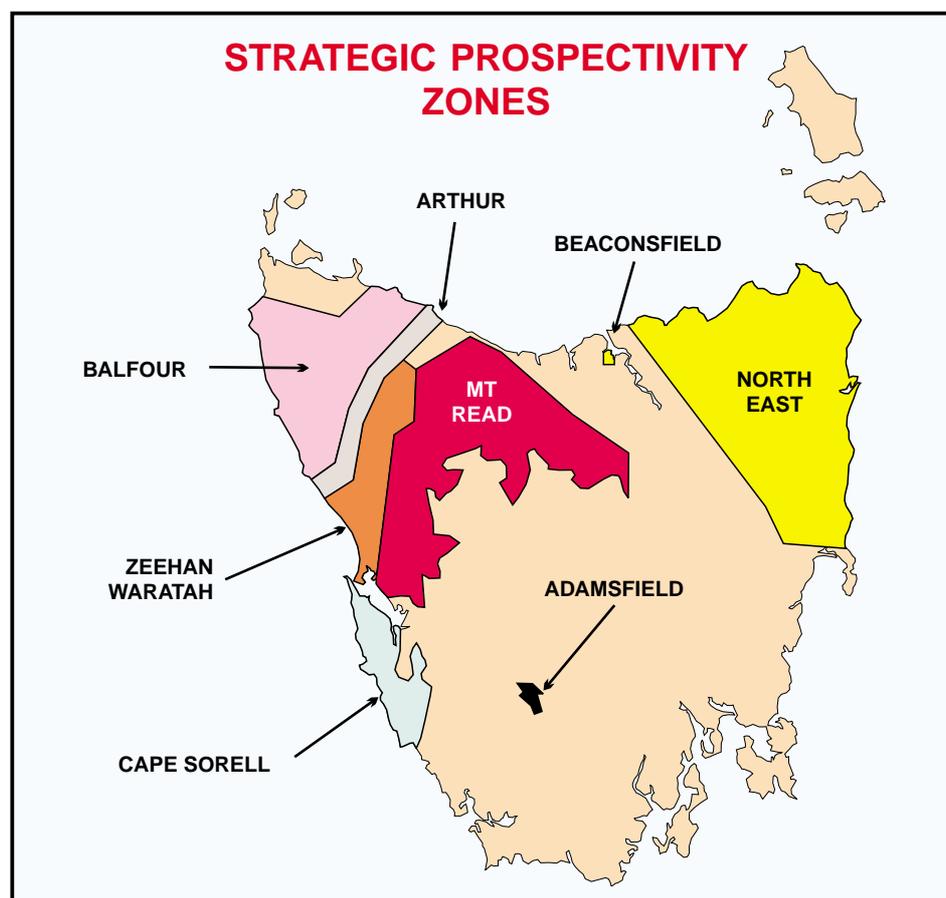
The last remaining operation in the Mt Nicholas upper coal seam was worked out at Blackwood No. 2 Colliery. Operations will continue in the Cornwall Seam at

a reduced rate. Production requirements necessitated the re-opening of Duncan Colliery at Fingal in May.

### Strategic Prospectivity Zones

Strategic Prospectivity Zones (SPZ) cover 25 200 km<sup>2</sup> or 37% of Tasmania. The areas in each SPZ occupied by mining tenements at the end of June 2000 are shown below.

SPZ	Metallic		Non-metallic	
	Area (km <sup>2</sup> )	Occupied (%)	Area (km <sup>2</sup> )	Occupied (%)
Adamsfield	0.0	0.0	0.0	0.0
Arthur	374.1	33.8	1.6	0.1
Balfour	1504.9	38.4	3.4	0.1
Beaconsfield	19.0	99.9	4.0	21.0
Cape Sorell	676.7	49.0	0.0	0.0
Mount Read	1548.2	22.0	29.0	0.4
North East	6135.1	63.1	207.0	2.1
Zeehan/Waratah	375.9	20.5	0.0	0.0



### Environmental management

The environmental monitoring of exploration programs continued with diligence and attention to detail. Regular field visits were made to ensure exploration work was being conducted in an environmentally responsible manner and that rehabilitation of past sites was successful.

To comply with the Regional Forest Agreement, Mineral Resources Tasmania has developed a system to spatially record exploration activity and attributes that chart the process of approval of individual work programs. All work programs,

whether on Crown land, State Forest or private property, are entered on this system to give a complete record of all the environmental information relating to exploration. The system has also been designed to provide ongoing information on the outcomes of rehabilitation of exploration activity.

Compliance auditing of this system requires verification that the agreed approval process is adhered to and that derived statistics reflect the RFA agreement and the recommendations of the Resource Planning and Development Commission. Mineral Resources Tasmania will conduct a trial audit of the system in early 2000/2001.

### Codes of practice

The fourth edition of the *Mineral Exploration Code of Practice* was gazetted as a code under the *Mineral Resources Development Act 1995*.

Following a review in 1999, the second edition of the *Quarry Code of Practice* was issued in September 2000. The code was provided with legislative backing following gazetting under the *Mineral Resources Development Act 1995*. The lead agency was the Department of Primary Industries, Water and Environment, with The Crushed Stone Association of Australia (Tasmania) Inc., the Tasmanian Mineral Council, Forestry Tasmania, Local Government Association and MRT being the principal organisations involved in the draft.

### Mining heritage

MRT chairs the Mining Heritage Committee (MHC) with members from the mining industry, the Queen Victoria Museum and Art Gallery, Department of Primary Industries, Water and Environment, and Forestry Tasmania. The MHC advises MRT on mining heritage policy and on specific issues affecting Tasmania's rich mining heritage.

During the past year MRT commissioned archaeological reports on the:

- Great Republic tin mine near Rossarden;
- Specimen Reef goldfield north of Savage River mine;
- Cleveland mine concentrating mill; and
- Storys Creek jig tails area.

### Town planning

Following the Tasmanian Government entering into Partnership Agreements with local government, information on mineral prospectivity was provided to the Waratah–Wynyard and Circular Head councils to assist them in preparing planning schemes. The information was derived from mineral resource potential analyses carried out by Tasmanian and Commonwealth agencies for the comprehensive regional assessment process during the RFA negotiations. The inclusion of this information forms a new benchmark for town planning submissions. Information was also supplied to the Kingborough Council under a similar program.

The long standing planning controversy over the Mornington quarry and Howrah Hills has been resolved. Following the closure of major operations by CSR Readymix, quarrying issues receded in importance. However skyline protection above Skyline Drive at Howrah remained to be resolved in Supreme Court and subsequent mediation hearings. The quarry has since been taken over by HBMI Pty Ltd for a waste transfer station. A permit appeal over this approval was averted through a mediation hearing and the operational change on the site is progressing.

Representations were made, and an appeal was lodged, over Central Coast Council's approval of a subdivision close to the Kimberleys Road quarry near Ulverstone, in an area potentially affected by dust. This matter was settled by mediation and set a precedent for a buffer zone around this quarry. Thereafter Council has refused the application of the operator, Lloyds North Pty Ltd, for

increased production at the Kimberleys Road and Riggs Road quarries. The company appealed but withdrew their appeal at the mediation hearing.

Permit approval for the Kimbolton coal mine was subject of an appeal, which was resolved by mediation hearing.

A recommendation regarding a buffer zone to discourage further subdivision near the major quarries in the vicinity of Breadalbane was submitted to the Northern Midlands Council.

MRT is represented at the Integrated Coastal Management Strategy, sponsored by the Clarence City, Sorell and Glamorgan–Spring Bay Councils. The project's aim is to improve and integrate planning along the coast from the Iron Pot, at the mouth of the River Derwent, to Cape Bernier south of Orford. Provision for long-term extraction of sand within the project area is an important planning dilemma.

A representation was made over a building permit near Marion Bay in the Sorell municipality. A successful appeal had been previously conducted over subdivision near Holloway's quarry near this site.

### **Sand resources**

A review of sand resources in southern Tasmania was carried out to examine the possible limits on extraction of the resources imposed by economic, planning, social and environmental constraints. It was found that the supply of sharp sand, essential for the manufacture of concrete, from local sources could be reduced as early as 2010. Dune sand resources could be depleted as early as 2020.

### **Acid drainage**

Following receipt of a grant from the Natural Heritage Trust, a statewide acid drainage and acid sulphate soil reconnaissance survey was commenced. A geochemist has been employed on a two-year program to carry out the work. Following a review of relevant historical data, intensive field investigations involving geochemical and hydrological sampling were carried out. Analysis of samples will continue into 2000/2001.

### **Phytophthora**

Mineral Resources Tasmania held field days, in conjunction with the Department of Primary Industries, Water and Environment and municipal councils, at St Helens and Rocky Point to help reduce the spread of *Phytophthora cinnamomi*, a root rotting pathogen which attacks coastal heath and moorland plant communities.

### **Mine closure**

The Australian Mineral Council developed a strategy on mine closure. MRT and regulators from other jurisdictions contributed to the strategy by reviewing the drafts through the ANZMEC technical environment task force.

### **RiverWorks Remediation Program**

John Miedecke and Partners Pty Ltd drafted a remediation strategy for the Storys Creek and Rossarden abandoned mine sites in 1998/1999. Significant emissions of acid and zinc in Storys Creek and Aberfoyle Creek affect the South Esk River downstream. The only two point sources of contamination were seepage from the precipitate dam on the banks of Storys Creek and an exploration adit nearby. Removal of the dam contents to a secure location and the sealing of the adit were carried out during the year.

Diffuse sources of contamination are the Storys Creek mine and tailing deposits along the creek banks. The use of limestone to neutralise acid production and slow

the emission of heavy metals, principally zinc, was also recommended and carried out in conjunction with the other works.

The Commonwealth Government contributed funding for the consultant through the RiverWorks program. The Department of Primary Industries, Water and Environment are providing laboratory analyses and MRT provided project management. Works will be funded by the Rehabilitation of Mining Lands Trust Fund and RiverWorks.

### **Rehabilitation**

Major works were carried out in the Rossarden–Storys Creek area in 1999/2000. A large component of this work involved the relocation and capping of the acid-producing precipitate dam away from Storys Creek. Work continued on making abandoned mine sites safe, with the capping and fencing of shafts at Golden Ridge, Orieco, Golden Mara and Great Republic. Maintenance of the erosion control works in the northeast tin fields continued and the clean up of the exploration camps south of Macquarie Harbour was completed. Rehabilitation of an open cut and old mullock dumps was undertaken at Queen Hill in joint venture with Aberfoyle Limited/Western Metals Limited.

Minor rehabilitation works were carried out using bonds from former mining leases at Newitt's gravel pit at Wattle Hill and Currant's sand pit at Old Waterhouse Road. The Department of Primary Industries, Water and Environment carried out minor rehabilitation works at the Coles Bay quarry.

At Zeehan the Aberfoyle Limited bond was discharged to rehabilitate a disused trial open cut at Queen Hill. A mining lease was required to provide clay for sealing and a plant growth medium. The company provided the bond when its own rehabilitation plans were deferred by proposed MRT rehabilitation of adjacent historic sites.

### **Mount Lyell**

Major pre-feasibility investigations concerning the extraction of copper from emissions from the Mount Lyell lease are under way. Solvent extraction and electro-winning, together with neutralisation, is the most feasible option. The Department of Primary Industries, Water and Environment is carrying out the work utilising Commonwealth funds from the RiverWorks Tasmania program. Potential benefits from a successful program would be a recovery in the condition of the Queen River.

### **Savage River Mines**

Programs to monitor and rehabilitate historic waste stockpiles and control acid drainage from the former operation at Savage River have been developed by the Department of Primary Industries, Water and Environment during the year.

### **Mining operations**

The Beaconsfield Mine Joint Venture commenced gold production following many years of redevelopment of the historic Tasmania mine at Beaconsfield.

The Hercules mine, five kilometres south of Rosebery, was closed in December 1999. The mine had been in intermittent operation since its discovery in 1894, with production peaking in 1979 at 70 214 tonnes. Peak employment in recent years was 50 in 1973. The mine supported the former town of Williamsford. Notable features associated with the mine included its visibility, the skipway, the aerial ropeway to Rosebery and the North East Dundas Tramway. Pasminco Mining Rosebery is now conducting rehabilitation work on the site under an environmental improvement plan.

The Hellyer mine closed in June following depletion of the ore resource. Construction of the mine commenced in 1987, with full-scale production starting in

1989. Peak employment was 299 staff and contractors. Fifteen million tonnes of ore were produced, with 2.4 million tonnes of zinc and 1.3 million tonnes of other concentrates being sold. An investigation into the possibility of re-treating the extensive tailings produced by the mining operation is currently underway.

### Registry Section

The Registry Section maintains a number of mining tenement registers in hard copy and electronic format. The section provides advice to officers within MRT, inquirers from other agencies, the mining industry, the legal profession and the general public on a wide range of matters associated with mining tenements and legislation.

The processing of applications for mining tenements and issue of tenement documentation continues to provide the majority of work for the section's officers.

Close liaison is maintained with professional geological officers of MRT, particularly in relation to maintenance of the TASXPLORE database, monitoring of exploration expenditure, circulation of company reports and preparation and circulation of the *TasXplorer* news sheet.

The section liaises with a number of other agencies in regard to tenement applications and provides information to field staff who monitor on-ground activity on mining tenements.

Requesting and collation of production and expenditure statistics is an important activity carried out by the section. These statistics provide the basic data for collection of royalties and assessment of exploration levels.

Fifteen Exploration Tender Areas were offered to potential explorers by way of the *TasXplorer* news sheet, which is circulated widely within the Australian mining community.

Officers of the section have played a key role into development, testing and implementation of the TASXPLORE and REGIS modules within the TIGER database management system.

### Mining Legislation

The *Mineral Resources Development Act 1995* (MRDA) came into force on 1 July 1996.

Although industry feedback and support of the Act has been positive, a small number of amendments to the Act and Regulations will be implemented in the coming year.

A review of the Act in relation to National Competition Policy is nearing completion. A review panel, consisting of industry and government representatives, has met on several occasions. A discussion paper was circulated widely to industry and interest groups for comment. A regulatory impact statement will be publicly circulated in late 2000.

*The Mount Read and Rosebery Mines Limited Leases Act 1916* was repealed during the year. The Mount Read Act served the Rosebery district well over 80 years but had reached a point where it needed extensive rewriting or replacement by the more modern MRDA. The MRDA provides provision for longer lease terms and amalgamation of non-contiguous areas, provisions which were previously only available to Pasma Australia Ltd, the holder of leases under the Mt Read legislation.

Mineral Resources Tasmania provides information through Service Tasmania outlets and forms approved under the Act are available via MRT's web page or direct from MRT on disc.

### *Mining Tribunal*

Under the *Mineral Resources Development Act 1995* a Mining Tribunal, consisting of a magistrate, has coverage of all Tasmania. Magistrate Michael Hill has acted as the Mining Tribunal since proclamation of the Act.

The Act places an obligation on the Director of Mines to attempt to resolve disputes before there is a formal hearing before the Tribunal. In effect this usually consists of an informal meeting, arranged by the Registrar of Mines, between the parties.

Experience to date suggests that the dispute resolution process required by the Act adequately covers most situations that would otherwise require formal determination. To date there have been no matters that have proceeded to formal hearing before the Mining Tribunal although the Tribunal has formally ratified agreements reached during dispute resolution.

Tribunal matters dealt with by MRT or referred to the Mining Tribunal during the year were:

*74087 C & S Strong and J Morrison v Anglo Australian Resources Ltd — ELA 2/98*

Landowners within an exploration licence application area at Lilydale lodged objections to the application. Meetings were held with the objectors and agreements were reached. The licence application withdrawn by applicant.

*74090 L Foyster v Australian Titanium Minerals Ltd — 1733P/M & other tenements*

Dispute over interest in tenements arising from former joint ventures. Matter settled by consent between the parties.

*74096 Tasmanian Aboriginal Centre Inc. v Targa Minerals Pty Ltd — ELA 3/99*

Objection withdrawn after meeting convened by Registrar of Mines.

*74097 Tasmanian Aboriginal Centre Inc. v Targa Minerals Pty Ltd — ELA 7/99*

Objection withdrawn after meeting convened by Registrar of Mines.

*74098 Tasmanian Aboriginal Centre Inc. & A Orchard v Targa Minerals Pty Ltd — ELA 8/99*

Objection lodged by landowner and the Tasmanian Aboriginal Centre Inc. Objections withdrawn after meetings convened by Registrar of Mines.

*74099 Tasmanian Aboriginal Centre Inc. v Targa Minerals Pty Ltd — ELA 9/99*

Objection withdrawn after meeting convened by Registrar of Mines.

*74100 J H Lawrence and others v Sorell Council — MLA 1718P/M*

Objection lodged by adjoining landowner affected by proposed buffer zone around a quarry application. Meeting convened by Registrar of Mines. Some agreements reached during on-site meeting resulting in change to Council Planning Scheme. Formal withdrawal of objection has not been received to date.

*74101 Various objectors v Western Metals Resources Ltd — ELA 17/99*

Several objections were lodged by caving organisations following an application for an exploration licence for limestone in sensitive karst areas. A meeting of the parties was convened by the Registrar of Mines. The licence area was reduced significantly but some outstanding issues were not resolved. Matter has been referred to Mining Tribunal for determination.

*74102 P Sims & Tasmanian Conservation Trust Inc. v Exploration and Management Consultants Pty Ltd and McNeil Associates Pty Ltd — ELA 21/99*

Agreements were reached at a meeting convened by the Registrar of Mines. Formal withdrawal not received to date.

*74103 Aboriginal Land Council of Tasmania Inc. v Mineral Holdings Australia Pty Ltd — ELA 9/99*

Objection withdrawn after meeting convened by Registrar of Mines.

74104 *P Sims v Mineral Holdings Australia Pty Ltd — ELA 5/2000*

Agreements reached at meeting convened by Registrar of Mines. Formal withdrawal not received to date.

 74105 *L Thorne v Beaconsfield Gold NL — ELA 7/2000*

Informal discussions have taken place between landowner and applicant. No resolution to date.

**Lease Applications, 1999/2000**
**Total number of all types of exploration rights held as at 30 June 2000**

<i>Mining Tenement</i>	<i>Number</i>	<i>Area</i>
Exploration Licences —		
All minerals	115	11 202 km <sup>2</sup>
Non metallic	13	244 km <sup>2</sup>
Oil (onshore)	1	30 356 km <sup>2</sup>
Retention Licences —		
All minerals	21	79 km <sup>2</sup>
Non metallic minerals	13	203 km <sup>2</sup>
Prospectors Licences Issued	59	Not applicable
Permits to explore for Petroleum under <i>Petroleum (Submerged Lands) Act 1967</i>	6	455 Blocks
Retention Licence under <i>Petroleum (Submerged Lands) Act 1967</i>	1	9 Blocks

**Leases applied for**

<i>Product</i>	<i>Number</i>	<i>Area (ha)</i>
All minerals	1	65
All minerals and stone	2	940
Clay	2	3
Dolomite	1	29
Gold	2	52
Gravel	12	82
Gravel and clay	1	12
Magnesite	1	100
Peat	1	300
Sand	2	17
Sand and gravel	1	8
Sand and stone	3	144
Sandstone	1	12
Specimens	2	1
Stone	9	62
Stone and gravel	4	67
Tin	2	10
<b>Total</b>	<b>47</b>	<b>1904</b>

**Leases granted**

<i>Product</i>	<i>Number</i>	<i>Area (ha)</i>
All minerals and stone	2	54
Clay	1	3
Coal	1	800
Gold	1	32
Gravel	12	81
Gravel and clay	1	12
Sand	3	24
Sand and stone	1	20
Sandstone	2	16
Stone	9	85
Stone and gravel	3	83
Tin	1	64
<b>Total</b>	<b>37</b>	<b>1274</b>

**Total number of leases in force at 30 June 2000**

<i>Principal product</i>	<i>Number</i>	<i>Area (ha)</i>
All minerals	31	18 911
All minerals and stone	5	1 095
Clay	7	89
Coal	5	6 514
Copper	2	8
Dolerite	1	40
Dolomite	5	276
Easements	23	311
Gold	19	1 102
Granite	4	50
Gravel	176	3 153
Gravel and clay	2	41
Iron	1	4 067
Kaolin	1	248
Lime sand	3	207
Limestone	11	1 266
Magnesite	3	815
Magnetite	1	55
Ochre	1	15
Peat	4	858
Quartzite	1	191
Sand	51	1 918
Sand and gravel	23	1 363
Sand and stone	11	320
Sandstone	7	113
Shale	4	39
Silica	6	454
Silica, sand and stone	1	50
Silica sand	1	20
Silver and lead	1	8
Slate	3	165
Specimens	4	14
Stone	243	5 734
Stone and gravel	16	561
Tin	11	1 118
Umber	1	6
<b>Total</b>	<b>689</b>	<b>51 195</b>

## **Engineering Geology and Groundwater**

This Branch provides geoscientific information for the management of groundwater resources, waste management and geohazards, especially land stability. By ensuring relevant geoscientific data is available to both the public and private sectors, better land-use decisions can be made.

The branch was involved in a number of projects and programs during the year. Enquiries from local government, other agencies and the general public for information on both engineering geology and groundwater continued at the high levels of previous years.

### **Engineering Geology**

Land stability issues continued to be an important aspect of the work of the branch. A significant project during the year was the transfer of the boundaries of proclaimed and advisory landslip zones onto modern base maps, so that the information will be more readily understood. These new plans will eventually be made available through the MRT web site.

The study of land stability in the Taroona area continued. A long history of a complicated sequence of ground movement was identified, using a combination of geological and geomorphological mapping, with reference to monitored data from installed inclinometer instrumentation. The report will be completed in the 2000/2001 financial year.

A contract surveyor continues to regularly survey active and recently active landslip areas in northern Tasmania, where these threaten property and transport routes. Ongoing monitoring of groundwater levels also continues at the site of the Rosetta landslide in Glenorchy, with technical advice on its stability being provided at regular meetings with Glenorchy City Council.

A second landslide in the Glenorchy municipality was the subject of a preliminary geotechnical investigation and proposal for a monitoring program, to define the magnitude of current activity of the slide.

### **Groundwater**

Telephone enquiries remain at the high level of previous years, and continue to be for information on groundwater resources, pollution and quality. Some enquiries have also been concerned with mineral waters from karst areas. An increasing number of requests for information about potential groundwater prospects were received from the public and other agencies. This may be related to the continuing lack of rainfall in some areas of Tasmania.

The study of groundwater resources in the Sorell area continued, with the compilation of water quality and borehole information being completed. The groundwater map and report will be completed in the 2000/2001 financial year.

Consultants were engaged during the year to carry out the groundwater theme of the National Land and Water Audit (NLWA), with the section providing input to ensure satisfactory completion of the audit. Fourteen potential Groundwater Management Units (areas regarded as having some vulnerability to groundwater overuse) were identified during the audit for possible declaration as groundwater management areas under the new Water Management Act. The branch also provided data for the dry land salinity theme associated with the NLWA.

Compilation of groundwater data, mostly derived from contract drilling in northern Tasmania, has continued. It is planned to produce a series of groundwater prospectivity maps which will provide broad information on groundwater quality and prospectivity, incorporating some information on pollution vulnerability. A 1:500 000 scale groundwater prospectivity map, identifying major aquifers and likely bore yields, has been produced for Tasmania.

The program of accurate monitoring of approximately thirty groundwater 'indicator' boreholes around Tasmania continued. Data loggers are used to record

various parameters, while each bore is sampled twice a year for routine laboratory analysis. The boreholes with the longest history of continuous monitoring, in the Devonport-Port Sorell-Sassafras area, continue to indicate that recharge is sufficient to replace extraction for irrigation in that area.

Groundwater quality protection issues occupy an increasing part of the branch's time. MRT is represented on the Committee on Wastewater Re-use, which is reviewing proposals for the use of waste water as an irrigation supply and the possible effects on groundwater. The branch also provides internal advice on groundwater issues concerned with mining tenements.

### *Groundwater resources in the Northern Midlands and Fingal Valley*

A project, funded by the Rural Adjustment Scheme, to examine groundwater prospectivity in the drought-declared region of the northern Midlands and Fingal Valley was completed during the year. This project formed part of the Tasmanian Regional Drought Initiative (TRDI), a multi-disciplinary regional study which examined means of drought alleviation and potential alternative agricultural practices in these areas. The TRDI was carried out in association with a number of external agencies, including the Department of Primary Industries, Water and the Environment (DPIWE), Agriculture, Fisheries and Forestry Australia (AFFA), and the Northern Midlands and Break O'Day councils. Funding was provided by DPIWE and AFFA.

The MRT sub-project involved geological mapping and geophysical surveys, and analysis of data from over 350 boreholes listed in the BORIS database. From this work thirty boreholes were drilled throughout the study area, at locations predicted to provide optimum new data on regional aquifer properties and groundwater chemistry. A number of pump tests were used to define aquifer properties.

The results of the study were used to produce some important predictors for future groundwater prospectivity in the region and examine the potential of using the local groundwater as an irrigation supply. The final report, which included a number of groundwater maps of the region, is to be published as an MRT Record and also forms part of a combined report for the whole project.

### *Hydrogeological setting of soil salinity in Tasmania*

A study, funded by the Natural Heritage Trust, to examine the relationship between soil salinity and groundwater continued during the year. A large amount of field and laboratory data were collated and interpreted, and a report was prepared. The project was based around case study areas at Cape Portland, Cressy, Tunbridge, Cambridge and Little Swanport. The sources of salinisation in each area were investigated and some conclusions were made about the likely future possibilities of amelioration of the salinity problem at each site.

### *Effects of waste disposal facilities on groundwater*

A project, funded by the Natural Heritage Trust, examining the effects of waste disposal on groundwater quality commenced during the year. A preliminary examination was made of a large number of waste disposal sites across Tasmania, with four key sites being identified for future detailed study during the project and certain other sites being selected for long-term monitoring. Consultants investigating pollution problems at various sites in Tasmania were supplied with information relating to groundwater for the areas concerned.

## GIS and Geophysics

The activities of the GIS and Geophysics branch were dominated by the continuing implementation of Project TIGER and the transition to the year 2000. The branch was also responsible for providing geophysical services and advice to MRT and our clients, and providing computer system and network support for MRT.

The staffing of the branch varied during the year. One officer resigned in April and was replaced by a temporary staff member, while two temporary staff capturing historical data for the metadata indexes completed their task and were transferred to other sections of MRT. At 30 June there were three staff in the GIS group, predominantly involved with the completion of Project TIGER Phase 3 and the implementation of Project TIGER Phase 4, two computer systems officers, and a section manager who is also responsible for geophysical activities.

The main projects of the GIS and Geophysics Branch during the year were:

- completing the final stage of Project TIGER (Tasmanian Information on Geoscience and Exploration Resources) Phase 3 with the implementation of the new tenement management system;
- migrating image data into Image Engine;
- preliminary mapping of the processes involved with the collection of geoscientific data;
- completing back capture of the spatial index for TASXPLORE reports;
- completing a successful transition through all critical dates regarded as Year 2000 risks;
- installing a development server for use during Project TIGER;
- improvement of intranet services by minimising network traffic;
- developing a standard for the digital lodgement of exploration data and reports by explorers in Tasmania that is consistent with the national standard;
- precise levelling and indexing aeromagnetic datasets; and
- production of a series of aeromagnetic images for parts of Tasmania.

### Data capture

Capture of documents into the TASXPLORE and DOMINFO applications continued throughout the year, with 155 documents being entered into TASXPLORE and 16 documents entered into DOMINFO. Eighty-four document entries were updated in DOMINFO and 2838 were updated in TASXPLORE. Both textual and spatial data are captured for TASXPLORE.

### Project TIGER

A new tenement management system, the final component of Project TIGER Phase 3, has been implemented to integrate a number of isolated applications and systems. The new system gives MRT staff access to a complete set of tenement information via a single easy-to-use interface.

Joint funding by MRT and DPIWE has developed common components of a system to enable deployment of data and services via The LIST (Land Information System Tasmania). A facility to automatically transfer data between MRT and DPIWE has been developed and when implemented will replace manual transfer and updating of data that is used by both organisations. The joint funding has extended the functionality of The LIST ([www.thelist.tas.gov.au](http://www.thelist.tas.gov.au)) interface to display mineral tenement information in combination with property titles and a wide variety of other map themes.

Project TIGER has contributed to the professional and organisational development of MRT by delivering a Transition Management Plan to be used as a template for managing change, such as implementing new information systems. A management workshop and Transition Training workshops for all staff followed the delivery of the plan. The workshops identified ways MRT can maximise the

effectiveness the tools provided by Project TIGER to deliver better services to the Tasmanian community and clients outside Tasmania.

Initial work has commenced on Project TIGER Phase 4. This phase will develop MRT Internet services with data to be made available via the MRT web site ([www.mrt.tas.gov.au](http://www.mrt.tas.gov.au)) as a series of modules. The Internet-ready data management system implemented by Phase 3 of the project will underlie the enhanced features of the new MRT web site. Design has commenced on a system that will display near real-time information on tenements and provide facilities to search for and order copies of technical documents. Visitors to the new MRT web site will be able to register for a variety of email updates such as additions to the web site or release of new Exploration Tender Areas.

### **IT summary**

The standard desktop configuration for MRT staff is a Year 2000 compliant PC running Windows NT and Microsoft Office 97. The corporate mail system is Microsoft Exchange. Anti-virus software is installed on all machines and updated frequently. Specialised applications are installed on individual desktop systems to accommodate the requirements of each user.

There are four network servers, three of which run Windows NT. The main PC network server is running Netware 5.0 and has been expanded to offer approximately 72 gigabytes of on-line storage. Windows NT servers provide anti-virus, e-mail, intranet and image delivery services to MRT staff. Files on the corporate Unix systems are also accessed from PCs using Samba software. Automatic gathering of software inventories from desktop PCs and licence metering are part of the IT infrastructure.

There are six Unix workstations in use in MRT. One of these is dedicated to running the production Oracle database system, developed under Project TIGER, that is used for storing spatial, textual and image data for use by both PC and Unix-based applications. A second workstation is configured as a development platform for Project TIGER. Solaris 7 is installed on all but the server running the production Oracle database system.

Overheads associated with the corporate intranet have been minimised by replicating the DIER intranet site internally within the MRT network. The ER Mapper Image Web Server has been installed as a method of delivering large volumes of image data to MRT staff via the intranet using a minimum of network bandwidth. Scanned and rectified geological maps have been used to test this application.

### **Year 2000**

MRT completed a successful transition through all critical dates associated with possible Year 2000 (Y2K) risks. Although the program to minimise MRT's exposure to Y2K risks commenced early in the 1998 calendar year the Y2K program resulted in a significant distortion in divisional IT employee availability and expenditure. Equipment purchases include checking for Y2K compliance and, where possible, selecting equipment that allows firmware upgrades if any Y2K 'bugs' were discovered. The divisional risk minimisation plan, identifying infrastructure, information technology, and activity-related risks as well as Y2K-related risks, is regularly updated to reflect changing circumstances. The supply chain was examined and early ordering implemented to avoid any possible problems near the critical dates.

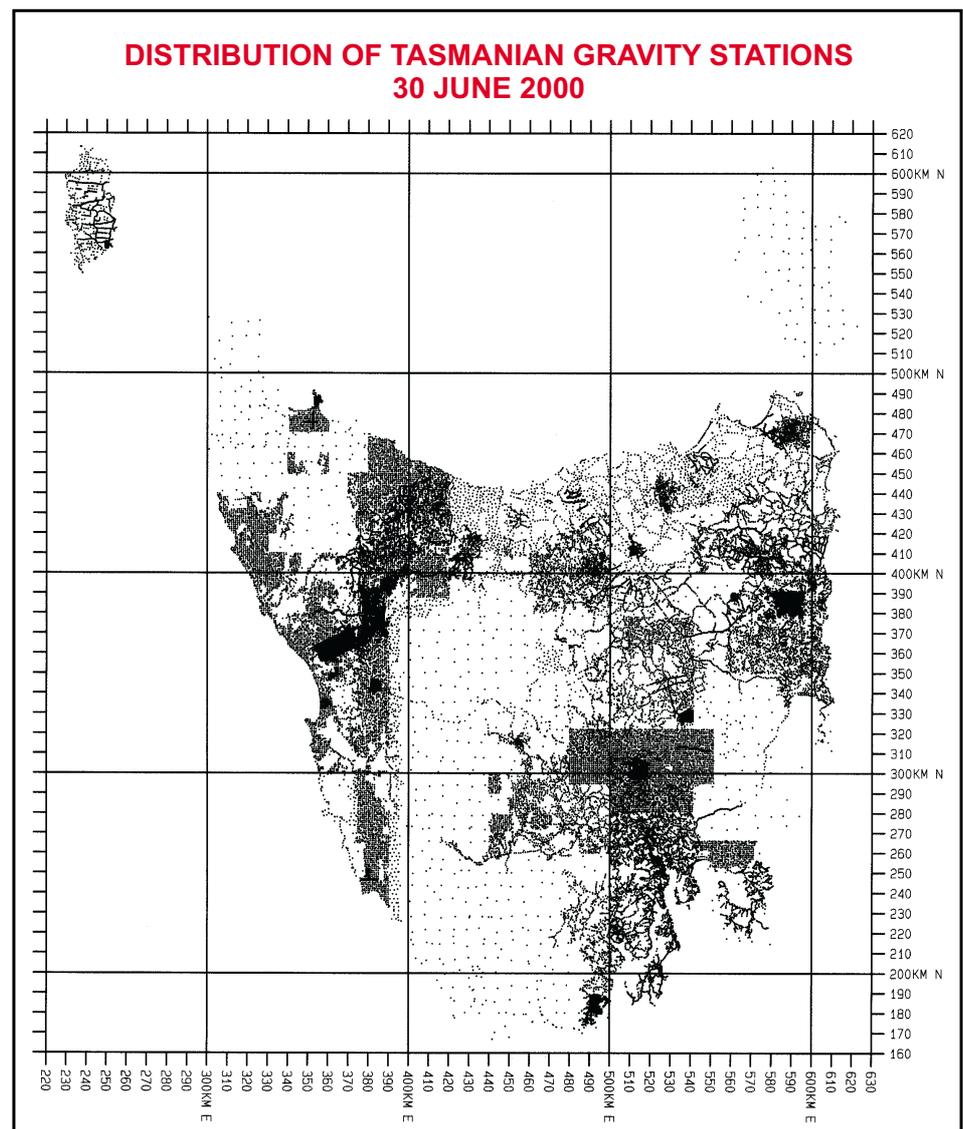
MRT was a member of the DIER Y2K project team and also reported on the status of two key divisional activities as part of the government's program of public disclosure of Y2K readiness. One hundred percent readiness was achieved in advance of the target date of 30 October 1999.

There are still a number of applications developed by individuals within MRT that hold MRT corporate data but many of these will be incorporated into the data management systems developed by Project TIGER. Until then, testing of datasets for the most common applications (Microsoft Access and Excel) held on the divisional PC server will continue. Incoming data continues to be monitored for possible Y2K problems.

### Geophysics

Indexing, and precise levelling where required, of airborne geophysical datasets has continued throughout the year. A total of 101 datasets are held by MRT in open or closed file and all have now been levelled and indexed. A number of open file images have been produced from these datasets including a 20 metre mesh image of Western Tasmania helimag data, a 50 metre mesh image of north and west Tasmania, and a 100 metre mesh image of the State. These images highlight the number of small datasets of varying qualities and vintages comprising the State aeromagnetic database and the lack of a consistent high quality dataset. The Australian Geological Survey Organisation AGSO is the custodian of a number of the regional datasets.

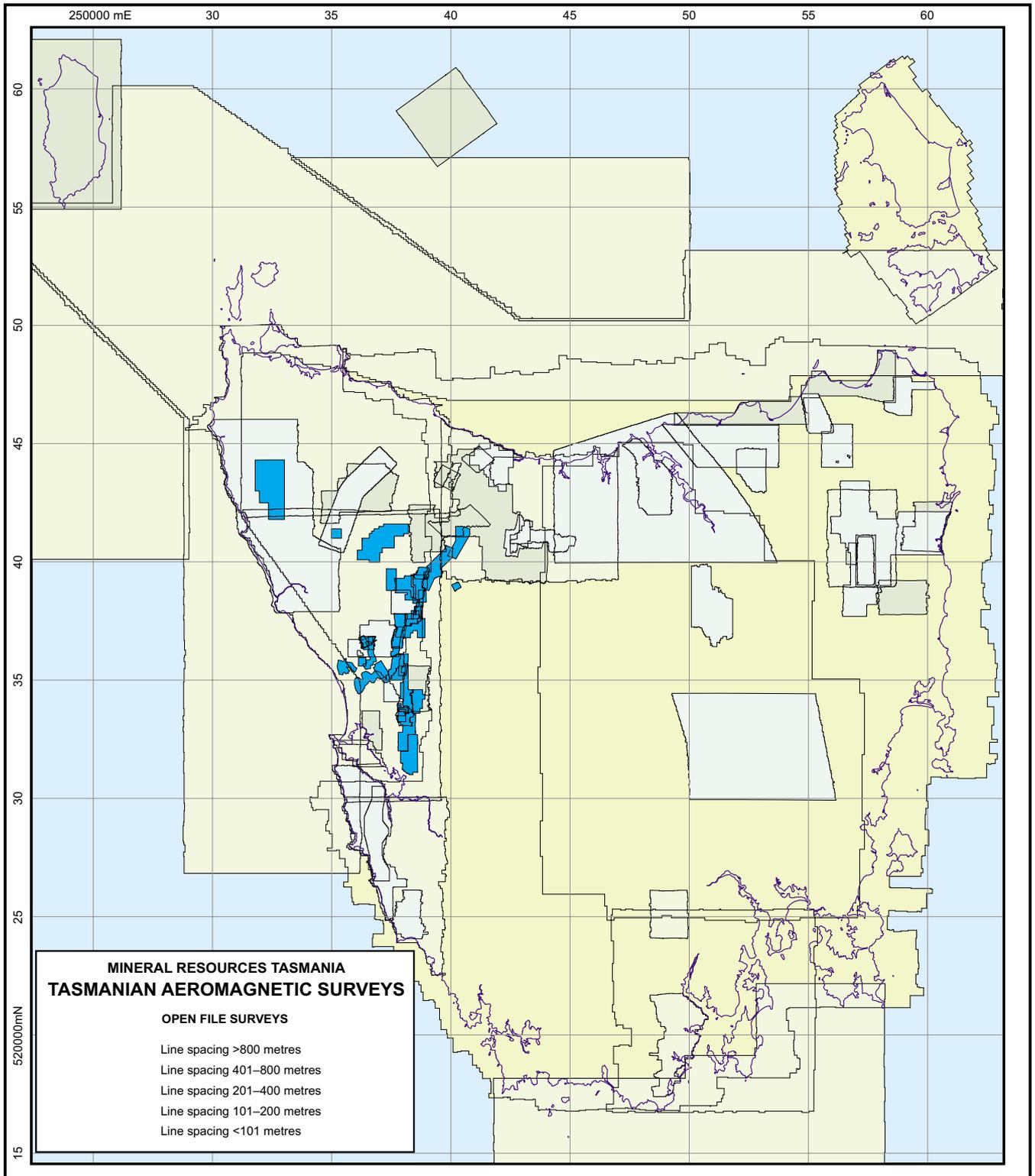
As part of the National Geoscience Mapping Accord, AGSO flew two areas in central Tasmania early in 1999. The first area was from the north coast to near Perth and the second was from near Melton Mowbray to near Ross. Aeromagnetic, radiometric and digital terrain data were acquired along east-west lines spaced 200 m apart and the processed data were released by AGSO in November 1999.



The datasets are of high quality and can be used to resolve previously obscured structures within dolerite-covered areas.

MRT continues to incorporate gravity data collected in Tasmania into the Tasmanian Gravity Database after checking and correction where needed. The gravity coverage of Tasmania as at 30 June 2000 is shown in the accompanying index map. Demand for this and similar index maps remains high.

During the year MRT has adapted the guidelines for the digital lodgement of mineral exploration reports and data developed by the Government Geologists Information Policy Advisory Committee for use by Tasmanian explorers and miners. It is planned to phase the digital reporting standards in over the year commencing 1 October 2000.





## Data Management

The role of Data Management includes:

- the recording of mining tenements on the Division's maps and plans;
- the management of the Division's Geographical Information System and Computer-Aided Drafting system; and
- the provision of support drafting services.

During 1999/2000 the capture of geological data continued, resulting in the completion of:

- five 1:25 000 scale digital geological maps in western Tasmania (Ramsay, Parsons, Selina, Albina, Hibbs Project Map 3);
- one 1:25 000 scale digital geological map in southern Tasmania (Hobart);
- two 1:25 000 scale digital geological maps in northeast Tasmania (Oxberry, Gladstone);
- five 1:50 000 scale digital maps in central Tasmania for the Tasmanian Regional Drought Initiative Project funded by the National Heritage Trust.

Revision of the 1:25 000 digital geology attribute data was undertaken and work on the creation of a 'seamless' 1:25 000 data coverage for Tasmania commenced.

The information system for recording the approvals process and monitoring activities undertaken by MRT in its administration of on-ground mineral exploration activities, as required under the Tasmanian Regional Forest Agreement (RFA), was implemented after work started in 1998/1999.

Tenement data was aligned to DPIWE's cadastre data for inclusion on The LIST.

The capture of Landslip A and B Zones (including the redrawing of plans), and landslip advisory zones data for Tasmania, commenced.

Thirty-six datasets of geoscientific data were produced for clients. Tenement data, updated on a weekly basis, is available as a free download from the MRT web site.

CAD continues to be used as a support tool for many projects, with 102 maps and plans and 116 tenement diagrams being produced throughout the year.

Output maps of digital geological data were produced on demand using the Division's inkjet plotters.

## Publications

The Publications Section is responsible for the production of geological reports, promotional books, newsletters and material for displays, Exploration Tender Area flyers, maintenance of the MRT Internet site, and other reports and leaflets as required. Major publications produced during the year included:

- The Mineral Resources Tasmania *Annual Review 1998/1999*;
- Geological Survey Bulletin 71 — *The petroleum potential of onshore Tasmania: a review*, by C. A. Bacon, C. R. Calver, C. J. Boreham, D. E. Leaman, K. C. Morrison, A. T. Reville and J. K. Volkman.
- *Mineral Exploration Opportunities in Tasmania — A summary of opportunities for mineral exploration and mineral resource development in Tasmania — February 2000*.
- *Fossicking areas in Tasmania* (revised edition), by C. A. Bacon and R. S. Bottrill.

Reports issued in the *Tasmanian Geological Survey Record* series included:

- 1997/03 — *Geology of the islands of southwestern Bass Strait*, by J. L. Everard, C. R. Calver, J. Pemberton, J. Taheri and G. Dixon.
- 1999/01 — *Porphyry and sedimentary-hosted gold deposits near Cygnet: new styles of gold mineralisation in Tasmania*, by J. Taheri and R. S. Bottrill.
- 1999/07 — *Tasmanian magnesite resources: a summary*, by C. R. Calver
- 2000/01 — *A field excursion guide to the Wilmot and Cethana map sheets*, by M. P. McClenaghan, D. C. Green, R. S. Bottrill and J. Taheri.

A report titled *Groundwater Resources of the Northern Midlands and Fingal Valley Regions* was also prepared as part of the Tasmanian Regional Drought Initiative Program.

## Library

The library continues to be staffed by a full-time librarian, with assistance being provided two days per week. The Workplace Standards Tasmania collection, although housed in the Rosny Park library, is maintained separately. A permanent part-time librarian was appointed to manage the WST collection in September 1999.

Work has continued on collection maintenance and improved access to information. There has been an ongoing program over the year of reorganising the journal collections housed in the compactus to maximise available space. This has included removing foreign language material with no English component and donating this to other libraries.

In June 2000 the majority of the collection was packed into boxes and removed to allow laying of new carpet. Once the collection was returned to position much time was spent reorganising mis-shelved items.

## Technical Services

The new version 4.3 of Inmagic DB/Textworks library management software was purchased and installed. A useful feature of the new version is the direct email facility which has streamlined the circulation of new addition lists which are generated and emailed to staff on a monthly basis.

A continuing program of indexing MRT publications for entering into the DOMINFO database was begun. This database became available for general library use during the year and has proved invaluable in searching the extensive collection of Departmental reports

Cataloguing of books and journals onto Inmagic DB/Textworks 4.3 continued during the year. A large portion of the modern monograph collection is still catalogued on the manual card system. Work has begun transferring these titles onto the library management software as time permits.

## Collection

Despite an increase in the price of journal subscriptions only one subscription was cancelled and two new subscriptions purchased.

Twenty-six new books were purchased during the year.

**External reports  
released during  
1999/2000**

- BOTTRILL\***, R. S.; **BROWN**, G. 2000. Rare Australian gemstones: Stichtite. *Australian Gemmologist* 20:391–393.
- BOTTRILL\***, R. S. 2000. The Mt Lyell mines, Tasmania. Australia's greatest mineral deposits. *Journal and Proceedings Royal Society of NSW*.133 (9):5–7.
- CALVER\***, C. R. 2000. Isotope stratigraphy of the Ediacarian (Neoproterozoic III) of the Adelaide Rift Complex, Australia, and the overprint of water column stratification. *Precambrian Research* 100:121–150.
- CALVER\***, C. R.; **WALTER**, M. R. 2000. The late Neoproterozoic Grassy Group of King Island, Tasmania: correlation and palaeogeographic significance. *Precambrian Research* 100:299–312.
- WALTER**, M. R.; **VEEVERS**, J. J.; **CALVER\***, C. R.; **GORJAN**, P.; **HILL**, A. C. 2000. Dating the 840–544 Ma Neoproterozoic interval by isotopes of strontium, carbon and sulfur in seawater, and some interpretative models. *Precambrian Research* 100:371–433.
- HILL**, P. J.; **ROLLET**, N.; **ROWLAND**, D.; **CALVER\***, C. R.; **BATHGATE**, J. 2000. Swath-mapping and geophysical survey of Australia's southeast marine zone, AUSTREA-1 research cruise using *L'Atalante*. *Record Australian Geological Survey Organisation* 2000/4.
- HILL**, P. J.; **ROLLET**, N.; **BERNADEL**, G.; **CALVER\***, C. R.; **ALCOCK**, M. 2000. Swath-mapping Australia's southeast continental margin for geoscience and environmental management: AUSTREA survey 2000. *Abstracts Geological Society of Australia* 59:226.
- KAMENETSKY**, V. S.; **EVERARD\***, J. L.; **CRAWFORD**, A. J., **VARNE**, R.; **EGGINS**, S. M.; **LANYON**, R. 2000. Enriched end-member of primitive MORB melts: petrology and geochemistry of glasses from Macquarie Island (SW Pacific). *Journal of Petrology* 41:411–430.
- TAHERI\***, J. T.; **BOTTRILL\***, R. S. 2000. Porphyry and sedimentary-hosted gold deposits, Cygnet area, southeast Tasmania. *Abstracts Geological Society of Australia* 59:487.

## Mineral Sector Overview

The 1999/2000 year was one of consolidation for the mining industry;

- Renison Bell Limited commenced major exploration to secure a further ten years of operation and began an investigation into the processing of ore and tailings;
- the Beaconsfield gold mine joint venture had its first gold pour in September 1999;
- Goldfields Limited announced that it had discovered two new zones of mineralisation in the Henty area, Zone 15 and the Tyndall Zone, and expected that these resources would enable mining to continue beyond the originally planned four years;
- a new iron ore deposit was discovered by Australian Bulk Minerals south of the existing Savage River mine.

The Australian Bureau of Statistics (ABS) reported a significant decrease in Tasmanian mineral exploration expenditure from \$11.9 million in 1998/1999 to \$8.7 million in 1999/2000. This 27% decrease was partly in line with an international decrease in exploration spending attributable to low commodity prices, but it is of concern that Tasmania's proportion of national expenditure decreased by 9% from 1.42% to 1.29%. Part of this decrease is due to a lower level of on-lease exploration following the conclusion of some successful projects.

Despite the low expenditure levels, there were some promising, but sub-economic gold discoveries. This included the Beaconsfield Joint Venture outlining an inferred resource of 264 000 tonnes of 1.64 grams per tonne gold at Pease Creek at Beaconsfield, and Jervois Mining NL defining an inferred 135 000 tonnes at 3.2 grams per tonne gold and 0.14% bismuth at the old Stormont mine near Moina. Defiance Mining NL discovered two new gold reefs, the Sophies and Dylans reefs, at Mathinna and Anglo Australian Resources NL reported a best intersection of eight metres of 5.6 grams per tonne gold from a twelve-hole reverse circulation drilling program at the East Denison prospect near Lebrina. Substantial exploration projects were also conducted by Pacific-Nevada Mining Pty Limited at Cygnet, near Cape Sorell and Temma, and by Pasmenco Exploration and Goldfields Limited in the Mount Read Volcanics.

Perhaps the most promising project is the exploration for nickel being conducted by Allegiance Mining NL, with a best intersection of 14 metres true width of 2.51% nickel at the Avebury prospect, nine kilometres southwest of Zeehan. The company also announced an intersection of 3.2 metres estimated true width of ore containing 4.36% nickel, 2.86% copper, 0.12% cobalt, 0.307 grams per tonne gold, 0.523 grams per tonne palladium and 0.435 grams per tonne platinum at the former Nickel Reward mine, six kilometres northeast of Zeehan.

## Value of the Tasmanian Mineral Industry

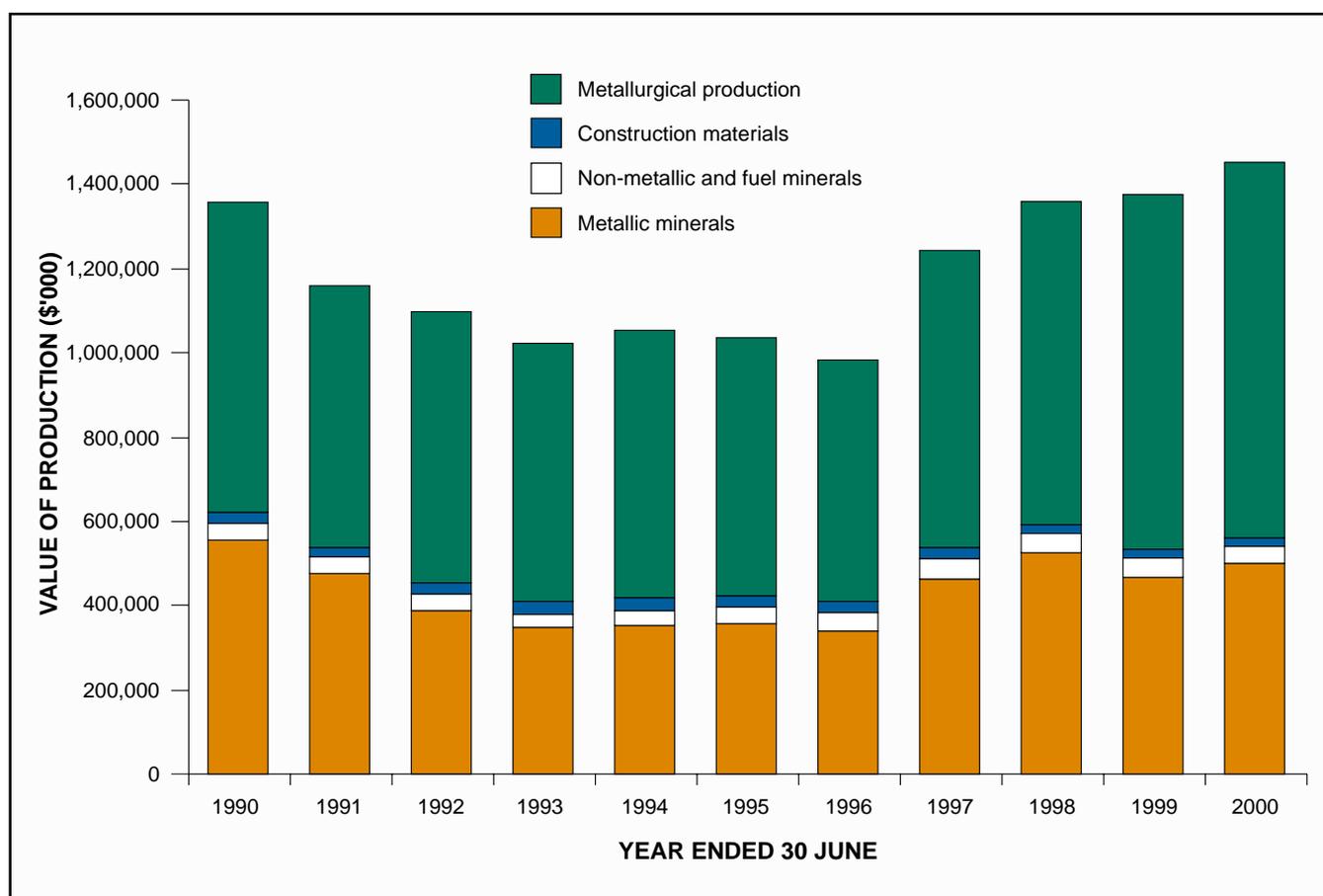
Year ended Commodity	Unit	30 June 1999 <sup>1</sup> Total Quantity	30 June 2000 Total Quantity
<b>Metallic Minerals</b>			
Copper (assayed) . . . . .	(tonne)	19 833	27 806
Gold (assayed) . . . . .	(kilogram)	3 635	7 823
Iron ore pellets . . . . .	(tonne)	1 816 150	2 068 341
Iron (in magnetite) . . . . .	(tonne)	62 071	53 301
Lead (assayed) . . . . .	(tonne)	65 153	65 416
Silver (assayed) . . . . .	(kilogram)	141 836	156 005
Tin . . . . .	(tonne)	7 807	9 207
Tungsten as tungstic oxide . . . . .	(tonne)	5	0
Zinc (assayed) . . . . .	(tonne)	190 676	161 883
<i>Value of Metallic Minerals</i> . . . . .		\$466 987 499	\$501 429 984
<b>Non-Metallic, Industrial and Fuel Minerals</b>			
Clay –			
Cement . . . . .	(tonne)	96 948	85 081
Brick . . . . .	(tonne)	22 571	24 943
Other . . . . .	(tonne)	0	14 110
Kaolin . . . . .	(tonne)	9 507	926
Dolomite . . . . .	(tonne)	6 021	6 176
Limestone –			
Agricultural . . . . .	(tonne)	153 006	145 558
Cement . . . . .	(tonne)	1 617 962	1 230 339
Chemical and metallurgical . . . . .	(tonne)	49 308	39 467
Other . . . . .	(tonne)	68 528	67 790
Silica (glass and other) . . . . .	(tonne)	118 966	139 888
Sulphuric acid . . . . .	(mono tonne)	386 302	446 735
Coal (run of mine) . . . . .	(tonne)	563 117	565 988
Coal (washed) . . . . .	(tonne)	385 437	398 181
Peat . . . . .	(m <sup>3</sup> )	510	2 310
<i>Value of Non-Metallic and Fuel Minerals</i> . . . . .		\$43 628 106	\$38 857 961
<b>Construction Materials</b>			
Building stone –			
Freestone . . . . .	(tonne)	1 159	792
Other . . . . .	(tonne)	12 890	6 809
Sandstone . . . . .	(tonne)	285	620
Crushed and broken stone –			
Basalt . . . . .	(tonne)	785 390	672 853
Dolerite . . . . .	(tonne)	720 764	728 746
Limestone . . . . .	(tonne)	28 999	29 659
Sandstone . . . . .	(tonne)	10 036	6 802
Other . . . . .	(tonne)	160 796	110 252
Gravel . . . . .	(tonne)	60 535	64 343
Sand . . . . .	(tonne)	384 959	422 518
Other road materials . . . . .	(tonne)	1 587 744	1 126 148
<i>Value of Construction Materials</i> . . . . .		\$24 357 789	\$21 062 561
<b>Total value with Australian metal prices</b> . . . . .		<b>\$534 973 394</b>	<b>\$561 350 506</b>
<b>Value added production from Tasmanian and other ores</b>			
Aluminium )			
Cadmium )			
Cement )			
Ferromanganese ) . . . . .		\$841 101 480	\$891 514 762
Silicomanganese )			
Sinter )			
Superphosphate )			
Zinc )			
<b>Total value of mining and metallurgical production</b> . . . . .		<b>\$1 376 074 874</b>	<b>\$1 452 865 268</b>
Reported average number of employees <sup>2</sup> . . . . .		3861	4159

1. Figures may vary from the 1998/1999 Annual Review because of inclusion of late or amended returns.

2. Not all operators report full details

## Value of Production, 1999/2000 and 1998/1999

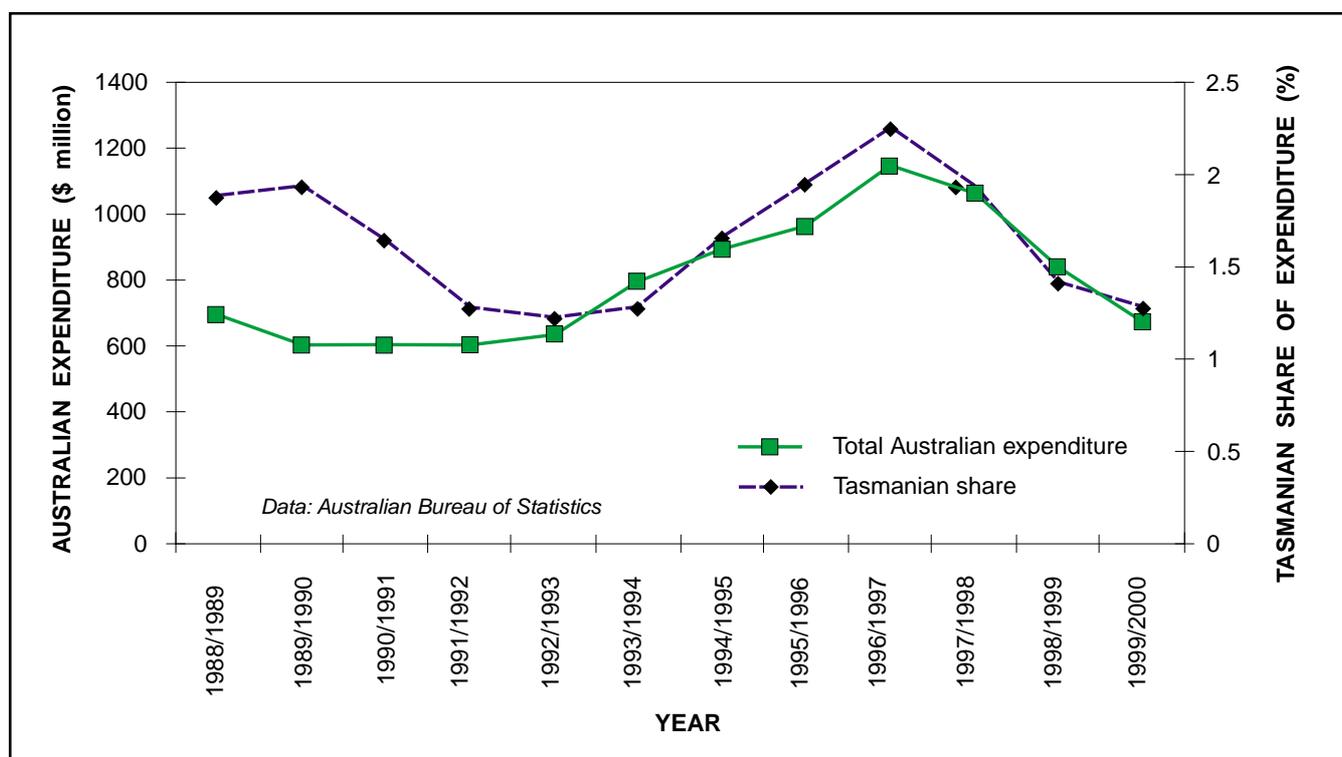
	1999/2000		1998/1999		% Change
	Tonnes	A\$'000	Tonnes	A\$'000	
Gold	7.82	–	3.64	–	+114.8
Silver	156	–	142	–	+9.9
Zinc	161 883	–	190 676	–	-15.1
Copper	27 806	–	19 833	–	+40.2
Lead	65 416	–	65 153	–	+0.4
Tin	9 207	–	7 807	–	+17.9
Tungsten	0	–	5	–	–
Iron ore pellets	2 068 341	–	1 816 150	–	+13.9
<b>Total metallic minerals</b>	–	<b>501,429</b>	–	<b>466,987</b>	<b>+7.4</b>
Non-metallic and fuel minerals	–	38,857	–	43,628	-10.9
Construction materials	–	21,062	–	24,358	-13.5
Value added production from Tasmanian and foreign ores	–	891,514	–	841,101	+6.0
<b>Value of mining and mineral processing production</b>	–	<b>1,452,865</b>	–	<b>1,376,075</b>	<b>+5.6</b>



## Mineral exploration expenditure

Year	Australian Expenditure (\$ Million)	Tasmanian Expenditure (\$ Million)	Tasmania as % of Australian Expenditure
1987/1988	802.2	10.4	1.30
1988/1989	697.6	13.1	1.88
1989/1990	607.5	11.8	1.94
1990/1991	601.5	9.9	1.65
1991/1992	603.7	7.8	1.29
1992/1993	631.7	7.8	1.23
1993/1994	792.6	10.2	1.29
1994/1995	893.4	14.9	1.67
1995/1996	960.2	18.8	1.96
1996/1997	1148.6	26.0	2.26
1997/1998	1066.8	20.7	1.94
1998/1999	837.8	11.9	1.42
1999/2000	676.4	8.7	1.29

Source: Australian Bureau of Statistics — Actual and Expected Private Mineral Exploration, Australia.



## Value of the Mining Industry

As well as the direct contribution to the Tasmanian economy through infrastructure development and employment, the mining and mineral processing industries also contribute to the State through royalties, taxes and charges paid to the Tasmanian and local governments.

According to figures obtained by Tasmanian Minerals Council surveys, the estimated total value of sales or shipments for 1999/2000 was \$1371 million, comparable to the sales recorded in the previous year. This figure included an estimated \$729 million of export sales.

Total equivalent full-time employment on mine sites was estimated as 3381 with a gross annual payroll of \$158 million. Government taxes and charges, including royalties, amounted to \$26.4 million, with electricity and port charges adding a further \$119 million. The minerals industry spent a total of \$694 million on goods and services (excluding electricity), of which \$420 million was spent within Tasmania. Capital expenditure for the year was estimated as \$108 million.

MRT collects royalties and rents and fees from mineral lands, which are forwarded directly to consolidated revenue. In 1999/2000, royalty revenue amounted to \$12 million compared to \$9.1 million in 1998/1999. Royalty collections are budgeted at \$12 million for 2000/2001.

## Metal Prices and Future Trends

The Australian Bureau of Agricultural and Resource Economics (ABARE) report that world prices for most metals increased strongly in 1999/2000 after substantial falls in 1998/1999. These rises were mainly in response to increased demand following economic recovery in Asia and continuing growth in Europe and America, and were aided by some production cutbacks and plant closures in response to the former low prices. Although copper, zinc, tin and aluminium prices all rose, gold and tin prices declined as supplies were more than sufficient to meet demand.

The strong price increases have been accompanied by an increase in production, as new facilities come on line and idle capacity is restarted. This will result in increased supply for a number of commodities, which in turn may suppress further price increases throughout 2000/2001. Accordingly the prices for most commodities are expected to rise at a slower rate in the coming year.

### Commodity prices

#### *Copper*

Copper prices continued to improve steadily from the historic low point reached in March 1999, reaching a peak early in 2000. The low copper price resulted in production cuts and some refinery closures, which had the effect of cutting stocks, while strong consumption growth also aided in the recovery of prices. Growth in copper consumption is expected to remain strong and a further improvement in the price of copper is likely.

#### *Tin*

Tin prices remained relatively stable for the first few months of 1999/2000 before rising sharply to a peak in January 2000. Prices then declined through to March but remained relatively stable for the remainder of the year.

#### *Aluminium*

The price for aluminium increased steadily throughout 1999, reaching a peak in January before declining in response to a sharp increase in production. Consumption of aluminium is forecast to grow faster than increases in global production in the short term which should result in prices continuing to improve.

### Zinc

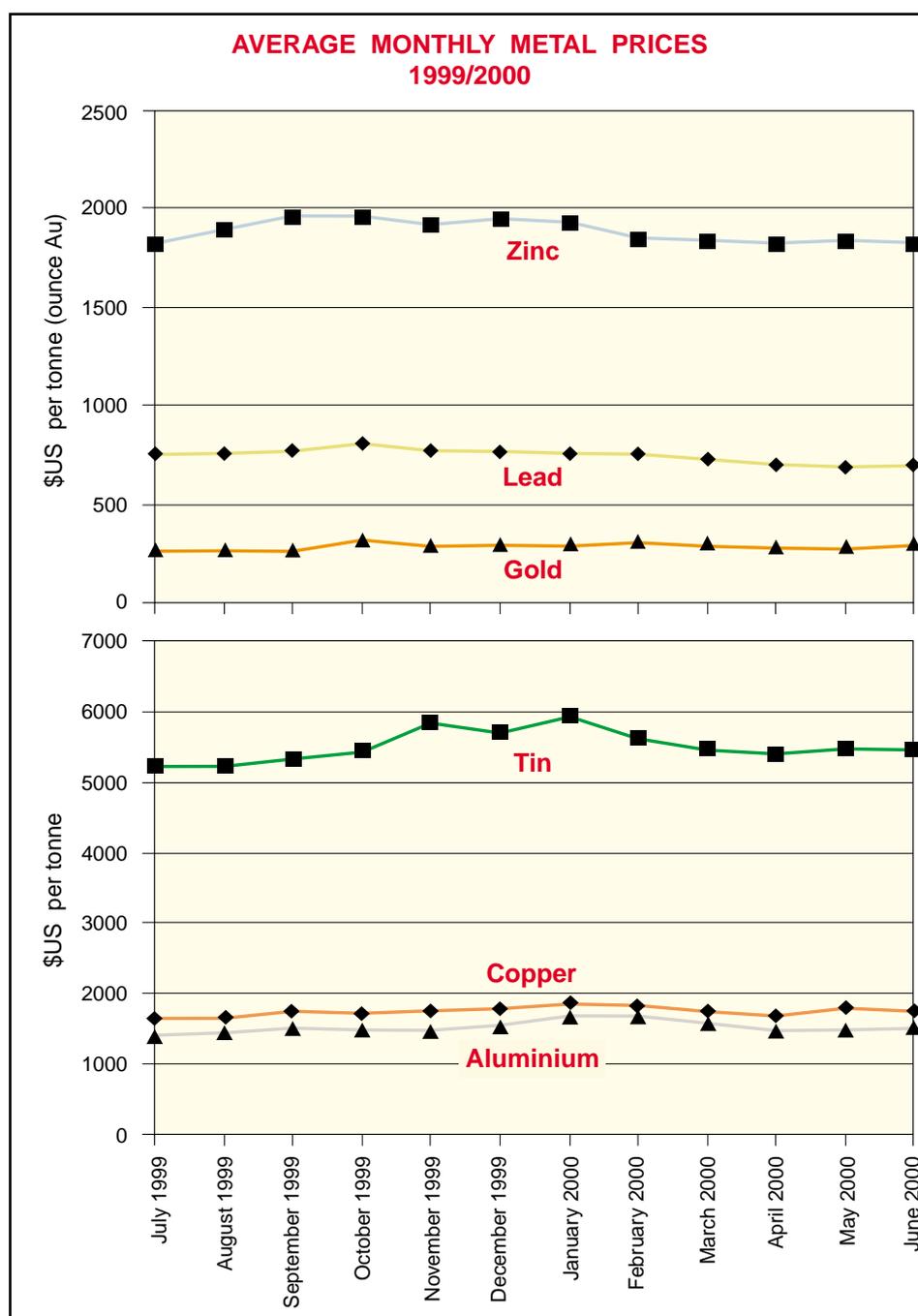
World zinc prices generally improved in the latter half of 1999 before declining in the first months of 2000, although prices at the end of the year were higher than in July 1999. Growth in supply and an easing in demand are expected to result in a lower zinc price over the coming year.

### Lead

In contrast to most other metals, lead prices reached a peak in September 1999 and then declined markedly in response to high levels of exports from China and an increase in stocks. Prices are predicted to fall further before some recovery in 2001.

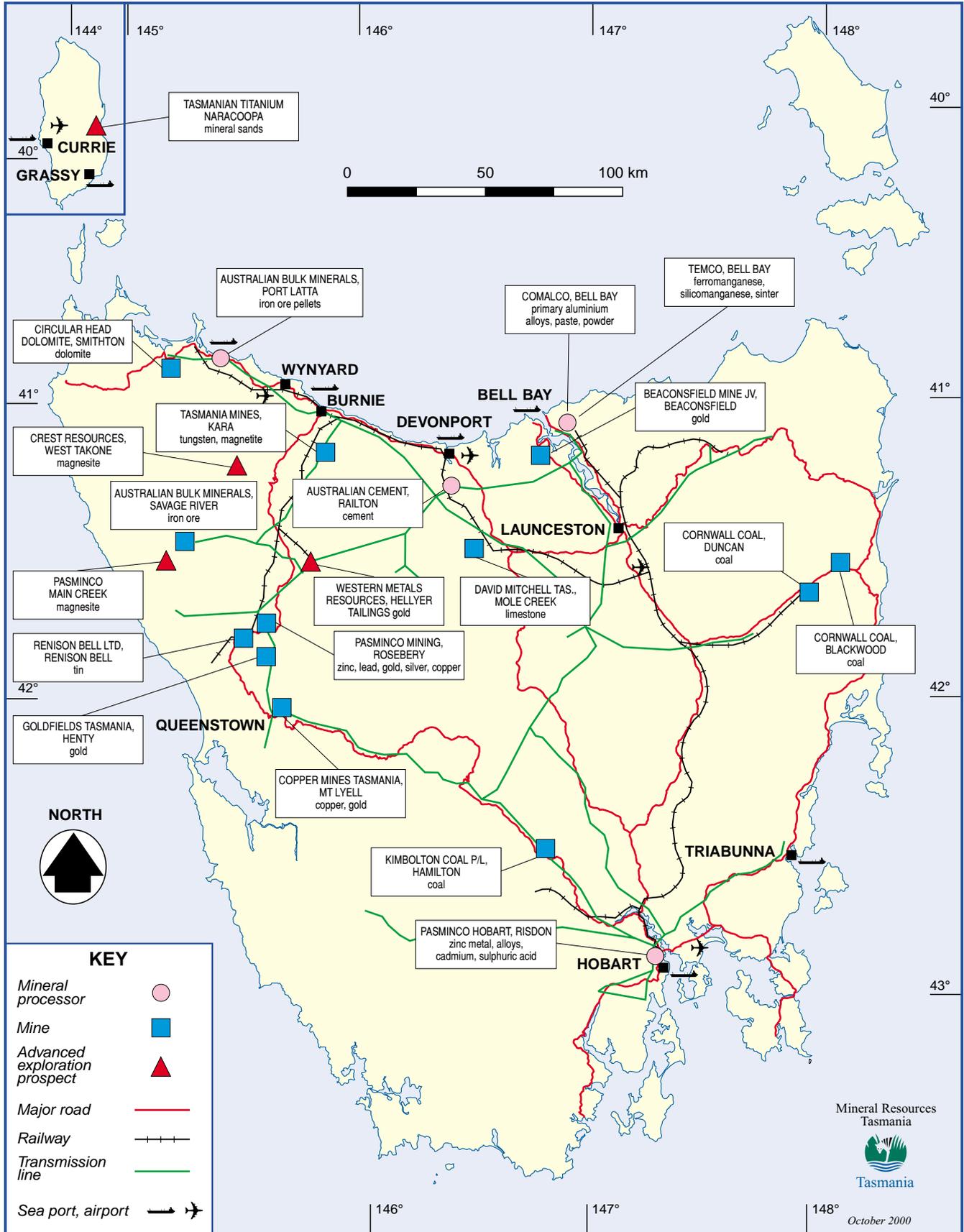
### Gold

The price of gold fluctuated throughout 1999/2000, increasing from a low of \$US256 in July to a high of \$US311 in October before easing to trade in a range from \$US300 to \$US275 for the remainder of the year. The influence of external factors, such as central bank sales, may negate any benefits of increasing demand with the result that prices are expected to remain low.



# Tasmania

## Major Mining and Mineral Processing Operations



## Review of Mineral Sector Operations — Metallic Minerals

### BASE METALS

#### Western Metals Resources Limited — Hellyer Operations

This year marked the cessation of mining and milling operations at the Hellyer mine, due to depletion of the ore body. Mining operations ceased on 7 June with ore processing operations ending a week later. A closing ceremony was held on 23 June.

During the eleven years of mining operations, the Hellyer ore body yielded more than 15 million tonnes of high-grade ore from which 2.7 million tonnes of zinc concentrate, 728 000 tonnes of lead concentrate and 601 000 tonnes of bulk concentrate were produced. The mine generated \$1.3 billion in gross revenue and \$34 million in State revenue through royalties.

The mine was originally operated by Aberfoyle Limited before Western Metals Limited purchased that company. The mine has left a legacy of high environmental standards for the West Coast and contributed to the region's economy and infrastructure through the direct employment of between 270 and 300 people during its eleven year life. The mine boasted one of the lowest staff turnovers in the Australian mining industry. A time capsule was buried on 30 June to commemorate the operation.

At year's end a pre-feasibility study was being conducted to assess the feasibility of reprocessing the Hellyer and Que River mine tailings, which comprise 11 million tonnes grading 3% zinc and 2.7 grams per tonne gold.

#### *Mining*

Ore production for the year was 1.3 million tonnes at an average grade of 0.27% Cu, 4.7% Pb, 8.7% Zn, 103 g/t Ag and 2.0 g/t Au. Waste production totalled 53 000 tonnes. The lower grade was consistent with the plan to mine up to thirty-two lower grade stopes and remnants at the end of the mine life.

#### *Milling*

The concentrator milled 1.37 million tonnes at a grade of 8.6% Zn, 4.6% Pb and 114 g/t Ag. The average milling rate was 170 tonnes per hour and mill availability was maintained at 96.5%. All surface stockpiles were recovered to the original ground surface and treated. Milling ceased on 12 June. This was the first time the mill had stopped due to a lack of ore.

Total concentrate production for the year totalled 267 953 tonnes comprising:

- zinc concentrate — 186 991 t @ 50.6% Zn;
- lead concentrate — 64 432 t @ 56.1% Pb, 414 g/t Ag;
- bulk concentrate — 7922 t @ 34.6% Zn, 11.7% Pb, 220 g/t Ag;
- copper-silver concentrate — 8608 t @ 11.6% Cu, 4089 g/t Ag.

Lower production and lower head grades were offset to a degree by improved metal recoveries. Good performance of the lead and zinc circuits resulted in better recoveries in the primary concentrates and a reduced recovery in the bulk concentrate.

A total of 280 489 tonnes of concentrate were shipped from Burnie.

#### *Development*

A pilot plant was operated at the Hellyer concentrator to determine the optimal retreatment of the Hellyer tailings by conventional means. While the retreatment of the tailings is being evaluated, the concentrator and administration facilities have been put on care and maintenance.

Dominion Mining Ltd and Western Metals Technical Services in Burnie evaluated hydrometallurgical processes for recovering zinc, silver, gold and copper

metal from the tailings. Western Metals has planned a bankable feasibility study for 2000/2001 with Dominion having withdrawn from the project.

### *Exploration*

Four diamond-drill holes totalling 2593 metres were drilled west of and within feasible mining distance of the existing underground workings. No significant mineralisation was found. Approximately 1200 drill holes totalling 184 000 metres were drilled during the life of the Hellyer project.

An exploration program was conducted at Comstock, west of Zeehan, under a joint venture agreement between Western Metals and Bass Resources. A geophysical and structural target was tested with three diamond-drill holes but no significant mineralisation was found.

### *Environmental initiatives*

The Environmental Decommissioning and Rehabilitation Report (EDRP) for mine closure was prepared and approved by the Minister for the Environment. The buildings associated with the mining operation are being removed and the area rehabilitated. Underground voids were being filled to prevent any subsidence at the surface.

Tracks and drill sites covering the equivalent of four hectares were rehabilitated during the year. A program to determine the longer term management of the tailings after operations cease was undertaken.

### *Employment*

The total workforce at June 30 was 18 full time employees and 49 contractors who were involved in the decommissioning of the plant and mine closure.

## **Pasminco Mining Rosebery**

### *Mining*

Ore production at the Rosebery mine totalled 597 703 tonnes with a further 35 193 tonnes being sourced from the Hercules mine, for a total production of 632 896 tonnes at an average grade of 12.1% Zn.

There was a major shift in production focus, with the bulk of ore (514 188 tonnes) being mined from the deeper northern orebodies of K and P Lens. A five-man crew with small-scale equipment achieved planned production from Upper level remnants and the B South Cut and Fill.

A high proportion of the 2973 metres of capital development was required to give decline/incline access to K and P lenses, with the 2200 metres of operating development being largely targeted at Upper K Lens above 37K.

### *Milling*

There was a 10.3% decrease in tonnage treated through the concentrator compared to the previous year, mainly caused by the closure the Hercules mine in November 1999. A total of 633 222 tonnes of ore, comprising 597 811 from Rosebery and 35 412 tonnes from Hercules, was treated. Ore grade averaged 12.11% Zn, 4.35% Pb, 0.37% Cu, 130 g/t Ag and 1.84 g/t Au.

Gold production as doré increased 167% on the previous year as a result of a recovery improvement coupled with higher head grades. Total gold credits (including concentrates) increased 22.3% to 764.6 kg.

Copper metallurgy was similar to the previous year in both grade and recovery. Silver content rose in proportion to head grades, but gold assay was reduced by the prior recovery to doré. There was a further improvement in lead flotation circuit metallurgy, with a 22% increase in lead concentrate output being achieved with a combination of increased head grade and recovery improvement despite the lower feed availability.

Silver metal credits were again substantial as a result of the continued lead circuit improvement. Saleable silver increased to 64.5 tonnes, a positive 14.3% variance on the previous year.

Zinc circuit quality performance improvement was retained with output down as a result of mill feed availability. The reduced lead in zinc circuit feed resulted in a cleaner zinc concentrate as demonstrated by the increase in assay to 55.4% zinc, while also achieving another modest increase in recovery (0.9%).

The mill produced and shipped 124 864 tonnes of zinc concentrate averaging 55.42% Zn, 34 310 tonnes of lead concentrate (65.73% Pb, 1324 g/t Ag), 5169 tonnes of copper concentrate (9.45% Pb, 22.30% Cu, 4318 g/t Ag, 54.4 g/t Au) and 445.98 kg of doré (32% Ag, 67% Au).

### Developments

Capital expenditure for 1999/2000 totalled \$14.3 million. The majority of this expenditure was on underground development, with lesser amounts being spent on the Northern Upcast Shaft, ventilation intake raise and the completion of the Deep Exploration Project.

### Reserves

The Rosebery mine lease resource inventory at the end of March 2000 showed an overall decrease of 1.563 million tonnes compared with March 1999. The decrease was due to a number of factors including:

- minimal exploration was undertaken during the year due to budgetary constraints and hence resource loss due to mining depletion was not replaced;
- infill drilling of the P6 and P7 lenses and re-assessment of Upper K lens downgraded the total resource by 0.72 million tonnes;
- an evaluation of potential open-cut resources (C and D lenses) during the year resulted in a transfer of 0.51 million tonnes to the 'inaccessible' category.

The decreases were partly offset by an increase in the Upper Level resource (0.42 million tonnes) as a result of the mining of the No. 1 shaft pillar access incline. This allowed previously inaccessible remnant ore pillars to be included.

Mine development in the K and P lens area was adversely affected by ventilation problems prior to the commissioning of the new Northern Upcast Shaft late in 1999. This limited access for the infill diamond drilling required to convert resources to reserves. As a result mining depletion was not replaced.

		<i>tonnes</i> <i>(000's)</i>	<i>Pb</i> <i>(%)</i>	<i>Zn</i> <i>(%)</i>	<i>Cu</i> <i>(%)</i>	<i>Ag</i> <i>(g/t)</i>	<i>Au</i> <i>(g/t)</i>	<i>Fe</i> <i>(%)</i>
Rosebery	Measured	2 086	3.9	10.6	0.54	117	2.4	10.5
	Indicated	1 188	4.3	13.2	0.63	140	3.1	13.0
	Inferred	6 178	5.7	16.5	0.34	179	2.3	8.7
	Inaccessible	2 236	3.6	12.1	0.65	111	2.2	14.3
	Meas. + Ind. + Inf.	9 452	5.1	14.8	0.42	161	2.4	9.6
	<b>Total</b>	<b>11 688</b>	<b>4.8</b>	<b>14.3</b>	<b>0.47</b>	<b>151</b>	<b>2.4</b>	<b>10.5</b>
South Hercules	Indicated	520	2.0	3.7	0.11	167	3.0	4.6
	Inferred	40	1.2	3.2	0.10	22	3.3	2.5
	<b>Total</b>	<b>560</b>	<b>1.9</b>	<b>3.7</b>	<b>0.11</b>	<b>157</b>	<b>3.0</b>	<b>4.4</b>
Browns Tunnel	Inferred	104	1.9	6.8	0.60	45	0.9	7.0
Southern Trenches	Inferred	10	17.3	21.9	2.0	93	11.0	7.0
	Total — other	665	2.2	4.4	0.21	140	2.8	4.9
<b>GLOBAL</b>	<b>Meas. + Ind. + Inf.</b>	<b>10 126</b>	<b>4.9</b>	<b>14.1</b>	<b>0.41</b>	<b>160</b>	<b>2.4</b>	<b>9.3</b>

### *Exploration*

No surface geological exploration was undertaken during the year. Underground exploration recommenced in April 2000, with the focus being testing the area immediately south of T Lens at the south end of the mine.

Underground drilling totalled 22 780.9 metres, the majority being for resource infill. Surface drilling in the open pit totalled 439.7 metres.

### *Environment*

Pasminco Limited has become a signatory to the Australian Minerals Industry 'Code of Environmental Management' and implementation actions are now being progressed. Pasminco published its First Group Public Environmental Report in September 1999.

An estimated 460 000 tonnes of mill tailings were pumped to storage in the Bobadil tailings dam during 1999/2000. Extensions to the dam were completed November 1999. About 63 000 tonnes of waste rock was brought to surface from the mine and deposited within long-term storage areas, with 30 000 tonnes of this material being used to fill and rehabilitate the quarry site on Primrose Hill and to provide an environmental control bund for progress pipelines along Williams Street.

Planned rehabilitation works were carried out mainly within the Hercules mine, Bobadil dam and No. 2 dam areas.

### *Community relations*

The Rosebery Community Liaison Committee met regularly during the year discussing aspects of company performance, projects, environment issues, transport, roads plus community projects and concerns.

### *Employment*

A total of 244 people were employed in the operation at 30 June 2000. There were 48 production hours lost due to industrial action during the year. Safety performance was disappointing, with 25 people sustaining lost-time injuries on the site.

## **Hercules Resources Pty Ltd — Hercules mine**

Production by Mancala Pty Ltd as sub-leasor finished in November 1999. Prior to this 35 193 tonnes of ore at average grade of 8.8% Zn was delivered to the Rosebery mill.

## **COPPER**

### **Copper Mines of Tasmania Pty Ltd — Mt Lyell mine**

Ore production at the Queenstown mine totalled 2 471 302 tonnes at a grade of 1.24 % Cu, 0.36 g/t Au and 4.01 g/t Ag. Waste production was 27 226 tonnes.

### *Milling*

Concentrate production totalled 106 903 tonnes containing 27.04 % Cu, 5.91 g/t Au and 40.86 g/t Ag. Copper, gold and silver recovery were 93.33%, 71.14% and 44.08% respectively.

### *New developments*

A three-year mining contract was negotiated with Barmenco Pty Ltd. A three-year quaternary crushing and screening contract was signed with Pac-Rim (Qld) Pty Ltd commencing in January 2000. Joint ventures were negotiated for exploration on the company exploration licences.

*Reserves*

Reserves and resources at 30 June 2000 totalled:

Proven reserves	5.09 Mt @ 1.28 % Cu, 0.35 g/t Au
Probable reserves	14.97 Mt @ 1.24 % Cu, 0.34 g/t Au
Measured resource	6.79 Mt @ 1.34 % Cu, 0.36 g/t Au
Indicated resource	144.32 Mt @ 0.81 % Cu, 0.26 g/t Au
Inferred resource	38.45 Mt @ 0.67 % Cu, 0.22 g/t Au

*Rehabilitation and environmental control initiatives*

The Princess Creek tailings dam was raised to RL 220 metres, and provision made to increase its height by a further five metres in 2000/2001. Measured as copper concentration of 5.6%, acid mine drainage treatment of emissions exceeded the requirements of the Mt Lyell Continuation Agreement.

Revision of the environmental management plan was carried out. A management plan was drafted for PCB management. The national pollution inventory report was completed.

*Employment*

The company employs 103 people with the mining contractor, Barminco Pty Ltd, employing a further 120 people.

**GOLD****Goldfields (Tasmania)  
Limited — Henty mine**

Production at this mine again increased, with 184 573 tonnes of ore and 69 085 tonnes of waste being hoisted. Development advance was 2040 metres including 1597 metres of capital work.

*Milling*

A total of 168 717 tonnes of ore was treated at a grade of 16.44 g/t Au. Gold recovery remained relatively consistent at 97.6%, with 87,034 ounces of gold and 31,986 ounces of silver being recovered. Gold poured totalled 87,875 ounces.

A gravity circuit was added to the concentrator during the year.

*Capital Expenditure*

A total of \$8.3 million was spent on mine development, plant and equipment, including the purchase of two Elphinstone loaders and the provision of second egress to the underground workings.

*Reserves*

Proven reserve	199 000 tonnes @ 15 Au g/t
Probable reserve	213 000 tonnes @ 14.5 Au g/t
Measured + indicated resource	437 000 tonnes @ 15.8 Au g/t
Inferred resource	936 000 tonnes @ 7.7 Au g/t

*Exploration*

Exploration expenditure totalled \$3.4 million. The Mt Julia resource was extended 150 metres north and the decline extended to permit further drilling. The Tyndall Zone inferred resource was added to reserves.

*Environment*

Goldfields Limited is a signatory to the Australian Minerals Industry 'Code of Environmental Management'. The company published its second Group Public Environmental Report in accordance with the code.

*Employment*

A total of 164 people were employed in the operation including 72 contractors.

## Beaconsfield Mine Joint Venture — Tasmania mine

The Joint Venture suffered from a delay in commissioning the treatment plant. Mining of the higher grade western section of the ore body was also delayed after encountering difficult ground conditions and significant water inflows. At year's end progress had been slow.

The plant is now fully operational and problems encountered with the bacterial oxidation circuit of the treatment plant have been resolved. Development of a dewatering drive on the 530 Level has enabled ore mining to recommence in the western section without hindrance from groundwater, and the poor ground conditions have been managed by reverting to a cut and fill method of mining.

### *Mining*

Ore production for the year totalled 114 120 tonnes at 15.5 g/t Au, with 127 259 tonnes of waste being mined. During the year a major upgrade of the underground primary ventilation system was completed.

### *Milling*

The gold processing plant was commissioned during the year with 37,779 ounces of gold bullion being produced by year's end.

### *Development*

There were 5930 metres of waste development completed during the year. This total included both capital and other development and represents linear metres advanced regardless of the size of the opening.

The main items of mine construction activity were:

- ❑ completion of the Return Air Rise and primary exhaust fan;
- ❑ completion of the processing plant construction;
- ❑ completion of the tailings dam construction;
- ❑ completion of the backfill plant construction.

Capital expenditure totalling \$15.91 million was spent completing the construction during the year.

### *Ore reserves*

Proven reserves	179 000 tonnes @ 15.9 g/t Au (92,000 Oz)
Probable reserves	964 000 tonnes @ 17.7 g/t Au (548,000 Oz)
<b>Total reserves</b>	<b>1 143 000 tonnes @ 17.4 g/t Au (639,000 Oz)</b>
Measured resources	120 000 tonnes @ 23.8 g/t Au (92,000 Oz)
Indicated resources	959 000 tonnes @ 19.1 g/t Au (589,000 Oz)
Inferred resources	646 000 tonnes @ 13.0 g/t Au (269,000 Oz)
<b>Total resources</b>	<b>1 725 000 tonnes @ 17.1 g/t Au (950,000 Oz)</b>

### *Exploration*

Grid-based soil sampling and detailed geological mapping were undertaken at Salisbury Hill, five kilometres southeast of the Beaconsfield mine.

### *Environmental initiatives*

Various environmental controls are currently being implemented towards an Environmental Management System.

### *Employment*

The total workforce at June 30 was 129 staff, comprising 111 permanent employees and 18 contractors

**TIN****Renison Bell Limited**  
— Renison mine

The mine produced 713 316 tonnes of ore at an average grade of 1.81% Sn. Production was 3.5% less than the previous year because of the concentration of mining operations at depth. Grade increased by 10% as stoping began from higher grade Rendeep orebodies and attention continued to dilution control. Development advance was 1169.8 metres, 1074.2 metres of which was capital works. The latter development is required for mine exploration and access to the Huon open stopes.

*Milling*

Mill throughput was 717 346 tonnes at a feed grade of 1.77% Sn. Tin recovery was 72% producing 9194 tonnes of concentrate at 62.2% Sn. Mill feed and recovery decreased from the previous year.

Sales of tin concentrate totalled 8922 tonnes to traditional Malaysian and Thai buyers.

*Capital*

Capital expenditure included:

Exploration drilling	\$700,000
Exploration development	\$1,300,000
Access development	\$2,600,000
Raising the tailings dam	\$400,000
Modification to the quaternary crushers	\$600,000
Mine light vehicles	\$700,000
Plant refurbishing	\$1,000,000

*Ore reserves*

Measured resource	2.5 million tonnes @ 2.07% Sn
Indicated resource	1.8 million tonnes @ 1.52% Sn
Inferred resource	3.3 million tonnes @ 1.79% Sn
Proved resource	1.6 million tonnes @ 1.75% Sn
Probable reserve	1.4 million tonnes @ 1.75% Sn

*Exploration*

Exploration for extensions to the Renison ore body commenced during the year. Drilling has been designed to test two inferred blocks in Area 4, the Deep Federal orebody and the potential of Rendeep North. Some surface exploration was also done.

*Tailings re-treatment*

Research into value adding has been carried out. The results have the promise to increase production by 50%.

*Rehabilitation and environmental management*

Work commenced on the rehabilitation of A and B tailings dams. The primary objective is to reduce oxidation of sulphide minerals by constructing wetlands on the dam surface wherever possible. In areas where beaches are required for dam stability, geochemical covers will be used for oxidation control. The first stage of rehabilitation has been the construction of a two metre upstream lift around the dams with strategically placed 'finger' banks for wetland establishment.

*Employment*

The mine employed 147 people.

## IRON ORE

### Australian Bulk Minerals Tasmanian Operations — Savage River mine

A total of 3 904 731 tonnes of ore was mined from the Savage River open-cut iron ore mine. A further 14 278 164 tonnes of waste rock was stripped during major cutbacks to North Pit and Centre Pit to expose more ore.

#### *Milling*

Pellet production improved despite lower ore tonnage and plant refurbishment projects being carried out at the concentrator and pellet plant. The Port Latta plant produced 2 068 431 tonnes of iron ore pellets @ 65.7% Fe, with an additional 54 507 tonnes of iron ore concentrate @ 67.3 % Fe being produced.

Shipment of iron ore pellets from Port Latta totalled 1 546 111 tonnes. An additional 53 594 tonnes of iron ore concentrate was also shipped.

#### *Developments*

Major stripping operations required the removal of 14 278 164 tonnes of overburden. An access to the newly discovered South Deposit was constructed.

The CSIRO has conducted research regarding the extraction of vanadium from the Savage River iron ore concentrate.

A study by ABM has indicated that a world-class capacity (500 000 tonnes per annum) magnesite project at Savage River is feasible. The agricultural use of magnesite was also reviewed.

ABM has signed a Joint Venture agreement with Mineral Holdings Australia Pty Ltd to potentially develop silica resources as well as calcium and magnesium carbonate deposits in northwest Tasmania.

The Savage River–Port Latta redevelopment continued throughout the year. Capital expenditure included:

Port Latta #1 furnace refurbishment	\$4 077 229
Port Latta plant and equipment	\$278 069
Savage River trunnion bearing installation	\$611 668
Savage river crossing	\$244 991
Savage River South Deposit	\$210 317
Savage River plant and equipment	\$411 814
Computers and communications	\$98 219
<b>Total</b>	<b>\$5 932 308</b>

#### *Ore Reserves*

Diluted recoverable ore reserves of magnetite at 30 June comprised:

Proven reserves	54 202 000 tonnes @ 51.0% DTR
Probable reserves	46 479 000 tonnes @ 49.0% DTR
<b>Total</b>	<b>100 681 000 tonnes @ 50.0% DTR</b>

Ore resources comprised:

Measured	71 584 000 tonnes @ 52.5% DTR
Indicated	69 662 000 tonnes @ 51.5% DTR
Inferred	72 409 000 tonnes @ 51.6% DTR
<b>Total</b>	<b>213 655 000 tonnes @ 51.8% DTR</b>

These figures include 11.1 million tonnes of reserves and 11.8 million tonnes of resources estimated at the South Deposit.

### *Exploration*

Exploration activities during the year were directed towards defining a near-surface, high-grade magnetite resource at the South Deposit, located approximately two kilometres south of the existing Centre Pit.

Sixteen diamond-drill holes were completed for a total advance of 2368.10 metres at the South Deposit. Grid drilling was completed at a nominal 50 m × 50 m spacing. The ore body remains open at depth and along strike to the south. Additional diamond drilling is scheduled for 2001.

### *Environmental initiatives*

An ongoing weed management program continued at the former Savage River township on behalf of the Department of Primary Industries, Water and Environment.

Classification and segregation of potentially acid-forming waste rock in clay lined cells has continued in the Broderick Creek valley as part of a mine waste management program. ABM will install oxygen and temperature probes in the Broderick Creek and South Dumps during the latter half of 2000.

Work has been carried out, in association with the Department of Primary Industries, Water and Environment, on the Savage River Rehabilitation Project.

Revegetation of land to the west of the site at Port Latta continued, with weed management and some replanting. A trial pavement has been constructed using spoiled hematite and magnetite to test its use for sealed roads around the plant.

Dust and noise monitoring at Port Latta and water sampling at Savage River has continued.

### *Employment*

ABM took over the direct mining operations from the previous contractor during the year. The total workforce at June 30 was 260 direct employees and 86 contractors.

## **Tasmania Mines Limited** — **Kara mine**

A new cutback commenced at the Kara No. 1 mine with 127 406 tonnes of ore of ore being mined and 48 916 tonnes of waste stripped to expose more ore.

The concentrator produced 53 311 tonnes of magnetite, primarily for use by coal washeries. Ten tonnes of scheelite were also produced. Sales consisted of 52 484 tonnes of magnetite.

Capital expenditure at the mine totalled \$140 000 plus freight for a new loader at the mill. A new tailings dam was commissioned at the start of the year.

### *Ore reserves*

Reserves of ore at June 30 gave a mine life of approximately eight years at current production.

### *Environmental initiatives*

The Kara No. 2 mine was rehabilitated during the year.

### *Employment*

Twenty-four people were employed at the mine.

## Non-metallic Minerals

### LIMESTONE AND DOLOMITE

#### Beams Bros Pty Ltd

Production for the year totalled 128 688 tonnes, which comprised limestone and dolomite fines used in agriculture (81 250 tonnes), metallurgical dolomite and limestone (36 491 tonnes), other limestone and dolomite products (3658 tonnes) and construction materials (9989 tonnes). Approximately 80 000 cubic metres of overburden was removed to achieve this result.

Overburden at the Cressy dolomite quarry is being used to bury gorse and provide a suitable slope for plantation timber. Clay overburden from Flowery Gully is being used to increase water storage capacity at the site. The water is used to control dust via spray bars.

Major capital expenditure for the year totalled \$825,000 and included the completion of a superfine air swept grinding mill and a new loader. The primary mill is still in the process of being upgraded.

The operation employs 24 people.

#### Circular Head Dolomite and Trading Co. Pty Ltd

Production for the year totalled 45 395 tonnes comprising 37 806 tonnes of agricultural dolomite and 7589 tonnes of dolomite screenings.

Capital expenditure of \$18,779 was spent on plant and machinery. Twelve people were employed on site.

#### David Mitchell – Tasmania

Production for the year totalled 107 000 tonnes, comprising 98 400 tonnes of calciner feed and agricultural lime, 7600 tonnes of crushed rock and 1000 tonnes of screenings. A total of 525 000 tonnes of overburden was stockpiled to uncover the limestone.

New plant included a new 30 tonne excavator, dust collection and oil handling facilities, and a road watering tanker, which amounted to a capital expenditure of \$392,000.

There were 27 full-time and two part-time employees on site, including 18 quarry and lime plant operators, two maintenance personnel and five employed in administration, management and sales. The Mole Creek staff has produced their own web site.

A major exploration drilling program and dump stability study was completed during the year. Land has been acquired adjacent to the overburden dumps for settling ponds and effluent monitoring has commenced. A Development Proposal and Environmental Management Plan is being prepared for the installation of a new lime kiln based on reserves sufficient for 40 years production.

### SILICA FLOUR

#### Cominex

Production of high purity silica for the year was 10 000 tonnes and 800 tonnes of gravel for road base. In order to win the silica, 11 000 tonnes of waste were stripped and stockpiled.

Continued steady growth in silica flour demand is expected as cathode ray tubes are replaced by Liquid Crystal Displays (LCD) and with the increasing use of hard computer disks. Production is forecast to increase to 16 000 tonnes during 2000/2001.

Measured reserves of high purity silica have increased from 600 000 tonnes to 1.2 million tonnes and the total resource (including reserves) has increased from 1.6 million tonnes to 3 million tonnes.

The workforce strength at year's end was the equivalent of nine full-time employees, with contractors employed on regular campaigns.

## **KAOLIN**

### **Tonganah clay mine**

Australian Paper announced the closure of the Tonganah clay mine during the year. Rehabilitation work at the mine has been progressive and is approaching completion.

## **CERAMICS**

### **K & D Bricks and Pavers**

Production of clay bricks and pavers continued at the New Town plant.

### **Pioneer Building Products — Nubrick**

A total of 17 000 tonnes of clay bricks, pavers and blocks were produced over the year. The domestic sales included 750 000 units sold in Victoria. Approximately 32% of total sales were exported overseas, primarily to Japan and New Zealand.

There were 31 full time employees at year's end.

## **CONSTRUCTION MATERIALS**

### **Boral Construction Materials**

Total production statewide was 744 000 tonnes of which 46% was road making materials. Approximately 10 000 tonnes of overburden was removed, mainly at the Launceston and Flowery Gully quarries.

Capital expenditure totalling \$700,000 was spent on a plant upgrade at the Launceston quarry, including a new control cabin and primary rock breaker.

Employee numbers were slightly lower than the previous year, with 19 full-time employees and seven sub-contractors dedicated to quarry operations.

Rehabilitation at the Mt Nassau limestone quarry and the Launceston quarry continued. Environmental Management Plans were completed for the Bridgewater and Nook quarries and McGraths gravel pit. Reserves at all quarries were in excess of 50 million tonnes.

### **Brambles Quarries Tasmania**

The total production from Brambles' quarries was 410 000 tonnes of material, which required 24 000 cubic metres of overburden to be stockpiled. Production comprised 198 000 tonnes of aggregate and fines for sealing, hot mix, concrete and select fill, 99 000 tonnes of base and sub-base materials for primary roads, 80 000 tonnes of gravel for minor roads, 25 000 tonnes of quarried rock and 8000 tonnes of miscellaneous material.

Following trials to improve waste water quality, settling dam water is being used for irrigation. One hectare of previously disturbed land is being rehabilitated.

Brambles has maintained its 9002 Quality Assurance and has introduced an Integrated Management System for crushing and screening.

Staff numbers were reduced to 13 employees, including three administration staff, eight quarry operators and two contractors.

### **Caroline Quarries**

Production from the Railton quarry was 11 528 tonnes of silica sand, with a further 479 tonnes of road material and general sand. At year's end the owner-operator employed two part-time employees.

The rehabilitation of worked out areas is progressing well, with both planted and self-sown trees flourishing.

### Duggans Pty Ltd

A total of 59 935 tonnes of construction materials was produced at the Cradoc quarry during the year, including 48 043 tonnes of road-making materials and 11 892 tonnes of concrete products.

An excavator was purchased during the year. The capacity of settling dams was increased and rehabilitation of benching undertaken at a cost of \$9000. Two quarry operators and three administration staff were employed, with up to two contractors employed as required.

### Hobart Blue Metal Industries

Production for the year was 227 700 tonnes, comprising 191 200 tonnes of crushed stone, 15 800 tonnes of gravel and 20 700 tonnes of sand. A reduction in sand production was offset by increased gravel production. The workforce at year's end was eighteen employees and one contractor.

A new wheel loader was purchased for the Leslie Vale quarry. The capping of sediment dams at Clarks Sand is now complete and the surfaces are ready to be planted.

### Fieldwicks

Road base, drainage aggregate, sand, sealing and concrete aggregates were produced by Fieldwicks, from operations based in East Devonport and St Helens.

### Island Resources

Island Resources supplies a significant proportion of processed sand and gravel in northeast Tasmania. New wholesale markets have been captured in the concrete, foundry and road construction industries, marking 1999/2000 as a year of major expansion in production.

The production of sand and gravel for use in concrete products increased to 31 414 tonnes. Road gravel production increased to 25 565 tonnes. The production of foundry sand increased to 11 235 tonnes, with most of the Tasmanian market now being supplied with sand from Island Resources. The remaining production is marketed variously as stone and sand used for FCR filler and retail. Approximately 4% of the material mined is processed as waste.

Capital expenditure totalled just under \$60,000, including the purchase of a second-hand grader, mobile office, a loader upgrade and weighbridge. A sand drying plant is also being considered. The sand reserves on the various operations are estimated to be 50 million tonnes with an additional three million tonnes of road gravel.

Rehabilitation of the major mine site has been progressive, with more *Eucalyptus rodwayi* planted this year. Two permanent staff and two casuals are employed.

### Lloyds North Pty Ltd

A total of 63 743 tonnes of aggregate and 20 319 tonnes of sand were produced from the Riggs Road and Kimberleys Road quarries during the year for use in concrete and road base. No overburden removal was required to quarry the material.

In an effort to reduce dust emissions from the Kimberleys Road quarry, the roads have been sheeted with screened blue metal and sprays have been installed around the crushing plant. Trees will be planted around the perimeter of the Riggs Road site in conjunction with the Kindred Land Care Group.

The operation supported four employees in the quarries, four administration staff, and four subcontractors.

### H G Morrisby & Sons

Production from the Sandford site was about 1950 cubic metres of gravel with four people being employed part time.

**Norske Skog Paper Mills  
(Australia) Limited**

Norske Skog acquired the Boyer newsprint mill from Fletcher Challenge Paper Pty Ltd during the year. The company operates 30 quarries, mainly in the Derwent Valley municipality, to provide road-making materials for its forestry operations which supply the Boyer paper mill.

During the year 64 000 tonnes of road materials were produced and 1400 tonnes of overburden stockpiled to open the Dora and Stormlea quarries and to extend the Newbury quarry.

The annual rehabilitation budget of \$50,000 will be used to progressively rehabilitate up to six quarries where the resource has been worked out or where forestry operations have finished. The major quarries have enough reserves to provide material for another 10 to 15 years at the current rate of production.

The quarry operations employed 14 people at year's end.

**North Forest Products**

North Forest Products is a subsidiary of North Limited and operates under three divisions, North Forest Products Burnie, North Forest Products Tamar and Tasmanian Pulp and Forestry Holdings Ltd.

North Forest Products operates 53 quarries to make and maintain roads servicing their forestry activities. Nearly all the quarry tenements are leased from the Tasmanian Government, although some operate under Forestry Practice Agreements where the land is private and the product is solely used for forestry roads. The combined production was 138 782 tonnes of road gravel.

Approximately 82 hectares of land has been disturbed by quarrying activities. Progressive rehabilitation is ongoing in areas that have been worked out. In the last two years Tasmanian Pulp and Forestry Holdings Ltd have rehabilitated disused quarries dating back to 1971.

North Forest Products Tamar are exploring for suitable deposits of road making stone north of Tebrakunna Road in northeast Tasmania and plan to establish new quarries in the eastern highlands to supply their operations in that area.

The roading operations support 16 full-time employees across the three divisions and indirectly employ 27 contractors.

The capital investment in forestry quarries is considerable, as the establishment cost for a typical forestry quarry is estimated to be between \$3000 and \$5000.

**Pioneer Concrete  
(Tasmania) Pty Ltd**

Production increased marginally from the previous year. The Flagstaff Gully quarry produced aggregates for concrete and asphalt as well as road-making materials. Mining has commenced on the uppermost bench of the quarry (RL260) and overburden has been stockpiled for use in rehabilitation once the bench has been exhausted.

Ongoing rehabilitation work is taking place, with 200 trees planted on the disused RL245 bench. Spray bars were fitted to primary and scalping conveyor belt head drums.

Ten direct employees and one subcontractor are engaged on site.

**RNB Trading Pty Ltd  
(Sanbar Pty Ltd)**

Production of construction sand, primarily for the manufacture of concrete, totalled 54 638 tonnes for the year.

Less than ten years reserves of sand remain on site and RNB Trading Pty Ltd has continued its efforts to secure future resources for the southern Tasmanian construction sand market.

The operation employed three people in total during the year.

### **Stornoway Quarries Pty Ltd**

A total of 279 942 tonnes of pavement material was produced from quarries at Frankford, Raeburn and Hunterston. The majority of production was quarried from Frankford for contracts awarded in association with the \$26 million Hagley–Westbury Bypass project. Production from the Raeburn quarry has also increased considerably.

A portable impact crusher and a mobile screening plant were purchased for the Frankford quarry.

The combined reserves at the group's operations, including Birralea and Misery Hill, were estimated at 2.95 million tonnes of material.

Stornoway Quarries directly employed five people during the year, including four operators at the Frankford and Raeburn quarries.

### **Alan Summers Transport**

Production of concrete and road making materials from the Calder area totalled 4100 cubic metres.

### **R M & K R Edwards**

This quarry at Longley produced 18 708 tonnes of gravel and base material for road construction during the year. Overburden from stripping is being used to rehabilitate large areas exposed by previous mining.

Approximately \$6500 was spent on rehabilitation during the year. A clean up of scrap and rubbish on the site has nearly been completed. Tree seedlings will be planted on the site over the next few months.

Two people are employed by the operation.

### **Treloar Transport**

Production for the year was 48 720 tonnes, with 32 570 tonnes of base course being supplied to the Burnie–Cooee National Highway project. The remaining 16 000 tonnes was sub-base material, drainage rock, pipe bedding and run-of-quarry material.

The bulk of capital expenditure was spent on a separation and screening plant. A maintenance shed was also constructed at the Shackley Hill quarry and weighbridge communications equipment was upgraded. Worked out areas are being progressively rehabilitated with native flora.

The quarry operations directly employed four people, with another two people employed in administration and management.

## Fuel Minerals

### Cornwall Coal NL

#### *Duncan Colliery*

This mine was reopened on 26 June 2000. Production commenced by developing off the main heading some four kilometres from the mine portal.

#### *Blackwood Colliery No. 2*

This was the main production source for the year. Pillar extraction retreated until it was within 400 metres of the portal. Considerable floor heave was experienced throughout the year until the depth of overlying cover was reduced by the retreat. Final extraction from this mine is expected at the end of July

#### *Blackwood No. 3*

Development was completed 1400 metres from the portal when the former Cornwall mine workings were intersected. These had collapsed under poor roof material. Over the last 250 metres the top metre of coal was replaced by shale leaving 2.5 metres of coal in the area which has now been pillar extracted.

#### *Huntsman No. 2 open cut*

Production from the Huntsman No. 2 open cut ceased because of excess coal stocks following record underground production.

#### *Cullenswood open cut*

A mining lease was established and plans made for a trial open cut at Cullenswood.

#### *Production*

Production for 1999/2000 totalled 552 676 tonnes. This coal was sourced from:

Blackwood No. 2	400 939 tonnes
Blackwood No. 3	119 053 tonnes
Huntsman No. 2 open cut	30 121 tonnes
Duncan	2 563 tonnes

An additional 3661 tonnes of coal was purchased.

Total raw coal handled was 556 337 tonnes , with a washery throughput of 548 152 tonnes. Washery production of saleable coal totalled 386 506 tonnes at a yield of 70.51%, with coal sales totalling 394 092 tonnes. Approximate washery yields were:

Blackwood	69.47%
Huntsman	83.03%
TEMCO	95%
Duncan	65.82%

Approximately 161 646 tonnes of reject material was deposited at the Duncan reject dump.

The company has continued to reduce prices to remain competitive with falling prices on international and Australian markets. Prices now show signs of increasing.

#### *Reserves*

Current reserves exceed twenty years life of the current operation.

#### *Exploration*

Underground drilling was carried out at Blackwood No. 2 and No. 3 mines down to the Fenton seam to establish the viability of mining the seam when operations cease at Blackwood No. 3. Information gained is still being assessed.

### *Capital expenditure*

A total of \$683,840 was spent on capital items. The major items purchased included a Komatsu front-end loader, mine monitoring equipment and a new underground transporter.

### *Rehabilitation*

Revegetation at Huntsman No. 2 is progressing well. Covering No. 1 and No. 2 dams of the Duncan reject site with coarse reject continues, and is approximately 75% complete. The fines stockpile has been reduced to 5500 tonnes.

### *Safety*

Two lost-time injuries occurred during the year underground at Blackwood. The washery and surface works achieved eight years with no lost-time injury in May 2000.

### *Employment*

A total of 73 people were employed in the operation, including 50 working underground, while 12 contractors were employed in coal transport.

## **Kimbolton Coal Company Pty Ltd**

The development application to permit the full-scale operation at Hamilton was approved by the Central Highlands Council in late 1999. Mine development has included landscaping waste material for noise and sight screens. The first of a three-stage tree-planting program, involving the planting of seven thousand trees, has been carried out by Greening Australia (Tas.) Inc. Survival has been good considering the drought conditions which prevailed.

Test burns have been carried out at Australian Paper Ltd at Burnie, Cadbury Schweppes Pty Ltd at Hobart, and a contract has been negotiated with the Royal Derwent Hospital.

### *Employees*

Six people are employed on the operation and administration.

### *Production*

Raw coal production for the year totalled 7000 tonnes with 5000 tonnes being shipped to consumers. A total of 23 000 cubic metres of waste was produced.

### *Reserves*

The estimated resource is 1.8 million tonnes of coal.

### *Capital expenditure*

A total of \$38,000 was allocated to Greening Australia for their work.

## Mineral processing operations

### Australian Cement Holdings Pty Ltd

Production at the Railton cement factory totalled 1.03 million tonnes of clinker from which 1.14 million tonnes of cement was produced. Cement shipped to NSW and Victoria totalled 1.04 million tonnes via MV *Goliath* through the port of Devonport. The remaining production was sold locally on the Tasmanian market.

Raw materials consumption comprised 1.73 million tonnes of limestone and 106 000 tonnes of clay extracted from the company's quarry. In addition, 21 100 tonnes of magnetite, 9200 tonnes of silica, 53 000 tonnes of gypsum and 159 300 tonnes of coal were purchased to achieve the yearly cement production.

#### *Capital expenditure*

A total of \$12.8 million capital was approved during the year. Nearly \$4.5 million of this was for the purchase of new mobile equipment for the limestone quarry. The new equipment, which included two 40 tonne articulated trucks, three 60 tonne rigid trucks, and an 80 tonne excavator, will replace the existing haul fleet and hire equipment. Other major projects included an upgrade of the site security with additional fencing and entrance improvements, and the purchase of a new gearbox for the raw mill at \$1.5 million.

#### *Development and rehabilitation*

Over 400 000 banked cubic metres of overburden was removed as part of the ongoing development of the quarry.

Rehabilitation work included the establishment of final slopes on overburden dumps located at the southeastern side of the new quarry, and completing landform stabilisation of the overburden dump located at the old quarry, completing the first stage of rehabilitation of that area. Rehabilitation expenditure totalled \$243,000.

#### *Employment*

A total of 154 people are employed on the site, including 13 involved in group administration.

### Impact Fertilisers Pty Ltd

The production of single superphosphate for the year totalled 116 279 tonnes, with 47 991 tonnes of this product being shipped to various mainland ports.

Raw materials treated/used in the production process included 15 553 tonnes of phosphate rock from Nauru Island, 21 145 tonnes from Israel, 14 319 tonnes from Christmas Island and 20 253 tonnes from China. Sulphuric acid use totalled 45 534 mono tonnes.

#### *Major projects*

The design and construction of a plant to dry and screen matured single superphosphate was completed. Design was carried out and construction commenced on a 45 000 tonne storage shed. The integrated computer system was upgraded.

#### *New developments*

New developments included the production and sale of Premier-Dried single superphosphate and Envirophos, a single superphosphate containing low cadmium concentrations.

#### *Rehabilitation and environmental control initiatives*

Preliminary designs of a phosphate rock storage facility were carried out. Continued landscaping improvement was carried out at the plant site.

#### *Employment*

A total of 83 people were employed, including 22 employed in depots and six contractors.

**Pasminco Hobart Smelter**

The Pasminco Hobart Smelter achieved a new zinc production record of 231 651 tonnes of zinc and zinc alloys during the year which was 8.2% higher than the previous record of 214 188 tonnes in 1998/1999. Cathode zinc production was also at record levels, while the site achieved best ever roaster throughput. Major contributors to this excellent result included higher roaster utilisation, a concerted current efficiency program in electrolysis, and a consolidation of stable performance in leaching-purification.

Zinc concentrates treated totalled 499 249 tonnes compared to 435 474 tonnes treated in 1998/1999. Concentrates were mainly sourced from the Broken Hill, Rosebery and Hellyer mines, with smaller quantities from several other mines. Major by-products produced included sulphuric acid, secondary leach residue, copper sulphate and cadmium.

*Major projects in progress*

Major capital projects included the foreshore scrubber replacement program, the Loogana and Inshallah stockpile wetlands rehabilitation project, and installation of replacement acid plant heat exchangers. Planned improvements include a new casting machine to further increase EZDA production capacity, and improvements to block casting equipment.

*Capital expenditure*

Major capital expenditure for the year was \$10.7 million. This comprised major expenditure on the rack store demolition, new foreshore scrubber, Loogana/Inshallah rehabilitation, 4A and 4B heat exchangers, new harmonic filter and relocation of the No. 5 unit feed launder.

*Environment and community*

The number of environmental incidents continued to fall during the year. The site won its second successive Tasmanian Environmental Award, this time recognising the project to re-use gypsum in cement production.

Pasminco is a signatory to the *Australian Mineral Industry Code for Environmental Management 2000* and implementation is progressing well. Pasminco issued its first Public Environment Report in 1999, and the second is due for release in September 2000. The Pasminco Hobart site published its first annual Safety and Environment Report in May 2000 and will continue to issue an annual report in the future.

Community relations programs continue, such as internal toolbox meetings and meetings with community consultative groups.

*Safety*

Safety performance was disappointing, with accident frequency rising from 61.9 to 77. Blood lead levels continued to progress downward, with the number of males having levels greater than 30 µg/dL falling from 32 to 25.

*Employment*

Total direct employment at the Hobart smelter was 611 people, including 460 in production-related employment.

**TEMCO**

Production from the Bell Bay plant totalled 98 421 tonnes of ferromanganese, 115 585 tonnes of silicomanganese and 232 339 tonnes of sinter. Sales for the year totalled 105 397 of ferromanganese, 113 500 tonnes of silicomanganese and 55 741 tonnes of sinter.

*Rehabilitation and environmental control initiatives*

A study has commenced in conjunction with the Horticultural Section of the Royal Tasmanian Botanical Gardens and the Parks and Wildlife Service to identify *Xantheria* species at Cabbage Tree Hill with a view to restoring the same species at site remediation of the quarry.

Accreditation to ISO 14001 has been achieved. The ambient manganese soil sampling program has been completed and the results are being collated and analysed. A silencer has been installed in the sinter plant waste gas stack.

Performance of the electrostatic precipitator at the sinter plant is monitored and logged to enable process operators to monitor the effect of process change on environmental performance. A camera is installed to enable the operator to view the precipitator on line.

Fume collection has been installed on Furnace 2 skimmer and new gas seals installed on Furnace 2 electrodes. These changes reduce fugitive emissions from furnace tapping operations.

*Capital expenditure*

Major capital expenditure of \$5.8 million for the year comprised:

OHS & E	\$771,472
Cost reduction	\$39,321
Process improvement	\$755,995
Capital purchases	\$199,457
Capital replacement	\$3,960,025
Other	\$103,026

Major projects completed or in progress included the Furnace 2 reline (\$1.25 million), computer and control upgrade (\$0.56 million), replacement of ERU igniters (\$0.45 million) and relocation of the casing workshop (\$0.38 million).

*Employment*

A total of 279 people were employed, comprising 266 permanent employees and 13 contractors.

## ANNUAL REPORT

### Rehabilitation of Mining Lands Trust Fund

#### Storys Creek precipitate dam relocation

The Storys Creek mine site has been recognised as an environmental hazard because it drains into the South Esk River. An improvement program has been proceeding since 1998 in collaboration with the Commonwealth Government, the Department of Primary Industries, Water and Environment, and Minerals Resources Tasmania. The precipitate dam, which was full of tailings from the former operation, was identified for removal because of its close proximity to Storys Creek, its potential exposure to flooding, and because it was a significant point source of acid and cadmium contamination to the creek. The relocation constituted the largest trust fund project for the year.

The successful tenderer for the work was Becketts Heavy Plant Hire of Exeter. The materials from the dam have now been relocated, neutralised with limestone, partially encapsulated and revegetated. The final lime spreading and revegetation of the former dam site and a clay borrow pit has also been completed.

An adit downstream of the mine, which was also a point source of acid contamination, has been dammed, although final grouting remains to be completed.

Total expenditure on the project was \$348,600.

John Miedecke and Partners carried out the investigations, trials and the works management for the program. The consultant also found diffuse contamination from mine tailings which had been deposited along the banks of Storys Creek and recommended the use of limestone to neutralise acid and slow the emission of heavy metals. This work was carried out in conjunction with limestone spreading for the precipitate dam relocation program at a cost of \$30,100.

Other recommendations included:

- ❑ construction of an anoxic limestone drain (ALD) above the workings to generate alkaline water to neutralise mine water;
- ❑ limestone additions to the creek to neutralise the water, precipitate metals and retard their uptake; and
- ❑ relocation of jig tailings stockpiled close to the creek.

Roadworks for limestone supply, and a trial removal of jig tailings, were carried out in conjunction with the final stage of precipitate tailings relocation. Partial revegetation of the encapsulation will permit a potential future program to be carried out with minimum disruption (cost \$15,000).

Plans for the ALD and jig tailings removal are being drafted (cost \$14,800).

The Commonwealth Government provided funding for the consultant's investigation and trials through the RiverWorks program. The Department of Primary Industries, Water and Environment provided laboratory analyses and MRT provided project management. The removal of the contents of the precipitate dam was jointly funded by the Trust Fund and RiverWorks, the latter contributing \$192,000.

#### Rossarden

Drainage diversion near the former shaft area was carried out in conjunction with the Storys Creek programs. The front of No. 3 tailings dam, which was particularly visible from the Storys Creek road, was covered with topsoil and revegetated. Revegetation carried out in 1996/1997 continues to progress although isolated areas affected by zinc contamination have died off. A decision over remedial work will be delayed until successful areas are considered to be self-sustaining. HEC Consulting was engaged to review a low-cost pumping proposal for Rossarden mine water, but found that the cost was likely to be higher than anticipated. Expenditure for the year totalled \$12,400.

## **Zeehan**

The consultants report for remediation of Silver Lead Creek was submitted after investigations during 1998/1999. The scale of works proposed were beyond the financial resources available to the Trust and the program has been deferred.

A minor rehabilitation program was carried out at the Zeehan Queen No. 4 mine. This area was close to rehabilitation works carried out on Aberfoyle's open cut. Work was carried out in conjunction with the latter program. Expenditure totalled \$6,100.

## **Northeast tin mines**

Further revegetation and small-scale erosion controls were carried out on the N2 gully at the Endurance site. Revegetation from earlier programs is becoming established. Expenditure for the year totalled \$2,900.

The Ruby Creek clean water diversion canal, constructed in 1998/1999, required repairs due to excessive erosion on a downstream section. Initial signs are that the repairs have halted the erosion. Expenditure for the year totalled \$6,994.

The revegetation program carried out in 1997/1998 at Star Hill was monitored and vegetation growth is promising.

At the Monarch site, erosion control works carried out in 1997/1998 were severely damaged after heavy rainfall in January. Drainage diversion and repairs have been commenced and are expected to continue into 2000/2001, at a cost of \$25,000.

Scottsdale High School was successful with its NHT application and has been granted \$20,000 under that scheme for revegetation work in the Monarch area. The Trust has also provided the School Board with \$10,000 funding. The revegetation is being carried out in conjunction with MRT works.

## **Exploration camp clean up**

The remaining abandoned items at old exploration camps south of Macquarie Harbour were cleaned up in April. These camps, at Innes Peak and Wart Hill, are within the South West Conservation Area. This completed the program that was commenced last year. A helicopter was used to ferry fuel drums from Innes Peak to Strahan, and drill rods from Wart Hill to Moores Valley, for fixed-wing aircraft removal to Strahan. Existing rubbish at the Moores Valley airstrip was also removed. Work was carried out with assistance from the Parks and Wildlife Service and Diamond Drilling Tasmania, at a cost of \$13,800.

## **Oak Dene Road, Scottsdale**

Rehabilitation of an area of indiscriminate gravel extraction was completed in July 1999, carrying over from the 1998/1999 program. Although some maintenance was done at the site, severe grazing caused excessive seedling loss and further maintenance is required.

## **Fencing and safety**

Fencing of shafts and adits was carried out in the Zeehan area at the Argent mine, at Granville Harbour Road, and on the Cuni mining field near Melba Flats. A shaft cover was installed at the Spray mine and a water-filled tank was filled with gravel.

Concrete caps were constructed at the Golden Mara mine near Branxholm and Orieco near Beaumaris in the northeast, where shafts are located close to roads. Heavy fencing was also carried out at the latter site. A dispersed fencing program was carried out at mine workings at Golden Ridge near Mathinna and at Gipps Creek. Work for the latter program was done by the Australian Trust for Conservation Volunteers. Expenditure totalled \$29,400.

## **Acid drainage reconnaissance**

Support of \$8900 was provided to purchase field equipment for the survey. This program is largely funded with an NHT grant. Trust activities should benefit when statewide information is available and priorities for acid drainage remediation can be agreed.