



**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

## 2000/2001

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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 Tasmania'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 2001/2002 —

- 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, 2000/2001

On behalf of the Department of Infrastructure, Energy and Resources, MRT continues to provide the necessary geoscientific information and tenement infrastructure to foster responsible mineral resource and infrastructure development, as well as land management, for the benefit of the Tasmanian community, and gives effect to government policy in relation to minerals and petroleum.

The consolidation of activities within Mineral Resources Tasmania continued during the 2000/2001 financial year. Although staffing and budget levels remained constant, innovative thinking amongst the staff resulted in outputs continuing to reach high standards. For the third time in four years MRT was rewarded with inclusion of one of its GIS maps in the world-wide *ESRI Map Book 2001*. This followed MRT being awarded third place for *Best Cartographic Design for a Single Map* (Geology of Macquarie Island) at the World ESRI Users Group Conference in San Diego, California, USA. Congratulations are due to all MRT staff, as such maps are the end product of a team effort involving a wide cross-section of staff.

Capture of data under the Western Tasmanian Regional Minerals Program (WTRMP) began during the year. The new remote-sensing geoscientific data collected under the WTRMP will be incorporated into the MRT databases and will be available on CD format from December 2001. The digitisation of company exploration reports also began during the year. The WTRMP data will become progressively available for delivery via the MRT website as the Phase 4 module of TIGER is sequentially completed over the period to June 2003.

At year end, MRT receiving funding from the Tasmanian Government's 2001/2002 Infrastructure Fund to undertake Phase 4 of the TIGER project. This phase will see continuing development of the integrated data system to allow delivery of all MRT and open-file company data via the World Wide Web.

The use of geoscientific information for infrastructure planning and to underpin local government planning schemes, especially in the area of geohazards mitigation and groundwater protection, continues to grow. MRT staff have accepted this variation in role and have developed specific, user-friendly, map outputs which can be easily used by a wide range of clients.

Growth in mineral exploration activity is essential for the future development of the mineral sector and for the economic well-being of Tasmania. Mining and mineral processing accounts for over 40% of Tasmania's export capacity. MRT, by providing information on areas of high mineral and hydrocarbon resource potential in Tasmania, encourages 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.

The mining industry in Tasmania experienced difficult conditions during the year, with low commodity prices and, in a number of cases, the mitigating effect of the low Australian dollar being offset by company hedging arrangements. Exploration of the Avebury nickel deposit by Allegiance Mining NL continued to be successful, with the company defining resources and successfully completing a scoping study. Goldfields (Tasmania) Limited continued to obtain promising intersections of gold mineralisation near the Henty mine. Overall levels of investment in mineral exploration remained low.

The Thylacine 1 exploration well, drilled in offshore petroleum permit T/30P, identified a substantial gas resource, the largest gas discovery to date in the Otway Basin. Preliminary volumetric estimates indicate that the in place gas resource will probably exceed 600 billion cubic feet, and may exceed one trillion cubic feet.

The major issues affecting MRT during 2000/2001 included:

- ❑ Progressing Phase Four of TIGER (Tasmanian Information on Geoscientific and Exploration Resources) within the given time frame and budget.
- ❑ The implementation of the recommendations of the first phase of the Western Tasmanian Regional Minerals Program using funds allocated by the Commonwealth for this purpose.
- ❑ Provision of an appropriate level of resources for environmental monitoring of exploration and mining tenements, and for inspection of mines and quarries.

## **Achievements against strategies identified for 2000/2001**

### *Promotion of mineral and petroleum potential*

The Minister for Infrastructure, Energy and Resources, the Hon. Paul Lennon MHA, hosted a function attended by several mineral exploration companies at the *Mining 2000* exposition in Melbourne in August 2000, resulting in coverage in the world's leading mining publication, *Mining Journal*. MRT presented a paper on Tasmania's mineral resource potential and prepared a booth for the convention. Promotional material was also presented at a booth at the Prospectors and Developers Association of Canada (PDAC) meeting in Toronto in March 2001. As part of the visit to support the booth, an MRT staff member visited twelve mining and three finance companies in Vancouver and Toronto as part of an Australian delegation.

Three offshore petroleum areas were released for bidding in 2001. These areas, in the Sorell Basin off the west coast, were actively promoted at the American Association of Petroleum Geologists Conference in Denver (USA) and at the Australian Petroleum Production and Exploration Association conference held in Hobart in April 2001.

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

An Internet facility for searching and ordering technical documents held in the MRT library was developed and implemented as the first deliverable of Project TIGER Phase 4. This document searching facility is a valuable research tool for a range of MRT clients ranging from local historians to global mining and exploration companies. The functional design for an Internet Tenement Information System was also commenced but further development of Phase 4 was suspended by the Project TIGER Steering Committee to allow a comprehensive review of the project's resource requirements and business plan.

The collection and presentation of information on Tasmania's mineral wealth and geoscientific nature continues. Thirteen 1:25 000 scale geological maps were prepared for digital capture compared with the target of twelve sheets, and data capture/output was completed for twelve of these areas. Corrections were made to another four maps. A significant amount of work was undertaken in the preparation of a seamless 1:250 000 scale digital geological compilation of Tasmania. Despite few geologists undertaking field work, primary geoscientific data acquisition totalled 300 square kilometres, in excess of the performance criterion of 200 square kilometres. This was a result of good access to the areas covered and favourable weather.

Two 1:50 000 scale digital maps covering the geology and hydrology of the Sorell area were produced. A 1:500 000 scale digital map showing the locations of known landslips in Tasmania, and three detailed maps of slope stability at Burnie, Penguin and Lilydale, were produced.

Recent developments in land stability hazard assessment have been designed to allow incorporation of data into quantitative risk assessments for planning purposes. MRT is in the process of developing a methodology for land stability hazard assessment that will be used to maintain the uniformity of future hazard

mapping. A predictive GIS-based system is being developed and one region will be mapped using this methodology in the coming year.

Raising awareness in MRT of project management methodology was a priority during the second half of the year. A series of seminars on the *Tasmanian Government Project Management Guidelines* was delivered to all key MRT stakeholders and the project steering committee by the Department of Premier and Cabinet Project Services Group. A group of MRT staff attended a project management course to increase practical skills for project management methodology.

### *Western Tasmanian Regional Minerals Program (WTRMP)*

A Reference Group, with an independent chairman and members drawn from the Tasmanian Minerals Council, the Department of Industry, Science and Resources, and MRT, developed a series of projects to implement the geoscience infrastructure recommendations of the Final Regional Development Plan of the Western Tasmanian Regional Minerals Program.

Under the WTRMP approximately 114 180 line kilometres of aeromagnetic and radiometric data have been acquired over King Island and western and northwestern Tasmania. The final data, which are of excellent quality, have been delivered to MRT. Helicopter-based acquisition of electromagnetic data over parts of western Tasmania commenced in February and will resume in October 2001.

Airborne radar and multispectral remote sensing data were collected over an area in northwestern Tasmania as part of the US National Aeronautics and Space Administration (NASA) Pacrim II project.

A collaborative study has been undertaken by MRT, the Australian Geological Survey Organisation, and the National Centre for Petroleum Geology and Geophysics to improve the knowledge relating to the petroleum potential of the offshore Bass and Sorell Basins.

The technical documents relating to onshore and offshore exploration and MRT technical reports are being scanned to allow on-line viewing on the Internet and downloading for local viewing or hardcopy production. At 30 June approximately fifty percent of the required scanning and indexing had been completed.

### *Setting and monitoring 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, for example, 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.

During the year 48 exploration work programs were submitted and approved by MRT. Of these 17 were in RFA-derived reserves and required assessment by the Mineral Exploration Working Group.

To comply with the Regional Forest Agreement (RFA), 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 and the recommendations of the Resource Planning and Development Commission. An external verification audit of the system was completed in early 2001 by Quality Assurance Services. The overall conclusion was that the auditing system was sound

but that the complexity of the process required a more formal documentation system to avoid errors and to allow for easy knowledge transfer. Resources have been allocated to further develop the system during this financial year.

MRT received and assessed 144 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 commenced phasing in reporting standards for the digital lodgement of exploration reports but there has been little response to date from explorers. Another educational program will be undertaken in the new financial year when MRT's reporting guidelines for Tasmanian explorers have been revised to bring them further into alignment with similar guidelines from other jurisdictions.

### *Rehabilitation of Mining Lands Trust Fund*

The funding to rehabilitate abandoned mines comes from an agreement with the mining and quarrying industries whereby a proportion of the royalty increase introduced in 1995 was to be allocated for rehabilitation.

In 2000/2001 major works were completed at abandoned mines near Gladstone in northeast Tasmania. Erosion control and revegetation works were carried out at the Endurance mine, while at the Monarch mine repairs were necessary to erosion control gabion structures which had been damaged by flooding. The revegetation at Star Hill continues to flourish and an additional area was re-seeded with suitable local provenance species.

An anoxic limestone drain was constructed above the former mine shaft at Storys Creek, to add alkalinity to the mine water.

Several disused gravel pits were rehabilitated near Beaconsfield. Maintenance was carried out at the revegetated gravel pits at Oakdeane Road near Scottsdale.

Smaller scale works included rubbish removal and safety work at Moina, repairs to the Arthur dam, and rehabilitation at the former Magnet mine site, near Waratah. Gorse was sprayed at the Queensbury mine near Zeehan.

### *Special initiative — core library*

The *Mineral Resources Development Act 1995* requires the 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. MRT 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.

The Tasmanian Government committed \$422,000 from the Capital Investment Program (CIP) for 1999/2000 and \$270,000 for 2000/2001 for the extension and refurbishment of the Mornington core library. The completion of the first phase, construction of a new storage module to house 450 kilometres of core, was completed within budget and a new fork lift truck was commissioned. The new module was opened by the Minister for Infrastructure, Energy and Resources, the Hon. Paul Lennon MHA, on 10 May 2000.

The completion of the core library extension project was fortuitous, as major acquisitions of core from the Hydro-Electric Corporation and the mineral industry would have exceeded the capacity of the previous storage by about 30%. About 51 kilometres of core was received for storage up to 15 May 2001. The need to store this influx of material has delayed completion of the second phase, the refurbishment of the inspection facility. Approximately \$160,000 of the \$270,000 allocated for extension and refurbishment in 2000/2001 has been used to provide racking. The remaining allocation will be used to upgrade the core inspection facility.

### *Royalty assessment*

MRT is responsible for the collection of mineral royalties from Crown Land tenements. Royalty is not a tax but a payment to the community for the purchase of the State's non-renewable resources.

The Tasmanian royalty regime operates under two systems depending on the type of resource recovered. Companies producing a metallic mineral or coal pay under a two-tiered system where royalty is paid on the net sales and profit from a mine. Royalty on the recovery of non-metallic minerals on Crown leases is set on a per metre or per tonne basis.

MRT conducts a royalty audit program to ensure tenement holders are paying in accordance with the Legislation. Mine and quarry inspections are also undertaken by Inspectors of Mines to determine the quantity of material taken from a tenement.

Mineral royalties totalling \$10.7 million were collected during the 2000/2001 financial year, a decline from the \$12 million collected in 1999/2000. The 2000/2001 financial year was a difficult one for most Tasmanian mines, with reduced commodity prices, unfavourable hedging programs and production problems impacting on revenues.

### *Centre for Ore Deposit Research, Special Research Centre (CODES-SRC)*

Funding is provided under this Output for support for CODES-SRC at the University of Tasmania in conjunction with the Commonwealth Government and industry. The allocation is used to part-fund honours scholarships, and thus help increase knowledge of Tasmanian geology, particularly in the important fields of economic geology and mineralisation. The MRT Library receives a copy of each thesis, which is available for reference use.

### **Dr AV Brown**

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

## Financial Performance

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

The 2000/2001 consolidated fund appropriation to Mineral Resources Tasmania was \$5.566 million. This funding consisted of:

- \$2.951 million for salaries for 52 full-time-equivalent staff;
- \$1.926 million for operating expenditure including rent;
- \$418,000 for administered payments (\$350 000 Restoration of Degraded Mineral Lands and \$68 000 grant for the Tasmanian Government Mining Scholarships at the University of Tasmania CODES-SRC unit); and
- \$271 000 from the Capital Investment Program to complete the core library extension.

The appropriation was basically unchanged from 1999/2000 except for a one per cent increase in salary to meet the State Service wage increase agreement and the expected year two adjustment of the Capital Investment Program. The core library expansion was allocated a total of \$693 000, of which \$422 000 was allocated for 1999/2000 and \$271 000 for 2000/2001.

In real terms Mineral Resources Tasmania's operating budget was further eroded due to the division absorbing various increases in costs, particularly the cost of leasing vehicles and the continued increases in delivering IT services due to the costs of licence and maintenance agreements.

During 2000/2001 Mineral Resources Tasmania also received \$5 million in funding from the Commonwealth to undertake the Western Tasmanian Regional Minerals Program. Details of this program can be found within this review.

Tasmanian government agencies are funded on an outputs basis. The outputs represent the goods and services provided by the agency. The government purchases these goods and services to meet policy objectives. Mineral Resources Tasmania has two outputs.

### Outputs — Application of Funds, 2000/2001

	\$'000
1. Minerals exploration and land management	2,764
2. Tenement management of the exploration and minerals industry	2,113
Administered payments	418
Capital Investment Program	271
<b>Total</b>	<b>5,566</b>

### Descriptions of Outputs and Outcomes, 2000/2001

#### 1. Minerals exploration and land management

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. Tenement management of the exploration and 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

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

Royalty revenue for 2000/2001 was \$10.7 million, which was a reduction from \$12 million in 1999/2000. The estimated royalty collection for 2000/2001 was \$13 million but was not met due to a number of factors affecting sales revenue and profitability of the major metallic mines. Individual mine reports in this review discuss production and profitability.

Mineral Resources Tasmania also collects rents and fees from mineral lands, which are forwarded directly to consolidated revenue.

Rents and fees from mineral lands raised \$0.838 million in 2000/2001, 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> 2000/2001	<i>Actual</i> 2000/2001	<i>Target</i> 2001/2002
Rents & Fees (\$,000)	770	733	747
Royalties (\$,000)	13,000	10,692	11,000
Sales of Maps and Publications (\$,000)	25	20	25

### Royalty regime

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. This system requires mining companies to pay a fixed percentage of sales in royalty for ore extracted, and allows the community to benefit further in good times when a company is making a profit.

Following negotiations with the mining industry, new royalty rates were approved in August 1997 with the 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 ad valorem rate for net sales is 1.6%. The profit component of the royalty regime is calculated via an exponential formula which increases the percentage of profit royalty paid as the mine's profit increases.

A royalty cap of 5% of net sales has been set so that high cost, short life mines are not discriminated against.

Mining companies that expand into downstream processing to produce a near pure specific metal can apply to the Treasurer to receive a 20% rebate on royalties payable. Companies that produce gold doré can apply to claim a 10% rebate on royalties.

The Treasurer has the discretion to increase the gold doré rebate to 20% depending on criteria such as the magnitude of investment undertaken and the benefit to the Tasmanian economy from the investments.

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

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<i>Contractor</i>	<i>Contract</i>	<i>Cost (\$)</i>
Kevron Geophysics Pty Ltd	Aeromagnetic and radiometric survey	305 302
Geo Instruments Pty Ltd	Aeromagnetic and radiometric survey	886 337
Geo Instruments Pty Ltd	Air electromagnetic and magnetic survey	530 747
Document Control	Document scanning	450 000
Coffey Geosciences Pty Ltd	Hydrogeological studies — soil salinity	91 000
Coffey Geosciences Pty Ltd	Taroona Landslip Hazard Project	50 000

## 2000/2001 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, the value of sales and shipments for 2000/2001 totalled \$1384 million, with approximately \$620 million being spent on goods and services (excluding contract labour and electricity). Royalties paid in 2000/2001 totalled \$10.7 million.

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, with the increased availability of this information being measured and correlated with exploration investment. 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 220 km<sup>2</sup> for the year.</li> <li>2. Eight 1:25 000 scale maps and two special area 1:25 000 scale maps produced. Work on seamless 1:25 000 scale coverage of Tasmania continued.</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.	<p>Direct promotional visits were made to companies in Canada. PDAC conference attended in Canada and Mining 2000 conference attended in Melbourne, where a paper, promotional function hosted by the Deputy Premier and promotional display were presented.</p> <p>Promotional displays were also held at the Australian Geological Convention in Sydney and at an international conference on volcanic environments and mineral deposits in Hobart.</p>
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.	Programs at former tin mines in the northeast and at Storys Creek continued.
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.	Digital capture of Landslip A and B zones was completed and four maps were redrawn. Four maps were produced for the Acid Drainage Reconnaissance Project
Digital geoscientific coverage of Tasmania's groundwater resources.	Completion of one map per year.	Two 1:50 000 scale maps of the Sorell area were completed.

**Achievement against external targets**

<i>Target</i>	<i>2000/2001 result</i>	<i>1999/2000</i>
Increase exploration expenditure and maintain level at 2% of total Australian exploration expenditure.	Exploration expenditure increased marginally to \$9.1 million in 2000/2001, but Tasmania's share of Australian expenditure declined slightly to 1.26%.	1.29%
Increase level of exploration expenditure to a minimum of \$30 million per financial year.		\$8.7 million
Obtain an increase in the area held under Exploration Licence.	Area held under All Minerals and Non-metallic Exploration Licences decreased to 8794 km <sup>2</sup> . A further 30 356 km <sup>2</sup> is held for onshore oil exploration.	11 446 km <sup>2</sup>
Obtain an increase in the number of Exploration Licences granted.	The number of Exploration Licences held decreased to 101.	129
Obtain an increase in the metres of exploration drilling completed.	Exploration drilling increased by 72% to 42 329 metres. This was due to an increase in on-lease drilling. Drilling other than on mining leases decreased by 51% to 10 700 metres.	28 040 m
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 decreased to 34%.	43.3%

**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

**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 — Land Access (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, 2000/2001**

During 2000/2001 Mineral Resources Tasmania consisted of five branches: Metallic Minerals and Geochemical Services; Industrial Minerals and Land Management; Information Systems and Geophysics; 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**

During 2000/2001 the Metallic Minerals and Geochemical Services Branch was involved in a number of projects and programs.

#### **Western Tasmanian Regional Minerals Program**

Planning of projects to be carried out as part of the Western Tasmanian Regional Minerals Program was completed in conjunction with the Commonwealth Government, industry and a consultant. Multispectral infra-red and side-scan radar data were acquired during August as part of the United States Government agency NASA Pacrim II project in the Pacific Rim.

#### **Geoscientific data generation**

Primary geoscientific data acquisition was completed for the Exeter, Harford and Gog 1:25 000 scale map tiles in the form needed for digital capture. Field data were acquired for the Beaconsfield map sheet.

Ten geological map sheets (Parrawe, Guildford, Adamsfield, Bowes, Table Head, Philips, Togari, Marrawah and the Hibbs special compilation sheets 1 and 2) were prepared for digital capture.

Reports on gold mineralisation in the Weld River area, tantalum and rare earth minerals, blue amphibole and wollastonite were prepared during the year. Substantial progress was made on reports on the geology of the southern Smithton synclinorium, the Maydena–Skeleton–Nevada–Styx–Picton area, and the mineralisation of the Balfour district. External papers were submitted on the tectonic implications of blue amphiboles in the Arthur Lineament, the stratigraphy and structure of the Mathinna Group of northeast Tasmania, and the implications of studies into illite crystallinity in Mathinna Group rocks to gold mineralisation.

The Geological Society of Australia Specialist Group in Tectonics and Structural Geology meeting and associated field excursion were held in Ulverstone in February 2001, and a field guide was published. Offers to date rocks associated with gold mineralisation arose from the excursion and samples have been provided.

A Tasmanian excursion, related to the international Minerals and Museums Conference in Melbourne, was held in December 2000. A paper on Tasmanian minerals was presented at the meeting.

Papers on the gold mineralisation at Cygnet, the Proterozoic basalts of northwest Tasmania and their tectonic setting, and the deformation of rock units in the Badger Head–Beaconsfield area were presented at the 15th Australian Geological Convention in Sydney in July. All papers were well received and provoked discussion.

Papers on the geological framework of Tasmania, mineral systems, increasing the gold prospectivity of northeast Tasmania, and the geochemistry of Devonian granites were prepared and presented at the TASGO-TASMAP workshop in June.

## Database development

The seamless 1:250 000 scale geological coverage of Tasmania was completed and a legend for the seamless 1:25 000 scale mapping was compiled. A start was made on the seamless 1:25 000 scale geological coverage.

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

A contractor completed the capture of the private sector stream-sediment geochemistry database during the year and commenced a comprehensive check of the mineral deposit database.

A start was made to compiling metadata on Mineral Resources Tasmania databases for the Australian Spatial Data Dictionary.

The geochemical data synthesis program CHEMDAT, developed in-house by a Branch member, became a project for information science students at the University of Tasmania. The main aim of this project was to convert the program from a Macintosh platform to a Windows environment to enable better interfacing with the Mineral Resources Tasmania computing environment.

The work of maintaining and upgrading Mineral Resources Tasmania's databases continued through the year, with particular effort placed on the TASROCK rock catalogue and a detailed audit of the DORIS drill hole database over a section of western Tasmania.

## Promotion of Tasmania's exploration potential

The Deputy Premier hosted a cocktail party, featuring Tasmanian food and beverages, at the international Mining 2000 conference held in Melbourne in September 2000. Several influential industry figures attended, including the editor of the *Mining Journal*, the world's leading international weekly industry newspaper. A positive article on Tasmania appeared in a post-conference edition. Mineral Resources Tasmania had a promotional booth at the conference and presented a paper on the mineral potential and exploration opportunities in Tasmania.

Geologists from the Branch presented three papers and held a promotional display at the Australian Geological Convention in Sydney. Each of the papers generated follow-up queries on exploration opportunities.

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 twelve mining and three investment companies were visited in Toronto and Vancouver with the Australian delegation and a luncheon was held with the editor of the *Northern Miner*, Canada's leading industry publication. One measure of success of the visits is that a Canadian company visited during each of the last two years has taken out an exploration licence in western Tasmania.

A joint promotional display with CODES was presented at the Volcanic Environments and Massive Sulfide Deposits International Conference in Hobart in November.

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

## Core library

Over 80% of the new storage area at the core library has been filled with core. Because of major changes in the mineral exploration corporate situation, there was an unprecedented level of core acquisition during the year, totalling 276 pallets.

The core library expansion project in 2000/2001 involved design completion for upgrading of the core inspection facility to contemporary standards and the installation of additional rock sample archival storage capacity. Because of activity

associated with storage of core in the new facility, construction of the new inspection area has been deferred until 2001/2002. The NSW Government core library in Londonderry was inspected during the Australian Geological Convention and information on design of the inspection area was obtained.

A decision to purchase a fork-lift truck was made during the year and payment was made.

A total of 31 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 \$37,887 worth of analyses and services to both Government (\$20,864) and external clients (\$17,023). Most of this external work cannot be otherwise conducted within Tasmania.

The lapidary laboratories prepared 436 standard thin sections, 145 polished thin sections and four other sections, making a total throughput of 585 samples, valued at \$14,760.

The technical officer for petrological services processed 390 samples by X-ray diffraction, including 148 quantitative dust analyses, and also conducted 43 soil and sizing tests and 66 optical asbestos identifications, for a total of 499 samples processed valued at \$23,127.

A total of 405 external samples were received for investigation, mostly by X-ray diffraction. These samples include 231 for occupational health clients, 36 soils, 11 metallurgical samples, five construction materials and 66 other samples (mostly rocks). This external work came from a wide range of external sources, including the University of Tasmania; Hobart City Council; Hobart Water; various Government departments; mining, mineral processing and mineral exploration companies; environmental and occupational health consultants; and the general public.

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

Extensive laboratory maintenance was completed on the lapidary equipment and petrographic microscopes, and cleaning routines were instigated. Repairs were completed on the XRD and fume cupboard. A potential lapidary laboratory relocation to the Mornington core store was planned in detail. Radiation safety guidelines were revised and radiation monitors were reassessed.

Forensic studies continued with work for Tasmania Police, the Department of Public Prosecutions, Workplace Safety Tasmania, and the Tasmania Fire Service. The petrologist spent one day in court as an expert witness, and some time was spent assisting with an external forensic display.

Construction material studies continued as a part of the Tasmanian Alkali-Aggregate Reactivity Research Project (TAARRP). This was undertaken in conjunction with the Roads and Public Transport Division and the Tasmanian Crushed Stone Association. Previous work, produced as consultant reports, is being compiled and prepared for publication as a departmental report. This 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, sorting and compiling thin sections, cataloguing various rocks, preparation of displays and supervision of the rock store. Some samples were dispatched to other museums on request. The computer database is being updated

for later integration with TIGER and TASROCK. A small new compactus unit was installed for rock samples.

The petrologist chaired a national mineralogical conference that was held in Hobart in June. The petrologist also manned a Mineral Resources Tasmania display/sales table and presented a mineralogical paper. A Mineral Resources Tasmania display/sales table at the two-day Hobart Gem and Mineral Exhibition in March was also attended by the petrologist.

A paper was published in the *Australian Mineralogist* on the mineral collections at the Tasmanian Museum and Art Gallery.

A contribution was made to the process of having crocoite designated as the State mineral. A geology talk was given at a local school, on request. Work on updating the *Catalogue of Mineral Occurrences in Tasmania* continued and is now substantially complete.

Assistance has been provided to the update of the Mineral Resources Tasmania publication *Fossicking Areas in Tasmania*. This entailed some site visits and a day trip to Launceston to explain fossicking/prospecting regulations to the Tasmanian Lapidary and Mineral Association.

### Geochemical laboratory

During 2000/2001 the laboratory was 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 Mineral Resources Tasmania's databases. A total of 565 samples were assayed for 13,004 individual determinations. A project studying acid mine drainage required larger samples to be processed for fewer individual determinations and a substantial amount of time was spent on processing these samples. A total of 292 samples for 5882 individual determinations were submitted for analysis during the year. This included 101 water samples, 171 rock samples, and 20 minerals and products.

Careful operation and maintenance has kept the XRF unit operating in a stable condition throughout the year. New Windows-based software is being installed which will generate data in Excel format. This will save time on the operation of the unit and data processing, and should be compatible with the TIGER information system.

Further refinements to the faster method of powder pellet preparation for X-ray fluorescence analysis, initiated last year, has allowed for a substantial time saving in sample preparation.

Another significant improvement to the sample preparation laboratory was the acquisition of a Boyd Crusher. The finer crushing possible has given improved sample quality due to better reproducibility of each split. The crusher has also given better working conditions, as it is fully enclosed for noise and dust management, and better safety control. The crusher is designed to work in conjunction with a Rotating Sample Divider (RSD). The purchase of an RSD, planned for the next financial year, will achieve 'one step' crushing and splitting of samples, allowing productivity to be maximised.

### On-going activities

Mineral exploration report and exploration performance assessments were carried out as required, as was the preparation of promotional leaflets for Exploration Tender Areas. Particular attention was placed on monitoring performance on exploration licences.

Numerous meetings were held with industry and CODES-SRC. Presentations were given to the Tasmanian Minerals Council Exploration Group on the Western Tasmanian Regional Minerals Program.

Many requests for information on geology, mineral resources, minerals and related matters were received and dealt with promptly.

A meeting of the Australian and New Zealand Minerals and Energy Council Land Access (Native Title) Task Force was attended in Adelaide in February. There was also a meeting of the task force with the peak industry body, the Minerals Council of Australia.

Contributions were made to the review of the *Mineral Resources Development Act 1995*, required under National Competition Policy. A Discussion Paper on amending the *Mining (Strategic Prospectivity Zones) Act 1993* was written and circulated to likely interested parties for comment.

Meetings of the Tasmanian Statistical Advisory Committee and the RFA Implementation Group were attended during the year.

Branch staff had training on project management and negotiation skills during the year. The majority of staff attended a refresher first aid course. The geochemical technician attended an atomic absorption spectrometry course in Melbourne.

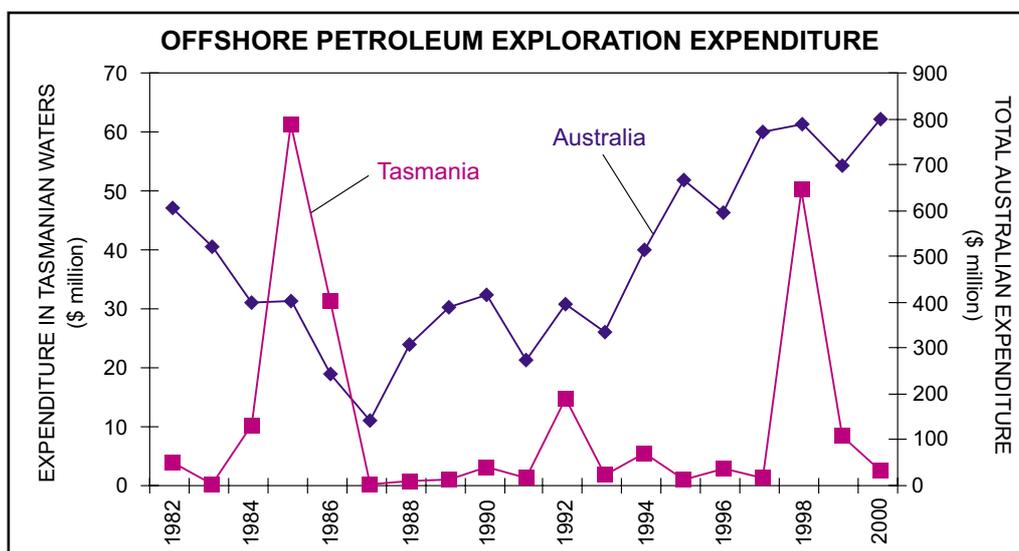
## Industrial Minerals and Land Management

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. It is also responsible for the management of groundwater resources, waste management, and geohazards, especially land stability.

### Petroleum exploration

Four offshore permits and one onshore permit are currently held for oil and gas exploration. A retention lease is held over the Yolla gas/condensate field in the Bass Basin. Although no hydrocarbons are produced in Tasmania or offshore waters, there were some encouraging developments in 2000/2001. A large gas field was discovered in the Otway Basin, northwest of Tasmania, and feasibility studies and marketing of the Yolla gas resource reached an advanced stage.

The retention lease over the Yolla field is held by a consortium headed by Origin Energy Resources Ltd and AWE Petroleum Ltd (the Yolla Joint Venture). Negotiations for the sale of Yolla gas to the Victorian market are at an advanced stage, and Heads of Agreement have been secured for supply of gas to Origin Energy Retail in Victoria. In June 2001, the Yolla Joint Venture applied for a renewal of T/RL1, with the expectation that a Production Licence application would be made in 2002.



In May 2001, a consortium led by Woodside Energy Ltd drilled the Thylacine 1 well in permit T/30P in the Otway Basin northwest of King Island, and discovered a large gas field. A preliminary estimate of the size of this resource is one trillion cubic feet, which makes it the largest gas accumulation so far discovered in Tasmanian waters. An appraisal well drilled in September 2001 confirmed the large size of the field.

In May–June 2001, Fugro Survey Pty Ltd carried out a major, non-exclusive seismic survey over the Otway and Sorell Basins that lie offshore of western Tasmania. The acquisition of modern, high-quality seismic data over these poorly-known areas should greatly enhance their prospectivity.

The Western Tasmanian Regional Minerals Program is currently funding collaborative studies of the Bass and Sorell Basins by Mineral Resources Tasmania, AGSO-Geoscience Australia, and the National Centre for Petroleum Geology and Geophysics. The studies include seismic reprocessing and analysis of cores, and will lead to a better understanding of the petroleum prospectivity of these basins. Results are due to be released in April 2002.

An offshore area to the east of Flinders Island, covering the southern platform of the Gippsland Basin, was gazetted for work program bidding in May 2000. No bids were received by the closing date in May 2001. Three offshore areas covering the northern part of the Sorell Basin, offshore western Tasmania, were gazetted in April 2001. Bids close on 11 April 2002. The new seismic data obtained by Fugro, the Western Tasmanian Regional Minerals Program studies, and the recent gas discoveries in the Otway Basin are expected to attract considerable industry interest to these areas.

Onshore, Great South Land Minerals Ltd holds Special Exploration Licence 13/98 for petroleum, covering most of the Tasmania Basin. During the year an extensive seismic survey was undertaken over the Central Plateau and northern Midlands.

Late in 2000, Duke Energy International announced construction of the \$380 million undersea Tasmanian Gas Pipeline, linking Tasmania and the Australian mainland and bringing natural gas to Tasmania for the first time. Mineral Resources Tasmania has been closely involved with approvals for this project under the *Environmental Management and Pollution Control Act 1994*, the *Commonwealth Petroleum (Submerged Lands) Act 1967* and the *State Petroleum (Submerged Lands) Act 1982*.

### 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 2001 are shown below.

SPZ	Metallic		Non-metallic	
	Area (km <sup>2</sup> )	Occupied (%)	Area (km <sup>2</sup> )	Occupied (%)
Adamsfield	68.4	92.8	0.0	0.0
Arthur	146.5	13.2	1.6	0.1
Balfour	1064.3	27.2	3.4	0.1
Beaconsfield	19.0	99.9	4.0	21.0
Cape Sorell	676.1	48.9	0.0	0.0
Mount Read	1085.1	15.1	0.0	0.0
North East	678.6	7.0	219.0	2.2
Zeehan/Waratah	292.5	16.0	0.0	0.0

Note: The North East SPZ figure excludes a special exploration licence that covers 4337.43 km<sup>2</sup> (44.8%) of the SPZ.



### Industrial minerals

Tasmania Magnesite NL (previously Crest Magnesium NL) had a change of management. The company has been seeking a partner to help develop a mine in northwest Tasmania and associated refinery.

Mineral Holdings Australia Ltd has recently established a number of exploration licences in northwest Tasmania to explore for dolomite and limestone to use in an export industry based on chemical, industrial and agricultural carbonate products.

### Beach sands

The proposal to develop a heavy minerals mine at Naracoopa on King Island by Tasmanian Titanium Pty Ltd has received all necessary approvals from the King Island Council and the Tasmanian Government. It is the company's intention to proceed with the mine when outstanding legal issues are settled and funding is secured.

### 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.

### Compliance auditing

In response to the Regional Forest Agreement and the RPDC CAR Inquiry, Mineral Resources Tasmania instigated a GIS-based project in 1998/1999 to develop a recording system of on-ground exploration activity. This project would allow compliance auditing of the Mineral Exploration Code of Practice and in the longer term outcome-based auditing of the environmental effects of exploration in Tasmania.

The information system, Tasmanian Exploration Auditing and Monitoring System (TEAMS), was developed as a pilot project in December 1998. Following the 1998/1999 summer field season, data capture processes were reviewed and further development undertaken. The first trial audit was undertaken in 1999/2000.

An external auditor from Quality Assurance Services (QAS) was contracted to do a verification audit of TEAMS in late 2000. The QAS audit noted that the TEAMS process was sound. There was criticism of the lack of strict work instructions and formalisation of processes. Mineral Resources Tasmania is currently implementing these recommendations while the TEAMS software will be rewritten to be compatible with the agency change to ARCGIS and the TIGER information system.

### Compliance auditing 2000/2001

Forty-seven work programs were submitted to MRT for approval. Thirty-two work programs were approved. Eleven of these programs were in CAR Reserves or High Quality Wilderness and required comment from the Mineral Exploration Working Group.

The remaining 15 work programs comprised:

- four were part of a larger approval of the Great South Land Minerals Ltd seismic survey;
- four were minor amendments to previously approved programs;
- three were pending at the end of the year;
- two were cancelled prior to approval;
- two provided inadequate details for entry onto the system.

#### *CAR Reserves*

There were thirteen site-specific activities within CAR Reserves, three drill sites and ten large sample sites, giving a total of approximately 1.15 hectares of disturbance. The sample sites were rehabilitated (1 hectare) leaving the drill sites (0.15 hectare) to be rehabilitated on completion of the exploration program.

#### *High Quality Wilderness (HQW)*

There was one work program in HQW within State Forest. This included three drill sites and a 750 metre long track giving approximately 3.9 hectares of disturbance. This program is active at present and the works will be rehabilitated on completion.

#### *Gridding*

A total of 141.5 kilometres of grid lines was cut. Of this 92.5 kilometres was new cutting with 49 kilometres of refurbishment of existing lines.

#### *Areas disturbed and areas rehabilitated*

<i>Land Tenure</i>	<i>Number of sites</i>	<i>Disturbance (ha)</i>	<i>Rehabilitation (ha)</i>
CAR Reserves	13	1.15	1.0
HQW	4	3.90	0
Crown Land	10	2.20	1.10
State Forest	63	16.95	5.55
Private Property	3	2.60	2.60
<b>Total</b>	<b>93</b>	<b>26.80</b>	<b>10.25</b>

Note: It is a licence condition that all disturbances will be rehabilitated on expiry of the licence and prior to the return of the environmental bond.

## Codes of practice

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

The second edition of the *Quarry Code of Practice* was issued in September 2000 and has been gazetted as a code under the *Mineral Resources Development Act 1995*.

## Mining heritage

Mineral Resources Tasmania 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 Mineral Resources Tasmania on mining heritage policy and on specific issues affecting Tasmania's rich mining heritage.

## Town planning

Mineral Resources Tasmania supplied information to the West Tamar Council to assist in the review of the West Tamar Planning Scheme.

Submissions were made to the Northern Midlands Council in relation to proposed buffer zones to protect quarries from residential development in the Western Junction–Breadalbane area. This is an area of strategic importance with Boral, Brambles and Stornoway carrying out operations in the vicinity.

The *Land Use Planning and Approvals Act 1993* has been reviewed. As a result of the review, it was recommended that mineral exploration activities continue to be exempted from planning schemes through Section 20.7 of the Act.

## Sand resources

A review of sand resources in southern Tasmania, completed in 1999/2000, was released. The Clarence City Council responded to the report by incorporating provisions for resource protection in the draft of the planning scheme review.

A digital coverage of sand resources for use by municipal councils was produced for incorporation in planning schemes.

A draft review of construction materials and planning restraints in northern Tasmania was undertaken.

## Acid drainage

Following receipt of a grant from the Natural Heritage Trust, a state-wide acid drainage and acid sulphate soil reconnaissance survey continued. Field investigations, involving geochemical and hydrological sampling, were carried out on Flinders Island to complete the acid drainage survey. Data analysis and GIS modelling were used to produce maps showing surface water contamination and the distribution of potential acid-forming host rocks.

A review of soil information was followed by fieldwork to survey the extent of potential acid sulphate soils in Tasmania, principally in northern Tasmania and on King Island and Flinders Island. A map showing the distribution of potential acid sulphate soil was produced. A notable finding was the occurrence of acid producing lenses in soils as high as 20 metres above sea level. In northern parts of Australia the expected areas of coastal sediments normally extend no higher than five metres above sea level.

## Phytophthora

A map to identify those areas most at risk of *Phytophthora cinnamomi* (a root rotting pathogen that attacks coastal heath and moorland plant communities) was developed using the TASVEG 2000 coverage, rainfall and topographic data. This will assist in the assessment of mining leases.

## **RiverWorks remediation program**

John Miedecke and Partners Pty Ltd drafted the final report of a remediation strategy for the Storys Creek and Rossarden abandoned mine sites. Significant emissions of acid and zinc in Storys Creek and Aberfoyle Creek affect the South Esk River downstream.

The Commonwealth Government contributed funding for the consultants through the RiverWorks Tasmania program. The Department of Primary Industries, Water and Environment provided laboratory analyses and Mineral Resources Tasmania provided project management. Works were funded by the Rehabilitation of Mining Lands Trust Fund and RiverWorks.

## **Rehabilitation**

Major works were completed at the abandoned Endurance, Monarch and Star Hill mine sites near Gladstone in northeast Tasmania. Erosion control and revegetation works were carried out at the Endurance mine. Repairs were necessary to erosion control gabion structures at the Monarch mine, which had been damaged by flooding. A further 15 hectares of land at the Star Hill mine were revegetated using local provenance species.

At Storys Creek, an anoxic limestone drain was constructed above the former mine shaft to add alkalinity to the mine water.

Several disused gravel pits were rehabilitated near Beaconsfield. Maintenance was carried out at the revegetated gravel pits at Oakdeane Road near Scottsdale.

Smaller scale works included rubbish removal and shaft filling at Moina, shaft filling at Natone, repairs to the Arthur dam, and rehabilitation at the former Magnet mine site near Waratah. Gorse was sprayed at the Queensbury mine near Zeehan.

## **Mount Lyell**

Investigations concerning the feasibility of extracting copper from emissions from the Mount Lyell lease are nearing completion. Solvent extraction and electro-winning, together with neutralisation, is the most practical 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 water quality improvement of the Queen and King rivers, and in Macquarie Harbour. Peer review of the report is imminent and final publication is anticipated before December 2001.

## **Savage River**

The Department of Primary Industries, Water and Environment is carrying out rehabilitation investigations and works on historic waste and tailings dumps at Savage River in partnership with Australian Bulk Minerals. The most prominent projects involved the southwest, hairpin and 'B' dumps.

## **Mining operations**

Operations at the Hellyer mine ceased last year. During 2000/2001 the adit was plugged with concrete to allow the mine to flood safely. Rehabilitation works were completed and some buildings were removed. Re-treatment of tailings is under review.

Goldfields (Tasmania) Limited announced increased ore reserves and an intensive underground exploration program. A new tailings dam was constructed requiring a revision of the rehabilitation security.

Australian Paper continued rehabilitation work at its former mine sites at Tonganah. The plant was demolished during the year.

Oceania Tasmania Pty Ltd applied for development approval of a concentrator for their zinc prospect at Comstock, near Zeehan. Preliminary rehabilitation of waste stockpiles was carried out.

Hercules Resources Pty Ltd opened a small-scale mine at Southern Trenches near Tullah. Approximately 15 000 tonnes of gold ore was delivered to Pasmenco Rosebery mine. Following extraction, rehabilitation was commenced.

Australian Bulk Minerals at Savage River constructed a crusher to process ore from the Southern Deposit. Movement occurred in the Main Creek tailings dam wall requiring urgent modification of tailings management and monitoring of the dam. Design review showed that the core of the dam is stable.

## 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 Mineral Resources Tasmania, 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 Mineral Resources Tasmania, 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.

Thirty exploration tender areas were offered to potential explorers by way of the *TasXplorer* news sheet, which is circulated widely within the Australian mining community. The news sheet is sent to 335 clients of Mineral Resources Tasmania by facsimile (88), email (66) and post (181), and is also available on the MRT web site.

Officers of the section play a key role in maintenance of the TASXPLORE and REGIS modules within the TIGER database management system.

## Mining Legislation

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

During the year a project team worked on amendments to the Act and Regulations. Amendments to the Act were of a minor nature and related mainly to removing some anomalies and clarifying sections to meet the intent of the Act. Sections relating to royalty in both the Act and the Regulations were amended to reflect agreements reached by Government and the mining industry

The review of the Act in relation to National Competition Policy was completed during the year. The review found that the Act complied with National Competition Policy and that any restraints or imposts on industry fell within acceptable guidelines. The review panel's final report has been endorsed by the appropriate Ministers.

Landslip provisions under the *Local Government (Building and Miscellaneous Provisions) Act 1993* are proposed to be brought under the geoscientific investigation and research sections of the *Mineral Resources Development Act 1995*. Cabinet has approved this proposal.

Mineral Resources Tasmania provides information through *Service Tasmania* outlets and forms approved under the *Mineral Resources Development Act 1995* are available via Mineral Resources Tasmania's web page or direct from Mineral Resources Tasmania 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 Mineral Resources Tasmania, or referred to the Mining Tribunal during the year, were:

#### *74049 North Forest Products v Tasmania Mines Ltd*

Claim for unpaid royalty arising from mining on land owned by applicant. Meeting convened by Registrar of Mines unable to resolve matter. Hearing date set and adjourned by Mining Tribunal to allow exchange of documents. Unresolved to date.

#### *74050 Kimbolton Coal Company Pty Ltd v P Willans*

Application by lessee against lodgement of caveat. Lessee failed to appear at Mention Hearing. Adjourned sine die.

#### *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. Land owner has agreed in principle to course of action. Formal withdrawal not received.

#### *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. Two meetings of the parties were convened by the Registrar of Mines. The licence area was reduced significantly, agreements were reached and formal withdrawal received.

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

Objection based on opening of easier access to southwest Tasmania. Agreement reached at meeting convened by Registrar of Mines. Formal withdrawal received.

#### *74103 Aboriginal Land Council of Tasmania — SEL 22/1999*

Objection based on restrictions on traditional usage of land in northeast Tasmania. Agreement reached at meeting convened by Registrar of Mines. Formal withdrawal received.

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

Agreement reached at meeting convened by Registrar of Mines. Formal withdrawal received.

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

Agreement reached at meeting convened by Registrar of Mines. Formal withdrawal received.

74106 *Various v Allstone Pty Ltd*

Minister refused licence application following representations from objectors and other landowners affected by application.

74107 *Various v Mineral Holdings Australia Pty Ltd*

General agreement reached at meeting convened by Registrar of Mines. Licence application withdrawn by applicant.

74108 *H E and J J Lack v F Bardenhagen*

Application out of time. Issues dealt with informally.

74109 *St Helens History Room v J E Brady*

Objector concerned about damage to mineral heritage on Blue Tier. Meeting convened by Registrar of Mines. General agreement reached. Applicant withdrew application prior to granting.

***Lease applications, 2000/2001*****Total number of all types of exploration rights held as at 30 June 2001**

<i>Mining Tenement</i>	<i>Number</i>	<i>Area</i>
Exploration Licences —		
All minerals	94	8 676 km <sup>2</sup>
Non metallic	6	118 km <sup>2</sup>
Oil (onshore)	1	30 356 km <sup>2</sup>
Retention Licences —		
All minerals	20	77 km <sup>2</sup>
Non-metallic minerals	7	183 km <sup>2</sup>
Prospectors Licences Issued	96	Not applicable
Permits to explore for Petroleum under <i>Petroleum (Submerged Lands) Act 1967</i>	5	341 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	138
All minerals and stone	1	4 945
Clay	1	1
Coal	1	36
Gold	2	41
Gravel	7	91
Lime sand	1	12
Sand	2	17
Sand and gravel	2	22
Specimens	9	79
Stone	5	64
Stone and gravel	2	47
Tin	1	34
<b>Total</b>	<b>35</b>	<b>5 527</b>

**Leases granted**

<i>Product</i>	<i>Number</i>	<i>Area (ha)</i>
All minerals	1	138
Gold	1	20
Gravel	7	38
Sand	2	25
Specimens	1	6
Stone	10	312
<b>Total</b>	<b>22</b>	<b>539</b>

**Total number of leases in force at 30 June 2001**

<i>Principal product</i>	<i>Number</i>	<i>Area (ha)</i>
All minerals	27	18 573
All minerals and stone	5	5 972
Clay	9	94
Coal	5	6 375
Coal and stone	1	175
Copper	1	5
Dolerite	1	40
Dolomite	2	138
Easements	21	298
Gold	17	1 085
Granite	4	50
Gravel	168	3 146
Gravel and clay	1	29
Iron	1	4 067
Kaolin	1	184
Lime sand	4	219
Limestone	11	1 266
Magnesite	3	815
Magnetite	1	55
Ochre	1	15
Peat	4	858
Quartzite	1	191
Sand	45	1 857
Sand and gravel	25	1 373
Sand and stone	9	298
Sandstone	5	48
Shale	3	35
Silica	4	436
Silica, sand and stone	1	50
Silica sand	1	20
Silver and lead	1	8
Slate	3	165
Specimens	18	133
Stone	235	5 623
Stone and gravel	19	322
Tin	9	1 074
Umber	1	6
<b>Total</b>	<b>668</b>	<b>55 098</b>

## Engineering Geology and Groundwater Section

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

The section 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 as a prime function.

### Engineering geology

Land stability issues continued to be an important aspect of the work of the section. Work to revise and integrate various previous mapping methodologies was carried out during the year. The Burnie and Penguin advisory zone maps were revised and integrated with information from the North West Tasmanian Landslide Hazard Assessment project. Information from the Tamar Valley advisory zone mapping and the Launceston Urban Mapping Project was integrated to provide a common legend for both schemes and to allow the Data Management Branch to compile a fully integrated set of land stability advisory zone maps for the Tamar area.

A national expert in the field of landslide assessment was engaged as a consultant to develop a strategy for future landslide assessment by Mineral Resources Tasmania, using modern concepts and techniques. A trial study, based on the principles described in the strategy, commenced in southern Tasmania.

The process of declaration of a landslip area, under the *Local Government (Building and Miscellaneous Provisions) Act 1993*, commenced in the Berriedale district and a number of groundwater monitoring boreholes were drilled around the location of the landslide. Regular monitoring of groundwater levels in boreholes at the site of the Rosetta landslide continued. Advice on stability issues relating to both these landslides was provided at regular meetings with the Glenorchy City Council. A contract surveyor continued regular monitoring of a number of landslides with the potential to threaten property and infrastructure in northern Tasmania.

Information was provided to the public, other agencies and companies on land stability issues concerning a wide variety of locations throughout Tasmania.

### Groundwater

A program of compilation of groundwater maps commenced during the year, using data held by Mineral Resources Tasmania to provide information necessary for the holistic management of water resources by the Department of Primary Industries, Water and Environment. Map boundaries of this program are delineated by surface water catchments defined by the Department of Primary Industries, Water and Environment. A draft map for the Great Forester catchment was produced.

Work on the groundwater resources study covering the Sorell area was completed, and a draft map was compiled using a large quantity of new and existing information.

The program of accurate monitoring of groundwater levels across Tasmania continued, using data loggers set in approximately thirty boreholes to provide real-time information on groundwater levels. Field sampling and check monitoring quality assurance was carried out at approximately six month intervals at each monitoring location.

General information on groundwater resources, pollution and quality was provided to other agencies, companies and members of the public, in response to enquiries. A decrease was noted in the number of groundwater-related telephone

enquiries in the period following the autumn season of 2001, possibly related to the marked increase in rainfall in many areas. Consultants investigating pollution problems at a number of sites in Tasmania were supplied with information relating to groundwater in the areas concerned.

Groundwater quality protection issues with respect to a number of wastewater reuse schemes continued to form an important element of the section's activities. The section provided valuable input into the State Committee on Wastewater Reuse, providing advice on the potential effects on groundwater of this method of irrigation, which is rapidly gaining popularity. In addition, the section provides advice on groundwater issues relating to mining tenements.

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

A project to examine soil salinisation in Tasmania, which forms part of a major joint project with the Department of Primary Industries, Water and Environment, commenced during the year. The project involves the investigation and modelling of groundwater and groundwater chemistry at three case study sites, and is being undertaken as a consultancy. Funding for the project, which is due for completion in 2002/2003, was provided by the Natural Heritage Trust.

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

This Natural Heritage Trust funded project continued during the year, in conjunction with local government and the Department of Primary Industries, Water and Environment. Extensive drilling and sampling programs were carried out at eleven case study sites selected for detailed study, and monitoring installations were emplaced for long-term monitoring by local councils. Initial conceptual models of the hydrogeological regime at each site were developed, and will be refined following further field testing and data analysis.

## **Information Systems and Geophysics**

The activities of the Information Systems and Geophysics branch were dominated by the continuing development of the Mineral Resources Tasmania information management system by Project TIGER and implementation of recommendations of the Final Regional Development Plan of the Western Tasmanian Regional Minerals Program (WTRMP). The branch also provided geophysical services and advice to Mineral Resources Tasmania and its clients, and computer and network support for Mineral Resources Tasmania.

The branch was restructured during the year to better reflect the outputs required by Mineral Resources Tasmania. As a result the project and operational functions have been clearly defined and resources moved to the operational area to ensure that information systems developed to date by Project TIGER can be supported within Mineral Resources Tasmania. An Information Systems Officer has been appointed within the project area of the branch and one full-time resource has been transferred to the operations area. As at 30 June there were six temporary staff performing document scanning and data back-capture associated with the WTRMP, two staff within the project area undertaking activities related to Project TIGER, three systems support staff in the operations area, and the branch manager who is also responsible for geophysical activities.

The main projects of the Information Systems and Geophysics branch during the year were:

- implementation of an Internet application to allow clients to search Mineral Resources Tasmania's indexes of open file technical documents over the Internet ([www.mrt.tas.gov.au](http://www.mrt.tas.gov.au));
- complete transfer of tenement data to the information system developed during Project TIGER Phase 3 and decommissioning of the previous Ingres-based system;

- ❑ implementation of a facility to allow automatic replication of data between the LIST and Mineral Resources Tasmania;
- ❑ delivery of source code for Project TIGER Phase 3 to Mineral Resources Tasmania by the contractors;
- ❑ training of all staff in project management concepts;
- ❑ transfer of the Mineral Resources Tasmania records system from RECFIND to TRIM;
- ❑ commissioning of a new Internet site for Mineral Resources Tasmania;
- ❑ acquisition at 200 metres line spacing of aeromagnetic, radiometric and digital terrain data over King Island, west and northwest Tasmania as part of the WTRMP;
- ❑ scanning of approximately fifty percent of the technical documents held by Mineral Resources Tasmania as part of the WTRMP to allow viewing over the Internet; and
- ❑ production of a new ER Mapper grid joining data from the helimag surveys over western Tasmania, including data from the Rosebery, Que River and Hellyer mine leases.

### **Data capture**

Capture into the TASXPLORE application of metadata summarising technical documents relating to exploration continued throughout the year, with 144 new summaries entered and 420 summaries updated. Summaries of open file technical documents relating to onshore exploration, offshore exploration and work carried out by Mineral Resources Tasmania can now be searched using the Internet and orders for copies of documents requested.

Business processes for indexing technical documents relating to onshore exploration have been revised to allow the assessing geologists to enter textual data directly into the information management system. All open file summaries are now searchable on the Internet as soon as the summaries are written. The business processes for entering the associated spatial data are currently being revised.

### **Project TIGER**

An Internet facility for searching and ordering technical documents held by Mineral Resources Tasmania was developed and implemented as the first deliverable of Project TIGER Phase 4. This document searching facility is a valuable research tool for a range of clients ranging from local historians to global mining and exploration companies.

Implementation of a facility to automatically replicate data sets between the LIST and Mineral Resources Tasmania realised a key component of the Project TIGER/LIST Whole of Government information management strategy. Changes to spatial information managed by either organisation (e.g. land parcel or mineral tenement boundaries) are now updated automatically each night.

An Internet Tenement Information System was designed to extend Internet resources and functionality. Further development of Phase 4 was suspended by the steering committee to allow a comprehensive review of the project's resource requirements and business plan.

Training for key stakeholders was identified and delivered during the pause in Project TIGER execution. Training to raise awareness within Mineral Resources Tasmania of project management methodology and technical training for Mineral Resources Tasmania staff to maintain technology introduced by the project was a priority. A series of seminars, run by the Department of Premier and Cabinet, on the Tasmanian Government Project Management Guidelines were delivered to all key stakeholders and the project steering committee. In addition, a group of Mineral Resources Tasmania staff attended a project management course to increase practical skills for project management methodology.

A technical training plan was developed and delivered so that Mineral Resources Tasmania staff now have the skills to maintain all aspects of the database and intranet technology developed so far by the project. Use of the new technical skills has been optimised by restructuring the Information Systems and Geophysics branch to ensure that staff with required technical skills are assigned to operational and project tasks.

### **IT summary**

In accordance with government guidelines Mineral Resources Tasmania replaces desktop PCs every three years and transfers the original PCs to the schools program. New PCs are purchased with the current Microsoft enterprise operating system and as a consequence Windows 2000 is being progressively introduced as new PCs are installed. Two A0 plotters have been purchased and have provided significant gains in print quality and productivity over the units replaced.

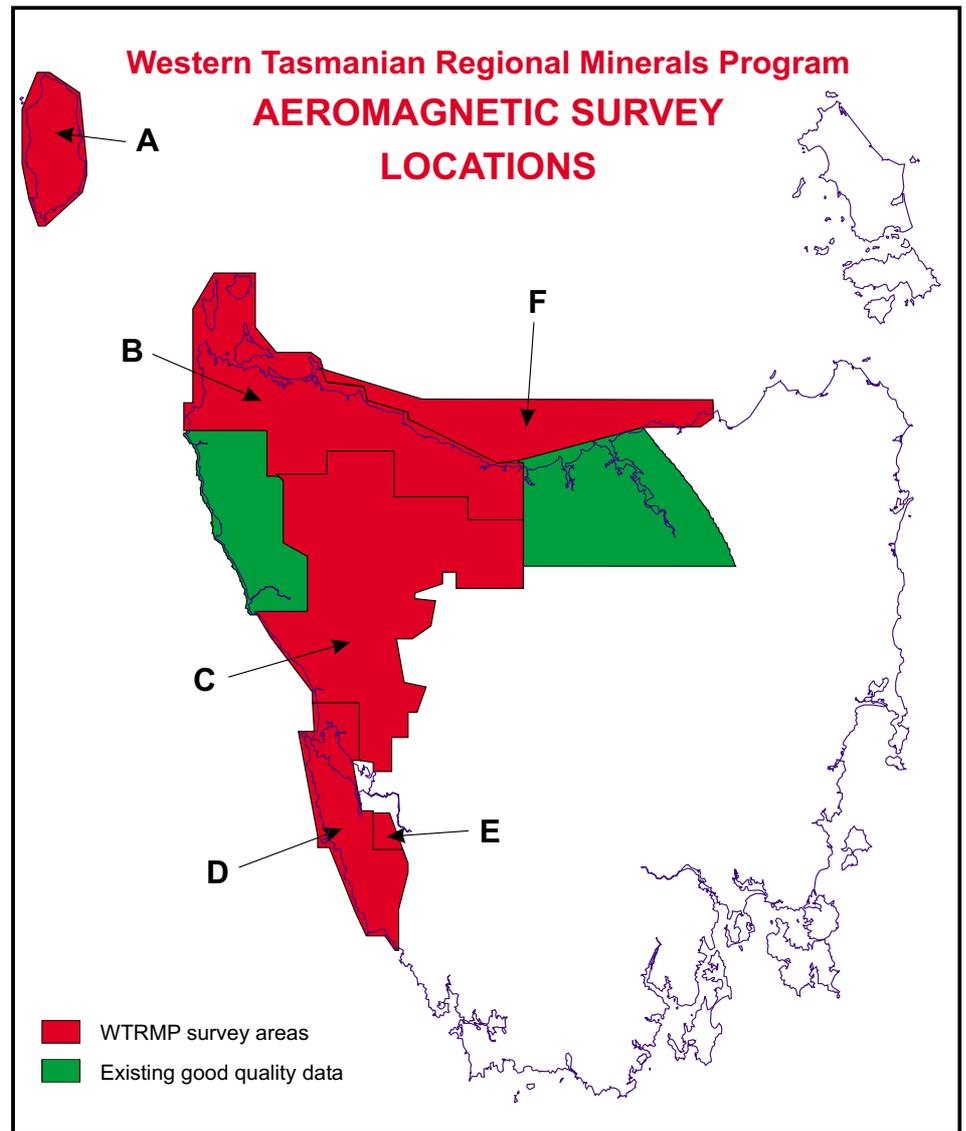
There are four network PC servers, three of which run Windows NT. The main PC network server is running Netware 5.1 and offers approximately 72 gigabytes of on-line storage. Windows NT servers provide anti-virus, e-mail, intranet and image delivery services to staff. Files on the corporate Unix systems 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. The volumes of data being generated by the document scanning project of the WTRMP cannot be stored on the existing Unix servers and a test mass storage server is being assembled to provide dedicated storage for this data.

The usage of Unix workstations has been rationalised to reduce overall maintenance costs for the Unix systems. The older disk sub-systems have been replaced by new disks in order to reduce data access times and consolidate data holdings. An enterprise server has been purchased to run the production Ingres and Oracle databases and host the Mineral Resources Tasmania records management system. An Oracle development server has been configured to allow development and testing without affecting the production systems. There are now four Unix workstations in use within Mineral Resources Tasmania and a fifth, hosting the Mineral Resources Tasmania website, is installed at 10 Murray Street, Hobart. The records management system has been transferred from RECFIND, using a proprietary data storage method, to TRIM, using Oracle for data storage.

The Mineral Resources Tasmania website has been upgraded to have a look and feel that is in accordance with departmental corporate guidelines. It is hosted on a dedicated Unix server and has a high speed connection (100 megabits/second) to the Networking Tasmania central core. The site has also been restructured and incorporates a module to allow the indexes of technical documents held by Mineral Resources Tasmania to be searched. Further upgrades and extensions are planned. The data link between the Rosny Park building and the Networking Tasmania central core has also been upgraded.

### **Western Tasmania Regional Minerals Program**

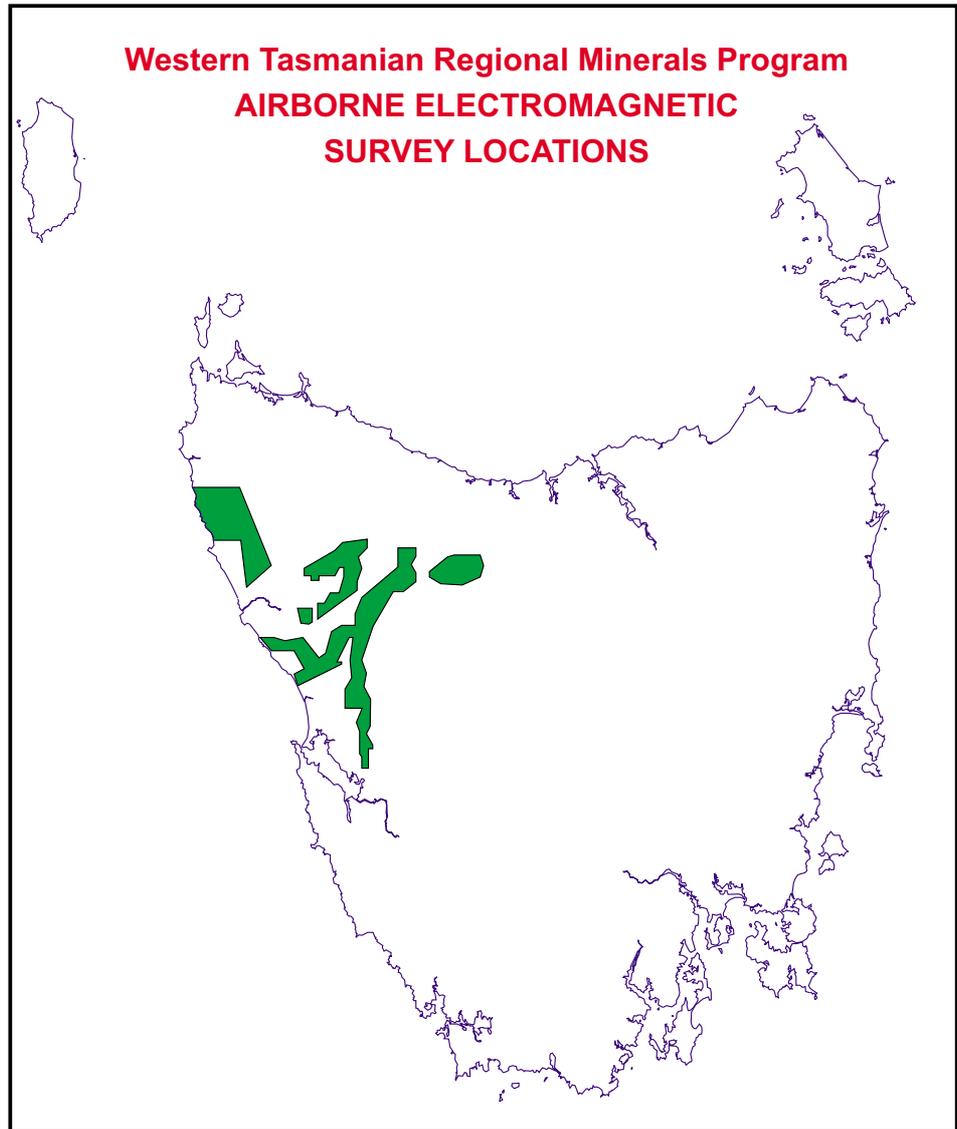
A reference group with an independent chairman and members drawn from the Tasmanian Minerals Council, the Department of Industry, Science and Resources and Mineral Resources Tasmania developed a series of projects to implement the geoscience infrastructure recommendations of the Final Regional Development Plan of the Western Tasmanian Regional Minerals Program. The Information Systems and Geophysics branch is responsible for the acquisition of aeromagnetic, radiometric and airborne electromagnetic data over parts of King Island and western and northwestern Tasmania and for the scanning and implementation of Internet viewing and downloading of the technical documents held by Mineral Resources Tasmania.



Approximately 114 180 line kilometres of aeromagnetic and radiometric data were acquired over areas of King Island and western and northwestern Tasmania between December 2000 and March 2001, using either fixed-wing aircraft (areas A, B, D, F) or helicopters (areas C, E). The final data were received in June and are of excellent quality with outstanding resolution of many previously unrecorded geological features. The initial release of the digital data is scheduled for October 2001.

Helicopter-based acquisition of frequency domain electromagnetic data over the Mt Read Volcanics and areas of shallow granite commenced in February but equipment difficulties required the survey to be suspended after approximately 1000 line kilometres. Acquisition is scheduled to recommence in October 2001 when weather conditions should have improved sufficiently to allow good productivity. A co-operative project has been established with the School of Earth Sciences at the University of Tasmania to carry out additional work on the electromagnetic data and an Honours student is working on the data already acquired.

The technical documents relating to onshore and offshore exploration and Mineral Resources Tasmania technical reports are being scanned to allow on-line viewing on the Internet and downloading for local viewing or hardcopy production. At 30 June approximately fifty percent of the required scanning and indexing had been completed. All such documents held by Mineral Resources Tasmania are being scanned, with Mineral Resources Tasmania providing funding to scan those documents not relating to the WTRMP area.



### Geophysics

The image of western Tasmania helimag data has been updated to include data over the Rosebery, Que River and Hellyer mine leases that was previously closed file. The new data acquired as part of the WTRMP has replaced this joined dataset as the best regional aeromagnetic coverage of western Tasmania but the individual surveys and combined grid will continue to be made available for more detailed studies.

In conjunction with other jurisdictions within Australia, Mineral Resources Tasmania has commenced phasing in reporting standards for the digital lodgement of exploration reports but there has been little response to date from explorers. Another educational program will be undertaken in the new financial year when Mineral Resources Tasmania's reporting guidelines for Tasmanian explorers have been revised to bring them further into alignment with similar guidelines from other jurisdictions. GGIPAC has made a production release of a freely downloadable software application for producing standard headers to accompany digital data lodgements.

## Data Management

The role of the Data Management Branch 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 2000/2001 the capture of geological data continued resulting in the completion of:

- Eleven 1:25 000 scale digital geological maps in western Tasmania (Parrawe, Guildford, Meredith, Livingstone, Stringer, Table Head, Philips, Innes, Moores, Osmund, and Lewis);
- One 1:25 000 scale digital geological map in northeast Tasmania (Exeter).

Revision of the 1:250 000 and 1:25 000 scale digital geology attribute data was completed and work on the creation of a 'seamless' 1:25 000 scale data coverage for Tasmania continued.

The digital capture of Landslip A and B zones (including the drawing of new plans) was completed. The digital capture of landslide advisory zones data in northwest and northern Tasmania was also completed together with the redrawing of four maps. Work on replacing existing advisory zone maps for the Tamar Valley commenced.

Two 1:50 000 scale digital maps for the Sorell groundwater project were produced.

Four 1:500 000 scale maps of Tasmania were produced for the Tasmania Acid Drainage Reconnaissance, a project funded by the Natural Heritage Trust. Maps and diagrams were also produced for another Natural Heritage Trust funded project on the effects of waste disposal on groundwater quality.

Tenement information is now included on the LIST and digital tenement data is available as a free download from the Mineral Resources Tasmania website. Ninety-one datasets of geological data were produced for clients.

Further development was undertaken on the information system for recording the approvals processes and monitoring activities undertaken by Mineral Resources Tasmania in its administration of on-ground mineral exploration activities, as required under the Tasmanian Regional Forest Agreement (RFA).

CAD continues to be used as a support tool for many projects, with 132 maps and plans and 194 tenement maps and diagrams being produced throughout the year.

Output maps of digital geological data were produced on demand using the agency'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 Mineral Resources Tasmania Internet site, and other reports and leaflets as required. Major publications produced during the year included:

- the Mineral Resources Tasmania *Annual Review*;
- *Mineral Exploration Opportunities in Tasmania — A summary of opportunities for mineral exploration and mineral resource development in Tasmania — February 2001*;
- *The geological framework of Tasmania — Abstracts volume*;
- *Fossicking areas in Tasmania* (revised edition).

# 1:25 000 SCALE DIGITAL GEOLOGICAL MAP PROGRAM As at 30 June 2001

WICKHAM	
NEW YEAR	EGG LAGOON
REEKARA	SALTWATER
LOORANA	SEA ELEPHANT
CURRIE	NARACOOPA
FEARSHAPE	GRASSY
STOKES	

SISTER		
PALANA	ARTHURS	
TANNER	WINGAROO	
EMITA	MEMANA	PATNAHICHS
WYBALENA	LEVENTHORPE	SELLARS
REEF	WHITEMARK	LOGAN
CHAPPELL	LOOCOTA	EISHER
BADGER	ANDERSON	RUNCHEON
BARRETTES	KERFORD	THRSTY
PRESERVATION	PASSAGE	
MORIARTY		

KERAUDREN	ROCHON														
CUIVIER	ADAMSON														
BIRD	WALKER														
GRIM	ROBBINS														
STUDLAND	MONTAGU	STANLEY													
CAMERON	MELLA	SMITHTON	ROCKY CAPE												
MARRAWAH	TOGARI	LILEAH	MAWBANNA	WYNYARD											
BLUFF	ROGER	TAYATEA	MILABENA	CALDER	BURNE										
SUNDOWN	SUMAC	HOLDER	FOLLY	YOLLA	STOWPORT	ULVERSTONE	DEVONPORT	PORT SORELL	BELL BAY	RETREAT	NABOWLA	SCOTTS DALE	DERBY	SPURRS RIVULET	THE GARDENS
TEMMA	DEMPSTER	BERYL	KEITH	TEWKESBURY	RIANA	KINDRED	LAYROBE	PARFORD	BEACONSFIELD	LILYDALE	LISLE	SPRINGFIELD	RINGAROOMA	BLUETIER	BIRN LONG
ORDNANCE	BALFOUR	BERTHA	BARETOP	PARRAWE	LOYETEA	CASTRA	RAILTON	WFRANKFORD	EXETER	DILSTON	PATERSONIA	MAURICE	VICTORIA	PYENGANA	ST HELENS
KENNETH	LILLY	DONALDSON	WARATAH	GUILDFORD	LOONGANA	WILMOT	SHEFFIELD	PARKHAM	BRIDGENORTH	LAUNCESTON	NUNAMARA	BENNEVIS	SADDLEBACK	BRILLIANT	BENOMARIS
JOHNSONS	LAGOON	SAVAGE RIVER	LUINA	PEARSE	LEA	CETHANA	GOG	DELORAINE	WESTBURY	PROSPECT	BLESSINGTON	GIBLIN	MATHINNA	DUBLINTOWN	FALMOUTH
INTERVIEW	MEREDITH	RAMSAY	CHARTER	PENCIL PINE	LIENA	MOLE CREEK	MONTANA	CLUAN	LONGFORD	EVANDALE	STACKS	MANGANNA	ST MARYS	IRONHOUSE	
HADDWICKE	LIVINGSTONE	PARSONS	BLOCK	CRADLE	BORRADAILE	LAKE MACKENZIE	QUAMBY BLUFF	LIFFEY	CRESSY	NILE	STANHOPE	ROSSARDEN	FINGAL	PICAMINNY	
AHRBERG	STRINGER	ROSEBERY	TULLAH	WILL	ROWALLAN	PILLANS	BREONA	POATINA	DELMONT	CLEVELAND	HANLETH	ST PAULS DOME	ST JOHN	SEYMOUR	
HEEMSKIRK	DUNDAS	SELINA	ACHILLES	CATHEDRAL	ADA	SPLIT ROCK	BRADYSLO	O'CONNORS	CONARA	DIAMOND	ROYS	HENRY	BICHENO		
TRIAL	OCEANA	TYNDALL	DOVE	DU CANE	OLIVE	MIENA	ARTHURSLAKE	MILLERS	JACOBS	CAMPBELL TOWN	SNOW	APSLAWN	LODI		
MALLANNA	PROFESSOR	GORMANSTON	GOULDS	OLYMPUS	INA	MONPEELYATA	WIHAREJA	PENNY	ELLINTHORP	ROSS	LEAKE	CRANBROOK	FRIENDLY		
BELLINGER	STRAHAN	OWEN	COLLINGWOOD	RUFUS	BRONTE	WADDAMANA	STEPS	INTERLAKEN	TUNBRIDGE	MORRISTON	COLONELS	SWANSEA	COLES BAY		
KELLY	TEEPOOKANA	DARWIN	LODON	ARROWSMITH	D'ARCY	ECHO	HERMITAGE	TABLE	VINCENTS	FADDENS	TOOMS	USSELLTON	GRAHAM		
TABLE HEAD	PHILIPS	ENGINEER	VERA	MAJORS	TARRALEAH	DEE	CLUNY	DENNISTOUN	OATLANDS	LEMONT	ROYALTY	MAYFIELD	SCHUPPEN		
ALBINA	SARAH	MCCALL	WARNES	ALGONKIAN	WAYATINAH	STRICKLAND	CAWOOD	BOTHWELL	STONOR	WHITEFOORD	RAVENS DALE	GRINDSTONE			
VARINA	BIRCHES	LIMEKILN	ABEL	SPIRES	WYLD	OUSE	MONTACUTE	KEMPTON	COLEBROOK	WOODSDALE	TRIABUNNA	BOUGANVILLE			
MEERIM	HIBBS	D'AGUILAR	LANCELOT	POKANA	GORDONVALE	ELLENDALE	HAMILTON	ELDERSLIE	BAINS	BUCKLAND	ORFORD	DARLINGTON			
ENDEAVOUR	INNES	OLEGAS	WINGS	TIGER	DOBSON	BUSHY PARK	BROADMARSH	TEA TREE	RUNNYMEDE	SANDSPIT	HEDDE				
HIBBS 3	MOORES	SERPENTINE	STRATHGORDON	ADAMSFIELD	MAYDNA	UXBRIDGE	NEWNORFOLK	RICHMOND	SORELL	KELLEWIE	PERON				
MONTGOMERY	OSMUND	VIEW	M'PARTLAN	BOWES	SKELETON	LLOYD	COLLINSVALE	HOBART	CARLETON	DUNWALLET					
MAINWARING	LEWIS	ROOKERY	SOLITARY	ANNE	NEVADA	LONNAVALE	LONGLEY	TARBOONA	BREMORNE	MURDUNNA					
VERIDIAN	ELLIOTT	PROPSTING	MACONOCHE	SCOTTS	WELD	GLENHUON	HUONVILLE	BLACHMANS BAY	COMMUNICATION	TASMANIA					
MULCAHY	DAVEY	CROSSING	RAZORBACK	PICTON	GEEVESTON	CYGNET	BLACHMANS BAY	COMMUNICATION	TASMANIA						
SETTLEMENT	LEGG	GLOVERS	BURGESS	WATERLOO	LYMINGTON	GREAT BAY									
BREAKSEA	RUGBY	FEDERATION	BOBS	RAMINEA	DOVER	ADVENTURE BAY									
HILLIARD	MIL	RAY	BISDEE	HASTINGS	PARTRIDGE	FLUTED CAPE									
COX	LOUISA	PRECIPITOUS	LEPRENA	GLOUDY											
TOLOPEA	DEWITT	PRION	RECHERCHE												

 Map complete



Reports issued in the Tasmanian Geological Survey Record series included:

- 1993/26 — *Blue amphibole in the Proterozoic to Cambrian Arthur Metamorphic Complex, northwest Tasmania*, by N. J. Turner and R. S. Bottrill.
- 1994/14 — *The Ironbound Group of southern Tasmania: new data bearing on the Cambro–Ordovician relationship between Tasmania and northern Victoria Land, Antarctica*, by R. H. Findlay.
- 1996/14 — *The Lonnvale oil seep*, by R. S. Bottrill.
- 1999/06 — *The nature and origin of gold mineralisation at Forsters Prospect, Glovers Bluff/Weld River area*, by R. S. Bottrill, J. Taheri and C. R. Calver.
- 2000/02 — *Field excursion guide notes for the Roger, Sumac and Dempster digital 1:25 000 scale geological map sheets, northwestern Tasmania*, by J. L. Everard, A. R. Reed, M. P. McClenaghan and D. B. Seymour.
- 2000/03 — *A review of socio-economic and environmental issues relating to the potential extraction of sand in the Hobart region*, by J. Mills.
- 2000/04 — *Groundwater resources of the Northern Midlands and Fingal Valley regions*, by K. Taylor.
- 2000/05 — *Hydrogeological setting for areas subject to soil salinity*, by M. Dell.
- 2001/02 — *Wollastonite in Tasmania: an update*, by R. S. Bottrill.
- 2001/04 — *Strategy — The rehabilitation of abandoned mining lands (Revision 1)*.

## 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 co-located in the Rosny Park library, is maintained separately. A permanent part-time librarian was appointed to manage the Workplace Standards Tasmania collection in September 1999.

## Technical Services

Inmagic DB/Textworks library management software was updated during the year to version 5.0. A useful feature of the new version is the upgraded spine label printing facility enabling individual labels to be printed as required.

The library web page was updated to accommodate access to online searching of the document indexes to onshore and offshore company reports and Mineral Resources Tasmania reports.

Cataloguing of books and journals onto Inmagic DB/Textworks continued during the year.

## Collection

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

An audit was conducted on collections indexed on TASXPLORE, DOMINFO and PETXPLORE over six weeks from mid-August to September. Reports were located and checked for completeness in preparation for being scanned as part of the Western Tasmanian Regional Minerals Program. Parts of reports found missing during the audit were checked against the microfiche reports and replacement copies ordered.

Scanning of company reports, Mineral Resources Tasmania reports and petroleum reports for eventual full-text display on the Mineral Resources Tasmania website began in December.

Despite an increase in the price of journals, all subscriptions were renewed but limited funds resulted in only ten new books being purchased.

**External reports  
released during  
2000/2001**

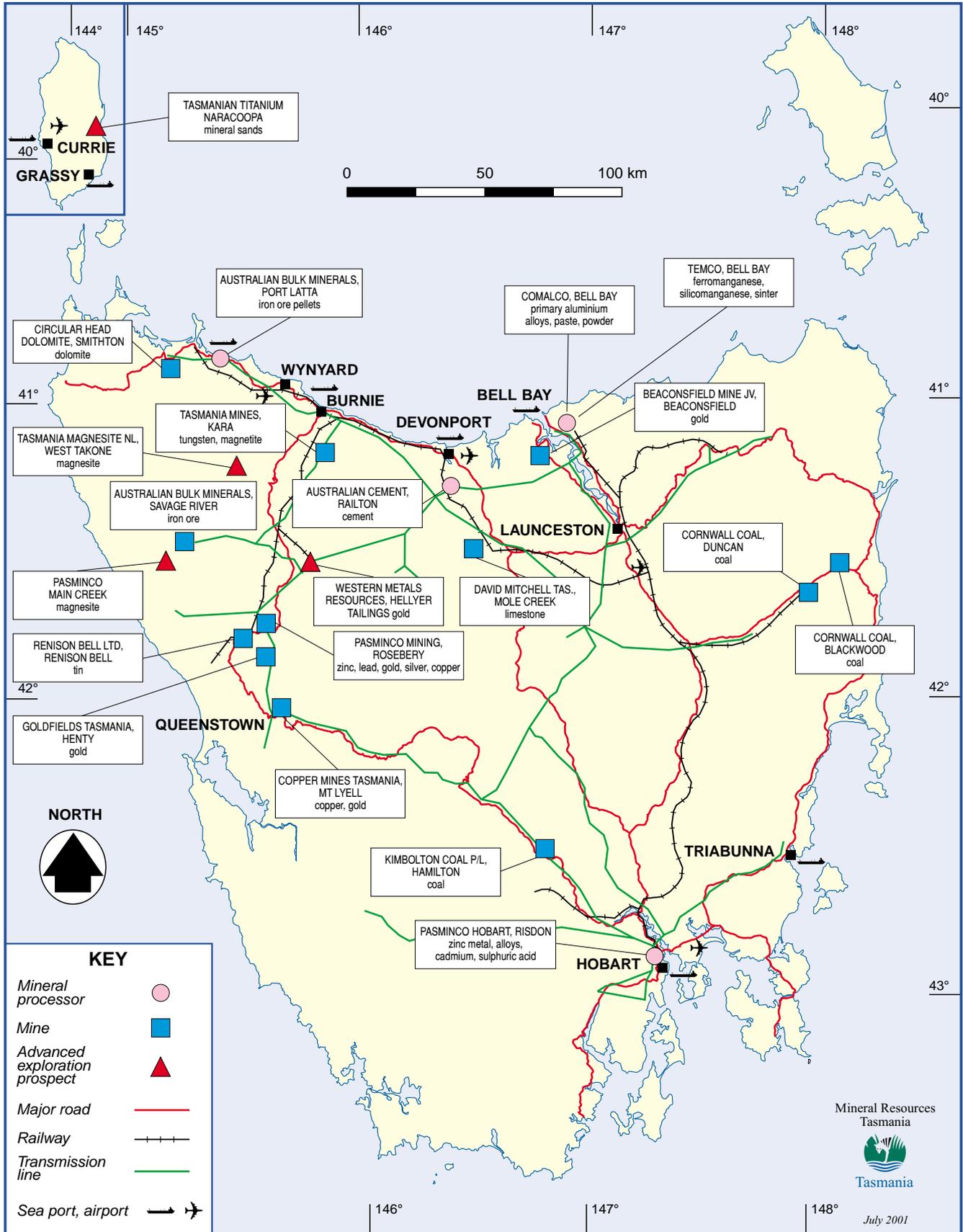
- BIRCH, W. D.; KOLITSCH, U.; WITZKE, T.; NASDALA, L.; \*BOTTRILL, R. S. 2001. Petterdite, the Cr-dominant analogue of dundasite, a new mineral species from Dundas, Tasmania, Australia and Callenberg, Saxony, Germany. *Canadian Mineralogist* 38:1467–1476.
- \*BOTTRILL, R. S. 2001. Minerals of the Moon. *Abstracts: 2001: A Space Odyssey*. 24th Annual Joint Mineralogical Societies seminar, Melbourne, 1999. p. 23.
- \*BOTTRILL, R. S. 2000. New minerals from old deposits: The Dundas Mineral Field, Tasmania: *Abstracts Minerals and Museums 2000: 4th seminar*. Melbourne, Victoria, June 2000.
- \*BOTTRILL, R. S. 2000. The Mt Lyell mines, Tasmania: *Abstracts: Australia's greatest mineral deposits: 23rd Annual Joint Mineralogical Societies seminar*, Broken Hill, NSW, June 2000, p. 5–7.
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- \* MRT author

# Tasmania

## Major Mining and Mineral Processing Operations

(as at 30 June 2001)



## Mineral Sector Overview

The 2000/2001 year has generally been one of difficulty for the mining industry, with the prices of most commodities decreasing throughout the year, particularly during the latter half.

Renison Bell Limited continued its exploration program and investigation into processing of ore and tailings, including a report of a favourable scoping study carried out by Bechtel International on the feasibility of retreating the Renison Bell tailings.

The Beaconsfield gold mine experienced difficulties in a number of areas, particularly with the performance of the bacterial oxidation section of the gold recovery circuit. At year's end the manager of the Beaconsfield Gold Mines Joint Venture, Allstate Explorations NL, had been placed in voluntary administration and the minority partner, Beaconsfield Gold Mines NL, was under the control of a receiver and manager. Despite the financial problems, the mine continued to operate under the control of the administrator with the full work force.

Goldfields Limited continued to report promising intersections of gold mineralisation from drilling south of the Henty mine. On 31 October 2000, the company announced that it would invest \$13 million extending the Mount Julia decline 500 metres to the south to enable detailed delineation drilling of the Mount Julia resource.

The Australian Bureau of Statistics (ABS) reported a minor increase in Tasmanian mineral exploration expenditure to \$9.1 million for the year compared with \$8.7 million in 1999/2000. Tasmania's share of Australian expenditure declined slightly to 1.26%, reflecting comparable marginal improvements in both the national and local situations.

Despite the low expenditure levels, there was significant progress in the nickel exploration being conducted by Allegiance Mining NL. Allegiance released results of a resource estimation and a scoping study into the potential economic worth of the Avebury deposit. The company announced a defined resource of 3.1 million tonnes of mineralisation grading 1.7% nickel, consisting of an indicated resource of 990 000 tonnes of 1.7% nickel at the North Avebury deposit and an inferred resource of 2 110 000 tonnes of 1.7% nickel at the nearby South Avebury deposit. Technical studies completed at a scoping study level suggest this resource is capable of supporting a medium-sized operation with an annual throughput of 300 000 tonnes of ore and an annual production of 19 400 tonnes of concentrate containing 22% nickel during a mine life of ten years. The company considers that this concentrate would be a premium quality product and readily saleable.

Defiance Mining NL has defined an indicated and inferred resource of 212 000 tonnes at 5.5 g/t gold for 37,800 ounces of contained gold at the New Golden Gate mine at Mathinna.

Anglo Australian Resources NL announced further interesting gold assays from its East Denison prospect near Lebrina.

A major recent contributor to 'greenfields' exploration in Tasmania, Pacific-Nevada Mining Pty Ltd, ceased active exploration following an attempted merger of its Canadian parent with a major South African gold company.

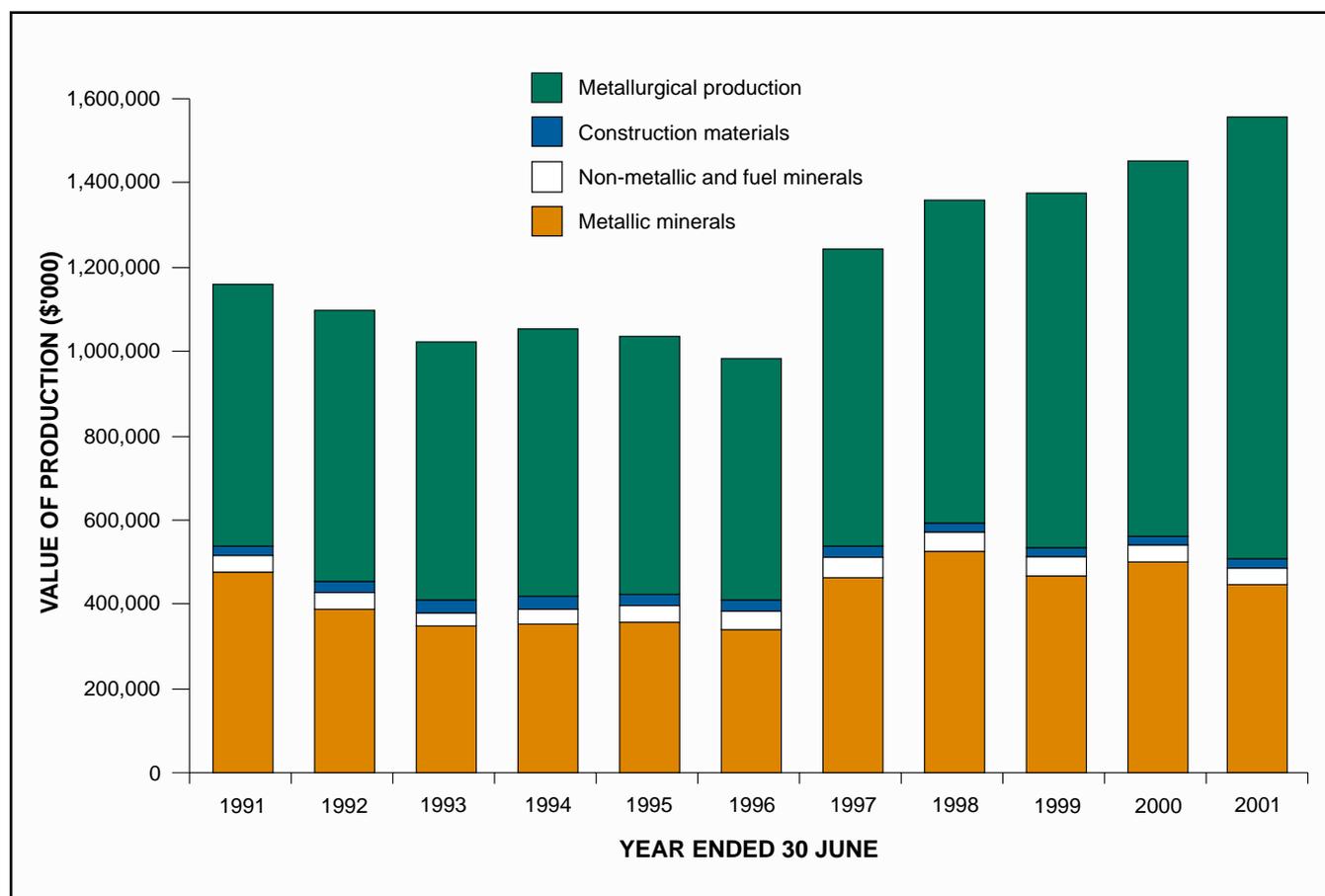
## Value of the Tasmanian Mineral Industry

<i>Year ended</i>		<i>30 June 2001</i>	<i>30 June 2000</i>
<i>Commodity</i>	<i>Unit</i>	<i>Total Quantity</i>	<i>Total Quantity</i>
<b>Metallic Minerals</b>			
Copper (assayed)	(tonne)	30 127	27 806
Gold (assayed)	(kilogram)	6 549	7 823
Iron ore pellets	(tonne)	2 027 324	2 068 341
Iron (in magnetite)	(tonne)	47 327	53 301
Lead (assayed)	(tonne)	30 290	65 416
Silver (assayed)	(kilogram)	100 544	156 005
Tin	(tonne)	8 985	9 207
Tungsten as tungstic oxide	(tonne)	0	0
Zinc (assayed)	(tonne)	77 430	161 883
<i>Value of Metallic Minerals</i>		\$444 840 694	\$501 429 984
<b>Non-Metallic, Industrial and Fuel Minerals</b>			
Clay –			
Cement	(tonne)	77 687	85 081
Brick	(tonne)	15 078	24 943
Other	(tonne)	0	14 110
Kaolin	(tonne)	5 265	926
Dolomite	(tonne)	7 214	6 176
Limestone –			
Agricultural	(tonne)	161 798	145 558
Cement	(tonne)	1 612 923	1 230 339
Chemical and metallurgical	(tonne)	62 096	39 467
Other	(tonne)	56 822	67 790
Silica (glass and other)	(tonne)	163 381	139 888
Sulphuric acid	(mono tonne)	291 199	446 735
Coal (run of mine)	(tonne)	473 097	565 988
Coal (washed)	(tonne)	349 389	398 181
Peat	(m <sup>3</sup> )	807	2 310
<i>Value of Non-Metallic and Fuel Minerals</i>		\$38 908 767	\$38 857 961
<b>Construction Materials</b>			
Building stone –			
Freestone	(tonne)	27	792
Other	(tonne)	4 228	6 809
Sandstone	(tonne)	1 401	620
Crushed and broken stone –			
Basalt	(tonne)	596 775	672 853
Dolerite	(tonne)	742 724	728 746
Limestone	(tonne)	46 369	29 659
Sandstone	(tonne)	496	6 802
Other	(tonne)	182 231	110 252
Gravel (aggregate)	(tonne)	41 438	64 343
Sand	(tonne)	315 650	422 518
Other road materials	(tonne)	1 528 636	1 126 148
<i>Value of Construction Materials</i>		\$20 438 698	\$21 062 561
<b>Total value with Australian metal prices</b>		<b>\$504 188 159</b>	<b>\$561 350 506</b>
<b>Value added production from Tasmanian and other ores</b>			
Aluminium	)		
Cadmium	)		
Cement	)		
Ferromanganese	)	\$1 054 668 594	\$891 514 762
Silicomanganese	)		
Sinter	)		
Superphosphate	)		
Zinc	)		
<b>Total value of mining and metallurgical production</b>		<b>\$1 558 856 753</b>	<b>\$1 452 865 268</b>
Reported average number of employees <sup>1</sup>		3522	4159

1. Not all operators report full details

## Value of Production, 2000/2001 and 1999/2000

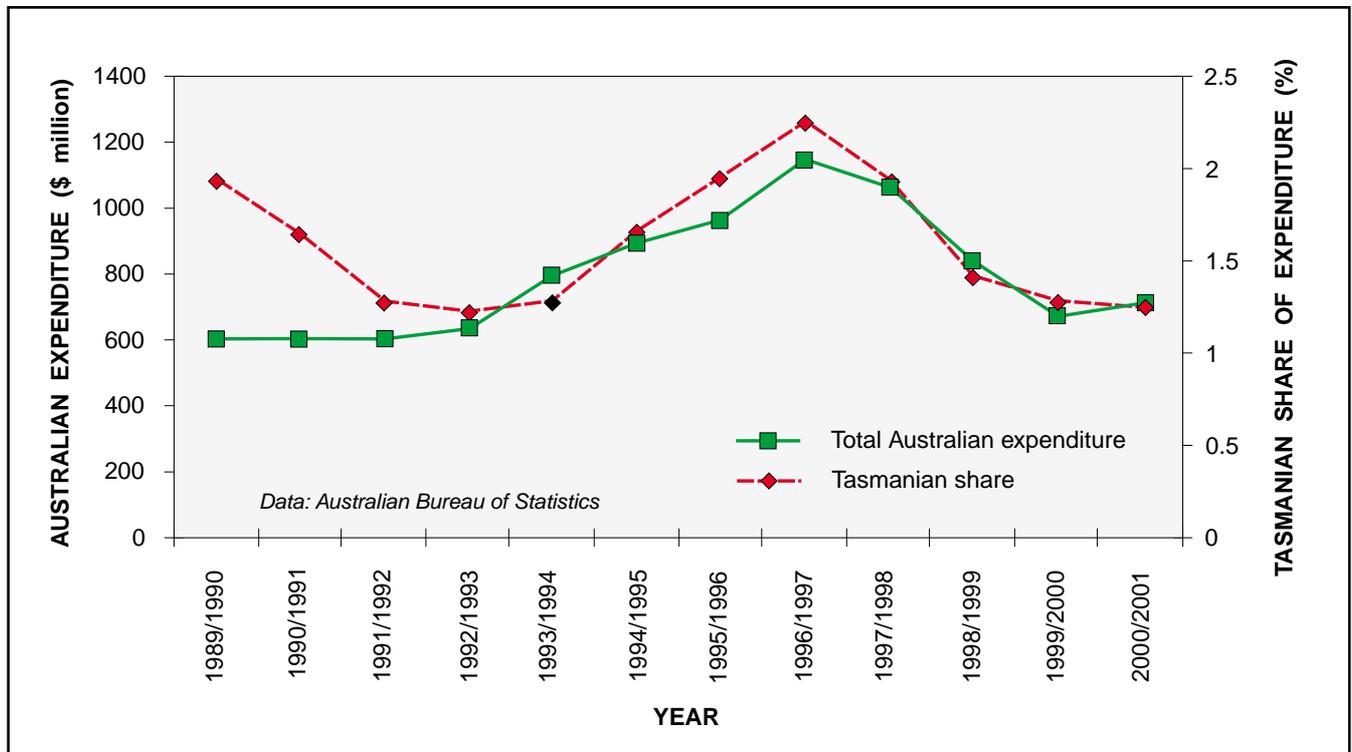
	2000/2001		1999/2000		% Change
	Tonnes	A\$'000	Tonnes	A\$'000	
Gold	6.55	–	7.82	–	-16.2
Silver	101	–	156	–	-35.2
Zinc	77 430	–	161 883	–	-52.2
Copper	30 127	–	27 806	–	+8.3
Lead	30 290	–	65 416	–	-53.7
Tin	8 985	–	9 207	–	-2.4
Iron ore pellets	2 027 324	–	2 068 341	–	-2.0
Total metallic minerals	–	444,841	–	501,429	-11.3
Non-metallic and fuel minerals	–	38,909	–	38,857	+0.1
Construction materials	–	20,439	–	21,062	-3.0
Value added production from Tasmanian and foreign ores	–	1,054,669	–	891,514	+18.3
<b>Value of mining and mineral processing production</b>	–	<b>1,558,857</b>	–	<b>1,452,865</b>	<b>+7.3</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
2000/2001	721.3	9.1	1.26

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 2000/2001 was \$1384 million, a reduction of 3 per cent compared to sales recorded in the previous year.

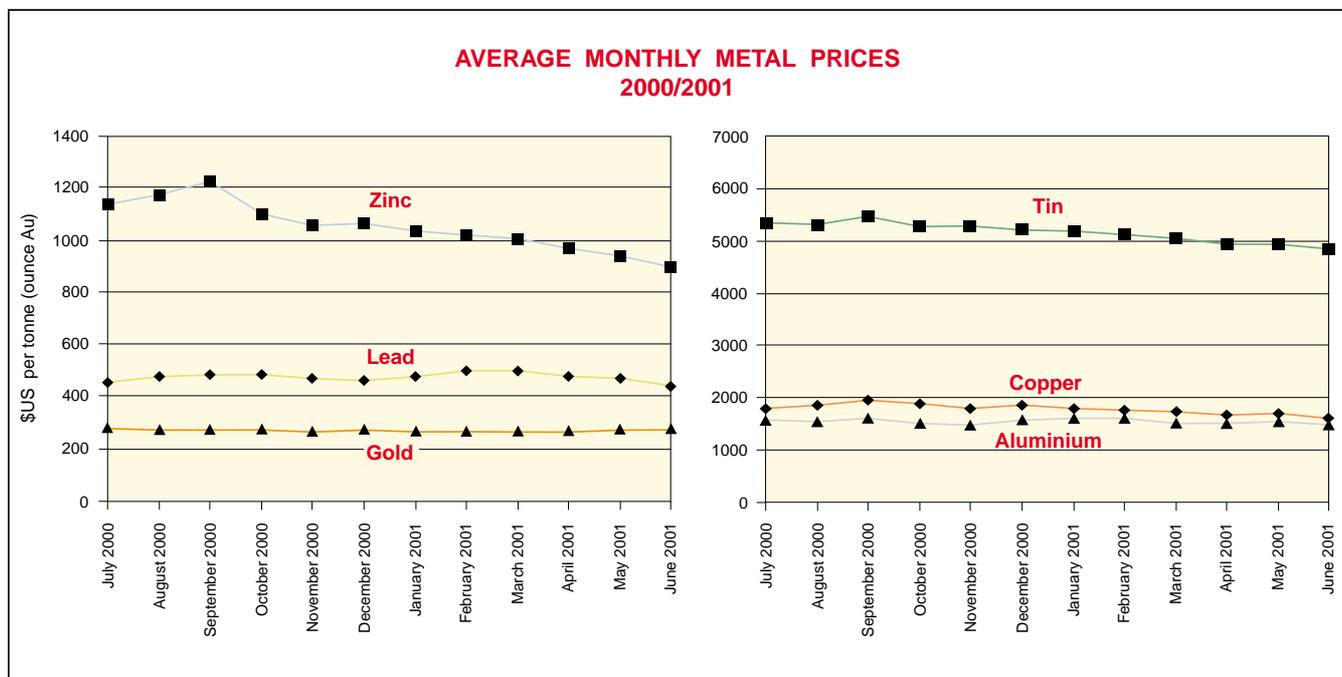
Total equivalent full time employment on mine and works sites, including contractors, was estimated as 3496 with a gross annual payroll of \$206 million. Payroll tax amounted to \$9.4 million.

Spending on goods and services (excluding freight, contract labour and electricity) totalled \$570 million, with a further \$49 million being spent on freight and port charges. Of this approximately \$348 million were spent in Tasmania. Capital expenditure for the year was estimated as \$143 million.

MRT collects royalties and rents and fees from mineral lands, which are forwarded directly to consolidated revenue. In 2000/2001, royalty revenue amounted to \$10.7 million compared to \$12 million in 1999/2000. Royalty collections are budgeted at \$11 million for 2001/2002.

## Metal Prices

The Australian Bureau of Agricultural and Resource Economics (ABARE) reported that world prices for most metals decreased in 2000/2001 in response to softening demand, reflecting a slowdown in world economic activity. Despite the easing of prices, production of most commodities has continued to increase, which may have the effect of constraining price rises as economic growth recovers. Any improvement in metal prices will be dependent on the timing of economic recovery, especially in the United States, and a significant increase in global demand.



## Review of Mineral Sector Operations — Metallic Minerals

### BASE METALS

#### Western Metals Resources Limited — Hellyer Operations

The Hellyer mine ceased operations in June 2000. Since then rehabilitation has been carried out at the mine, with work being completed in December. The mine workshop and office block buildings have been removed and the mine access adit was sealed with a large concrete plug, designed to permit safe flooding of the mine.

The concentrator and services infrastructure were placed on care and maintenance pending the outcome of a feasibility study into the re-treatment of the material contained in water covered storage in the Hellyer tailings dam. The Hellyer tailings resource comprises 10.88 million tonnes @ 0.16% Cu, 3.0% Pb, 2.8% Zn, 88 g/t Ag and 2.6 g/t Au.

Three contractors were employed on care and maintenance, security and environmental monitoring duties.

A metallurgical research and development facility, managing the Hellyer Metals feasibility study, is operated at Burnie. Seven people are employed full time and two part time. Technical services are also provided to two Western Metals metallurgical operations, Pillara zinc/lead in Western Australia and Mt Gordon Copper in northwest Queensland, and the facility also undertakes research and flowsheet development work for new projects.

Investigations to process Hellyer tailings included:

- ❑ Comprehensive batch laboratory pressure autoclave leaching;
- ❑ Smelter waste leaching;
- ❑ Laboratory batch and semi-continuous iron removal and basic zinc sulphate zinc recovery test work;

Additional investigations were carried out in Hobart and Perth. A pilot test program is planned for 2002.

#### Pasminco Mining Rosebery *Mining*

Ore production from the Rosebery mine totalled 712 342 tonnes, with 588 864 tonnes at 11.4% Zn being sourced from Underground (Lower Levels) and 123 478 tonnes at 10.8% Zn being sourced from Underground (Upper Levels). A further 14 064 tonnes at 12.3% Zn was sourced from Burns Peak.

On the Underground (Lower Levels), production from J and T lens at the south of the mine was completed during the year with the bulk of the ore again coming from the deeper northern ore bodies of K and P Lens. Of the ore mined 67% was extracted from K Lens, 26% from P Lens, 6% from T Lens, and 1% from J Lens.

A 5-man crew with small-scale equipment achieved plan production from Upper level remnants and from cut and fill stoping in B lens at 17B South and Access I.

Hercules Resources delivered 14 000 tonnes of ore from a small open-cut operation at Burns Peak north of Rosebery.

#### *Development*

Development for the year totalled:

- ❑ Capital: 2852.6 metres for 193 000 tonnes (estimated);
- ❑ Operating ore: 1327.4 metres for 126 514 tonnes;
- ❑ Operating waste: 929.9 metres for 63 000 tonnes (estimate).

A high proportion of capital development was required to give decline/incline access to K and P Lenses, with operating development being largely targeted at K Lens below 37K and P lens below 33P.

### Milling

Mill throughput increased by 16% to 734 884 tonnes assaying 11.12% Zn, 4.52% Pb, 0.36% Cu, 150 g/t Ag and 1.96 g/t Au. The major reason for this variance was the increase in mine output and the processing of 14 641 tonnes of ore sourced from Burns Peak. Production for the year totalled:

- 129 026 tonnes of zinc concentrate assaying 56.33% Zn;
- 40 611 tonnes of lead concentrate assaying 65.31%, 1275 g/t Ag;
- 6599 tonnes of copper concentrate assaying 22.84% Cu, 9.45% Pb, 5958 g/t Ag, 92.7 g/t Au;
- 476.22 tonnes of doré assaying 29% silver, 69% gold.

Gold production as doré increased 6.8% on the previous year as a result of the increased mill throughput but offset by lower recovery. Total gold credits (including concentrates) increased 37.3% to 1050 kilograms.

Copper metallurgy improvement compared to the previous year was demonstrated in recovery. Copper assay was steady. Silver content rose in proportion to head grades, but gold assay increased as prior recovery to doré fell away.

An 18% increase in lead concentrate output was achieved, reflecting the increased feed availability and small increment in feed grade.

Silver metal credits were again substantial as a result of continued good lead circuit performance and higher feed grades, coupled with the increased mill output. Overall saleable silver increased to 87.8 tonnes, a positive 36% variance on the previous year.

Zinc circuit quality performance improvement was retained with output up 3% as a result of the mill feed availability but offset by lower feed head grades (down 8%). A cleaner zinc concentrate, as demonstrated by the increase in assay to 56.3% zinc, was offset by a loss in recovery to zinc concentrate (1.3%).

### Reserves

The ore reserve inventory at Rosebery as of March 2001 showed an overall increase of 0.220 million tonnes compared with March 2000 despite mining depletions of 0.682 million tonnes during the year. This increase was due to the conversion of resources to reserves in P and K lenses, and the transfer from the 'inaccessible' category back into the resource category of some remnant mining areas where previously mined areas are being re-opened.

Identified ore reserves as at March 2001 comprised:

Category	Tonnes (000's)	Pb (%)	Zn (%)	Cu (%)	Ag (g/t)	Au (g/t)	Fe (%)
Proved	1973	3.6	10.8	0.37	111	2.0	7.7
Probable	662	3.8	13.3	0.64	118	2.1	14.1
Total	2635	3.7	11.4	0.44	113	2.0	9.3

The Rosebery mine lease resource inventory as of March 2001 showed an overall decrease of 0.444 million tonnes compared with March 2002. The decreases caused by depletion from mining, revisions following infill drilling and transfer of some remnants to the 'inaccessible' category were partly offset by additional resources defined by exploration drilling.

Identified mineral resources as at March 2001 comprised:

		<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	2 439	4.2	12.6	0.43	132	2.4	8.7
	Indicated	990	4.5	15.6	0.70	140	2.5	16.2
	Inferred	5 579	6.1	18.2	0.34	175	2.3	8.5
	Inaccessible	2 397	3.5	11.7	0.72	109	2.1	14.9
	Meas. + Ind. + Inf.	9 008	5.4	16.4	0.41	160	2.4	9.4
	<b>Total</b>	<b>11 405</b>	<b>5.0</b>	<b>15.4</b>	<b>0.47</b>	<b>149</b>	<b>2.3</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>
<b>GLOBAL</b>	<b>Meas + Ind + Inf</b>	<b>9 568</b>	<b>5.2</b>	<b>15.7</b>	<b>0.39</b>	<b>160</b>	<b>2.4</b>	<b>9.1</b>

### *Exploration*

Two orientation partial leach soil sample lines were completed north of the Rosebery mine. A soil sampling program was completed in the White Spur area. Interpretation of the data has yet to be undertaken. No geophysics or geological mapping programs were completed.

### *Drilling*

Underground exploration recommenced in April 2000. The main areas targeted were between K and W lenses and to the south of T lens. The exploration to date has been successful in defining extensions to K Lens and has located a small pod of mineralisation close to T Lens.

A total of 40 893 metres of drilling was carried out, comprising 27 957.2 metres of underground resource infill, 12 021.1 metres of underground deep exploration, and 915.2 metres of surface open pit drilling.

### *Capital expenditure*

Capital expenditure in 2000/2001 totalled \$21.3 million. Major projects included underground development (\$9 million), exploration drilling (\$1.1 million), and the purchase of trucks and loaders (\$6.7 million).

### *Personnel*

Operations employed 223 people including four casual staff. A disappointing result was 30 lost time accidents during the year. Employees submitted 82 process improvement opportunities to management for consideration. The Rosebery Community Liaison Committee and the Rosebery Development Committee merged to channel communication between the community and the company. Subjects discussed included development of the surface decline, company performance, environmental issues and community projects.

### *Environment*

An estimated 558 000 tonnes of mill tailings were pumped to storage in the Bobadil tailings dam. The initial stage of works to raise the dam by two metres was completed in April.

Some 22 000 tonnes of waste rock was brought to surface from the mine and deposited in long term storage areas within the Assay Creek rock dump or in worked-out areas of the Southern Open Cut.

Planned rehabilitation works were carried out mainly within the Hercules mine and former No. 1 Tailings Dam areas.

*Australian Minerals Industry Code of Environmental Management*

Pasminco Limited became a signatory to the Australian Minerals Industry Code of Environmental Management during August 1997. The company published its Second Group Public Environmental Report in September, 2000.

Implementation actions are incorporated within the Site Management Systems and an assessment of progress against the Code of Environmental Management principles are planned to be published within the Pasminco Limited Sustainable Development Report in September 2001.

### Hercules Resources Pty Ltd — Hercules mine

A small-scale open-cut mining operation was opened in the Burns Peak–Southern Trenches area near Tullah. Production was 14 100 tonnes of ore at 1.25% Cu, 7.88% Pb, 11.89% Zn, 55 g/t Ag and 8.86 g/t Au which was shipped to Pasminco Rosebery mine for treatment. The mining operation required the stripping of 92 000 cubic metres of overburden. Mining was completed during the year and the site was rehabilitated.

Two people are engaged full time, with contractors being employed for the mining operation. Potential resources are being investigated at Burns Peak.

## COPPER

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

#### *Mining*

Ore production at the Queenstown mine totalled 2 471 719 tonnes at a grade of 1.17 % Cu. Waste production was 116 510 tonnes.

A new mining contractor was engaged in October 2000. This changed production based schedule of rates underground mining contract from a cost plus contract, and resulted in an increase in mine production and a considerable reduction in costs.

#### *Milling*

Ore processed totalled 2 504 694 tonnes at a feed grade of 1.16% Cu. Recovery was 91.41% with concentrate production totalling 98 756 tonnes at a grade of 27%.

The milling rate increased from the historic 280–300 tph to 350 tph and hence the plant could achieve 2.5 million tonnes per annum. An additional crusher was added to the crushing circuit in the plant. This service was contracted out and the contractor is responsible for installation, commissioning, operating and maintaining the crusher. This crusher helped in reducing the size of ore feed to the mills which resulted in an increase in production and better recovery and concentrate grade.

#### *Resource/reserves*

The company carried out delineation drilling to redefine the Prince Lyell ore body at a cost of \$231,000.

At 30 June 2001 the Prince Lyell mining resource (1640 to 1400 mRL, in situ material) at 1% Cu cutoff comprised:

Measured:	5.63 Mt @ 1.51% Cu, 0.35 g/t Au
Indicated:	7.19 Mt @ 1.52% Cu, 0.37 g/t Au
Inferred:	0.55 Mt @ 1.29% Cu, 0.29 g/t Au
<b>Total resource:</b>	<b>13.37 Mt @ 1.51 % Cu, 0.36 g/t Au</b>

The Prince Lyell ore reserve (1640 to 1400 mRL, sublevel cave) at 30 June 2001 comprised:

Proved:	8.28 Mt @ 1.29% Cu, 0.28 g/t Au
Probable:	10.53 Mt @ 1.29% Cu, 0.29 g/t Au
<b>Total reserve:</b>	<b>18.81 Mt @ 1.29% Cu, 0.29 g/t Au</b>

The Western Tharsis mineral resource (within 0.75% Cu wireframe) totalled 11.77 million tonnes @ 1.26% Cu, 0.31 g/t Au.

### *Employment*

There were approximately 100 employees on the CMT payroll and about 140 permanent contractors employed at the mine.

### *Rehabilitation and pollution control initiatives*

CMT has continued to draw ore from a single underground resource, the Prince Lyell mine. Waste rock is stored in the Slag Heap Waste Rock Dump. The volume of waste trucked to surface is minimised by placing rock in abandoned sections of the mine. The size of the waste rock dump is less than 1.5 hectares, and it will reach capacity during late 2001. The dump has been shaped for closure with three metre wide benches every five metres in vertical height, and batter slopes of 16 degrees.

Tailings dam construction during 2000/2001 required excavation of about 250 000 m<sup>3</sup> of clay and rock from borrow pits adjacent the Princess Creek Tailings Dam. The borrow pits occupy an area of about ten hectares. Topsoil has been stockpiled around the edges of the borrow pits. No rehabilitation has been completed because the borrow pits will be utilised in future dam lifts.

Refuse that cannot be recycled or taken to council landfill is disposed of on site at the Cape Horn landfill. The existing landfill cell, of approximately 0.5 ha, was capped and revegetated during the year, while a new cell of equivalent size was excavated. The new cell is expected to last at least 12 months.

Significant modifications to surface drainage around milling operations have been initiated to divert clean water from surface operations and reduce discharge of solids from the site. This work includes installation of a large drain that diverts water from the store and mill area directly into Haulage Creek.

### *Capital expenditure*

A total of \$5.7 million was spent on capital expenditure. CMT is building a new decline bypass and at the end of the year had completed 610 metres of the total 1180 metres. A total of 737 metres of decline development was carried out during 2000/2001.

Various projects were carried out in the processing plant to increase the plant throughput and efficiency.

Major capital expenditure for the year comprised:

Decline bypass	2,005,000
Mine development	1,892,580
Tailings dam	556,540
Prince Lyell delineation underground drilling	231,360
Concentrator projects	201,610
Underground fuel station	166,990
Symon crusher 5½"	164,520
Escapeway 1640 to 1590	149,290
Quaternary crusher	79,260
11 000 volt power reticulation	41,880
Thickener overflow pumps	38,630
Ventilation infrastructure	29,640
Refuge chamber	27,860
1615 Pump Station stage 1 & 2	19,750
Escapeway 1590 to 1565	18,070
Other	78,280
<b>Total</b>	<b>5,701,260</b>

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

Production at the Henty mine on Tasmania's West Coast continues to increase, with 206 933 tonnes of ore and 62 965 tonnes of waste being hoisted in the past year. Mine development comprised 1518 metres of capital and 172 metres of operating development.

*Milling*

Mill throughput was 196 855 tonnes at a head grade of 15.06 grams/tonne gold. Metal recovery was 96.6% with 92,048 ounces of gold and 31,605 ounces of silver being recovered. Gold poured totalled 91,158 ounces.

*Employment*

The operation employed 197 people of which 104 were contractors.

*Ore reserves*

Proven reserve	90 000 tonnes @ 12.7 g/t Au
Probable reserve	209 000 tonnes @ 12.8 g/t Au
Measured + indicated resource	345 000 tonnes @ 13.5 g/t Au
Inferred resource	1 401 000 tonnes @ 6.8 g/t Au

*Capital expenditure*

Capital expenditure totalled \$5.319 million. Two ventilation rises were commenced at Mt Julia and additional Elphinstone loaders were purchased. First pass exploration drilling was completed at Mt Julia as part of a total of \$5.641 million spent on exploration.

**Beaconsfield Mine Joint  
Venture — Tasmania mine**

Production of ore from the Tasmania mine at Beaconsfield totalled 193 000 tonnes with a further 111 421 tonnes of waste being mined. Gold production was 2.25 tonnes of bullion with 320 kg of silver also being produced.

*Employment*

Mining, processing and administration employed 133 people including ten contractors. Intermittent contract labour employed approximately ten people for services such as ore haulage, assay laboratory and security.

*Reserves and resources*

At 30 June the total reserves and resources were estimated as:

Proven reserve	183 000 tonnes @ 16.5 g/t Au (97,000 ounces contained gold)
Probable reserve	790 000 tonnes @ 16.8 g/t Au (427,000 ounces contained gold)
<b>Total reserve</b>	<b>973 000 tonnes @ 16.7 g/t Au (524,000 ounces contained gold)</b>
Measured resource	134 000 tonnes @ 23.7 g/t Au (102,000 ounces contained gold)
Indicated resource	808 000 tonnes @ 18.0 g/t Au (468,000 ounces contained gold)
Inferred resource	632 000 tonnes @ 12.9 g/t Au (262,000 ounces contained gold)
<b>Total resource</b>	<b>1 574 000 tonnes @ 16.4 g/t Au (832,000 ounces contained gold)</b>

*Major projects and capital expenditure*

Capital expenditure of \$3.7 million was mainly spent in the following programs:

- Decline development continued and reached the 680 metres level by the end of June, with development continuing;
- Installation of the next stage of mine de-watering from boreholes drilled on the 655 metre level;
- Completion of the second lift of the tailings dam;
- Installation of pedestal bearings on four of the six reactors of the bacterial oxidation plant in the concentrator to improve the mechanical robustness;
- Thickeners and blowers on the bacterial oxidation circuit were upgraded.

*Rehabilitation and environmental initiatives*

Rehabilitation has taken place on land disturbed during construction. The pipeline corridor between the mine and the concentrator, and on several batters around the concentrator, was revegetated. A second lift was constructed on the tailings dam to ensure containment of tailings. Preparations have been made to seal the remaining high traffic roads around the concentrator.

*Financial developments*

Allstate Explorations NL was placed in Voluntary Administration on 8 June 2001, with Beaconsfield Gold NL being placed in Voluntary Receivership a fortnight later. The mine continued trading normally and it is anticipated that it will continue to operate during the interim period while a buyer is being sought for the entire project. All exploration work has been deferred but it is hoped that exploration will recommence in 2002.

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

Ore mined at Renison totalled 701 001 tonnes at an average grade of 1.83% Sn. Delays in bringing the Huon open stopes into production caused a production shortfall but the stopes are now in production and it is anticipated that tonnes mined will increase in 2001/2002. Grade increased marginally as mining continued to focus on the high-grade Rendeep orebodies.

The increase in operational development to 917.9 metres over the current year reflects the development required to bring the Huon open stopes into production. The capital development of 741.6 metres was principally utilised in establishing hangingwall drill drives for the in-mine exploration programs.

*Milling*

Mill throughput declined from 717 346 tonnes in 1999/2000 to 696 451 tonnes in the current year, although feed grade improved from 1.77% Sn to 1.79% Sn. Tin recovery was maintained at 72%, resulting in the production of 8977 tonnes of tin concentrate at 61% Sn.

Sales of tin concentrate totalled 8715 tonnes to traditional Malaysian and Thai buyers. The decline in sales from the previous year was partly due to the timing of end of year shipments.

*Employment*

Renison directly employed 63 people at the end of June 2001. There were 149 employees until May when the company let the bulk of its operations out to contract in order to meet the challenge of a declining tin price. Renison continues to provide jobs in the area through its contractors.

*Resources*

Published resources at 1 July 2001 are as follows:

Measured Resource	2.2 Mt @ 1.96% Sn
Indicated Resource	0.8 Mt @ 1.36% Sn
Tailings Dam Indicated Resource	16.8 Mt @ 0.42% Sn
Inferred Resource	2.4 Mt @ 1.86% Sn

Reserves converted from Resources:

Proved Reserve	1.5 Mt @ 1.72% Sn
Probable Reserve	0.5 Mt @ 1.67% Sn

### *Exploration*

Exploration for extensions to the Renison orebody continued during the year. To date the in-mine exploration program has focussed on testing deep fault and stratabound targets located over a strike length in excess of 2000 metres along the Federal–Bassett Fault. During the year diamond drilling was carried out primarily in three areas, Deep Federal, Area 4 and South Bassett. The South Bassett exploration target was drilled from surface. Results from all areas drilled so far continue to be encouraging. Capital expenditure on this project totalled \$0.8 million for the 2000/2001 financial year.

### *Capital expenditure*

Major items of capital expenditure included:

- \$1.4 million to provide hangingwall drill drives for the continued drilling of the Area 4 and Deep Federal exploration targets;
- \$2.7 million on the mine decline and lateral development to give access to the Huon and Lower Federal orebodies;
- \$0.64 million on a two metre upstream lift on C tailings dam;
- \$0.4 million on miscellaneous items of plant and infrastructure;
- \$0.3 million on metallurgical research.

### *Metallurgical research*

A total of \$0.3 million was spent on pre-feasibility studies to improve tin recovery process from the tailings dams and the development of a process flowsheet which combines the tailings recovery work with processing plant improvements and downstream processing.

*Tailings:* In conjunction with the JK Research Centre in Queensland, an important advance was made during the year on tin recovery from the tailings dam. Fine grinding to –75 micron and gravity concentration achieved recovery of 51% to a grade of 56% tin. This is essentially similar to that currently operational at Renison Bell.

*Leaching:* A test to extract tin from a roasted concentrate using sulphuric acid as a leaching agent and electrowinning tin metal using EMEW cell technology has been completed at Electrometals with spectacular success. Tin extraction was approximately 83%. A tin metal powder was produced containing 98% tin.

*Process flow sheet:* A process flow sheet has been developed for the Renison Downstream Processing project, incorporating all the information gained from the tin recovery and downstream processing test work. Tailings can be recirculated into a new enhanced gravity circuit to form a low-grade concentrate with potential further treatment by tin fuming or roasting/electrowinning. The calculated improvement to the existing plant recoveries is 13%.

### *Rehabilitation and environmental management*

Environmental management continued in accordance with the site Environmental Management Plan. A revision was to be submitted to Government in July 2001.

Work continued on rehabilitation of A and B tailings dams. The primary rehabilitation objective is to reduce oxidation of sulphides by constructing wetlands on the dam surface wherever possible. In areas where beaches are required for geotechnical stability, geochemical covers will be used for oxidation control. The first stage of rehabilitation, the construction of a two metre upstream lift around A and B Dams with strategically placed ‘fingers’ for wetland establishment, has been completed. Placement of tailings within A and B dams to form the base of the wetland cover is continuing.

## Spectrum Resources (Aust.) Pty Ltd — Anchor Mine

This company holds a mining lease over the Anchor mine at Lottah. The mine plant at Anchor was commissioned in January 1995 but operations were suspended in December 1996 in response to grade problems and a weak tin price, and the mine was placed on care and maintenance.

The mine has now been formally closed and final rehabilitation work has been carried out during the year. This has included the sealing of underground workings, the dismantling of the concentrator and transport from site, and the disposal of rubbish. The tailings dam wall has been stabilised and re-contoured and disturbed areas were seeded and fertilised.

## IRON ORE

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

Production of iron ore pellets from ore mined at Savage River totalled 2 027 324 tonnes, with a further 38 300 tonnes of iron concentrate being sold. Waste mined totalled 6 105 024 bank cubic metres.

#### *Ore reserves*

Diluted recoverable reserves of magnetite at 30 June 2001 comprised:

Proven reserves	49 700 000 tonnes @ 51.9% DTR
Probable reserves	39 900 000 tonnes @.51.7% DTR
<b>Total</b>	<b>90 000 000 tonnes @ 51.8% DTR</b>

Ore resources comprised:

Measured	66 700 000 tonnes @ 52.9% DTR
Indicated	66 500 000 tonnes @ 51.7% DTR
Inferred	71 900 000 tonnes @ 51.9% DTR
<b>Total</b>	<b>205 000 000 tonnes @ 52.2% DTR</b>

#### *Employees*

A total of 459 people were employed in the operations. These comprise 202 people at the Port Latta pelletising plant, including 147 contractors, and 238 employed at the mine site at Savage River, including 87 contractors. Nineteen people are employed in administration at Burnie.

#### *Rehabilitation and environmental management*

Contract weed management continued within the former Savage River township on behalf of the Department of Primary Industries, Water and Environment. This was restricted to weed mapping to determine efficacy of control and determine future control needs.

Mine waste management is central to operations to control acid generation. In situ classification and segregation of waste rock from pits has continued. Dumping of potentially acid-producing material occurred in clay-lined waste rock cells above the Broderick Creek flow-through structure. This included waste from Centre Pit West and North Pit. South West Dump was covered with clay and compacted. Seeding with a sterilised rye grass was carried out to form an organic bed for future native seed regeneration. Further seeding and hydro-mulching is planned for 2002.

Revegetation of land to the west of the pellet plant at Port Latta continues with weed management replanting. ABM has committed to a continuing Coastcare program from Hellyer Beach to Brickmakers Bay for the next twelve months.

#### *Capital expenditure*

Capital expenditure on major projects totalled \$18.67 million. Major projects included mining equipment purchases (\$5.2 million), southern anomaly crusher development (\$3.5 million), substation refurbishment (\$0.5 million) and control systems (\$0.8 million).

## Industrial minerals

### LIMESTONE AND DOLOMITE

#### Beams Bros Pty Ltd

Production from quarries at Flowery Gully and Cressy totalled 150 000 tonnes. This included 85 000 tonnes of agricultural limestone and dolomite, 38 000 tonnes of dolomite, and 15 200 tonnes of material for limestone flux. Approximately 1400 cubic metres of gravel were also produced.

At Cressy overburden has been used for landfill cover and for road works. At Flowerdale clay is stockpiled for rehabilitation, dam repairs and landfill.

Twenty-five people were employed including staff in administration and transport. Plant upgrading included installing a larger capacity crusher and removing two smaller crushers.

Environmental works included planning for revegetation of the hill crest near the roadway at Flowerdale, development of the water storage, and dust control measures.

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

Production from the Smithton quarry comprised 38 000 tonnes of agricultural dolomite and 5000 tonnes of screened rock. An additional 5000 tonnes of concrete were sold. Eleven people are employed in the operations.

#### David Mitchell – Tasmania

##### *Production*

Production from the Mole Creek quarry totalled 112 000 tonnes of limestone of which 8800 tonnes was crushed rock and 1500 tonnes was screened rock. The remainder was agricultural limestone and calciner feed. Overburden moved to stockpile totalled 402 000 tonnes.

##### *Employment*

A total of 23 full-time and five part-time employees were employed in operating the quarry and lime plant and in sales and management.

##### *Reserves*

An evaluation was carried out on reserves of low and medium quality limestone to determine its suitability for use in the kiln. Trials were successful on medium quality stone and this material is being processed. Kiln trials were not successful on low quality stone, but investigations continue to determine its suitability as agricultural limestone. These trials have improved resources and waste handling.

Reserves of 1.4 million tonnes of high quality and 1.3 million tonnes of medium quality limestone have been estimated, with potential for additional reserves in the lower levels of the quarry.

##### *Major projects and capital expenditure*

Work is continuing to ensure the long-term viability of the operation. This includes increasing agricultural limestone production, gas conversion of the kiln, upgrading electrical equipment, and replacing drilling equipment and buildings. A new dump truck was purchased for \$250,000.

### SILICA FLOUR

#### Index Mineral Processors

Silica sand from the Cominex mine at Corinna is transported to Burnie for treatment. Production for the year comprised 10 600 tonnes of 20/250 product and 3500 tonnes of 35/75 product. The operations employed twelve people.

There were two major projects undertaken. A new sand storage shed was built at the Heybridge site and an upflow classifier was installed in the plant.

A revision of the environmental management plan has been submitted to the Department of Primary Industries, Water and Environment for consideration.

## CONSTRUCTION MATERIALS

### Boral Construction Materials

Total production for the year was 712 000 tonnes of which 48% was road making material. Overburden removed totalled 15 000 tonnes, principally at the Launceston and Flowery Gully quarries.

A total of 20 people were employed in operations, including three administrative staff. Seven full-time contractors were also employed.

On-going rehabilitation of worked out areas occurred at the Launceston quarry and Mt Nassau limestone quarry.

### Brambles Quarries Tasmania

This company operates quarries at Birralee, Ridgley, Pipers River, Talisker and Western Junction in northern Tasmania. Total production for the year was 355 000 tonnes comprising:

Road construction material base and sub base	115 000 tonnes
Road surface finishing materials, aggregate and dust	46 000 tonnes
Miscellaneous fill for domestic construction	123 000 tonnes
Aggregates for concrete and brick production	54 000 tonnes
Ballast for rail and drainage	5 000 tonnes
Dust for agricultural use	5 000 tonnes
Specialised rock for drainage, retaining walls and decorative use	7 000 tonnes

A total of 12 000 cubic metres of overburden was stripped to expose suitable source rock.

#### *Employment*

The operations employed thirteen people including administration, supervisors, and contractors. All employees were offered the opportunity to be evaluated to attain certification to Level 3 Extractive Industries. They are also being trained in MARCSTA general contractor safety induction.

#### *Rehabilitation/environment*

Water sprays were updated to reduce and control dust. The pre-coating of metals ceased in the north to reduce the risk of contamination spills. Where practical overburden stripped has been used for acoustic bunds on the perimeter of quarries.

#### *Developments*

A washing screening plant was installed at the Western Junction quarry, at a cost of \$100,000, for final working of aggregates.

### Caroline Quarries

Production from the Railton quarry was 18 230 tonnes of silica sand, with a further 850 tonnes of road gravel and sand. The operation employed four people.

Environmental work included enlarging settling ponds, and progressive rehabilitation of part of the quarry.

### Duggans Pty Ltd

Production from the Cradoc quarry was 47 000 tonnes of road-making material and 17 000 tonnes of construction material. Up to seven people, including contractors, were employed. Rehabilitation work included the expenditure of \$1500 on tree planting.

### **Hobart Blue Metal Industries**

Production for the year comprised 227 900 tonnes of crushed rock, 18 400 tonnes of gravel and 6000 tonnes of sand. There were 18 employees and one contractor engaged in the operations.

Minimal capital expenditure occurred, with only minor upgrading of the plant being undertaken. It is planned to construct a new access road to the main bench level which will reduce cartage times to the primary crusher.

Rehabilitation work at Clarks Sand, Huonville, and at the Leslie Vale quarry continued during the year.

### **Island Resources**

Total production from the Scottsdale operation was 74 000 tonnes. The main products were 16 000 tonnes of concrete sand, 15 000 tonnes of foundry sand and 18 000 tonnes of road gravel. Waste material is approximately 4% of material mined. Four people are employed in the operation.

Capital expenditure of around \$37,000 included the purchase of a 22 tonne excavator and new welding equipment. Upgrading the washing plant is under consideration.

Rehabilitation work is ongoing, with further plantings of *Eucalyptus rodwayi* seedlings.

### **Pioneer Construction Materials Hobart quarry**

Operations at the Flagstaff Gully quarry employed eleven people, including a contract driller.

Overburden stripping of the highest bench in the quarry, 260 metre RL, was completed and the material was stored for future rehabilitation. Rehabilitation has commenced with the planting of 270 trees, one kilogram of native seeds and 1000 grasses on the 260 and 245 metre RL benches. Spray bars were fitted to transfer points in the crushing circuit.

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

This company conducts a dry screening of dune sand operation on the site of the Males sand pit at South Arm. The permit is held by the property owner, who also undertakes stripping and rehabilitation. Three people are employed in the operation.

Production for the year comprised 54 960 tonnes of asphalt and concrete (screened) sand and 330 tonnes of filling and bedding (general) sand. All material stripped is used in rehabilitation.

Investigations continued over resources held on several exploration and retention licences.

### **Stornoway Quarries Pty Ltd**

This company operates quarries at Frankford, Raeburn, Hunterston, Birralee and Misery Hill in northern Tasmania. Production for the year totalled 187 000 tonnes with sales of 278 000 tonnes. Five people were employed in the operations.

Bituminous sealing of the four kilometre long access road into the Frankford quarry was completed. An automatic sprinkler system was also installed outside the only residential house on the access road. This system is activated by a sensor, and is designed to spray water and suppress accumulated dust blowing off the wheels of trucks.

The company completed a contract to Leighton Contractors to supply and place 300 000 tonnes of pavement material from Frankford for the Bass Highway Westbury/Hagley Bypass.

## Fuel Minerals

### Cornwall Coal Company NL *Duncan Colliery*

Following closure in 1995 and a period of care and maintenance, production re-commenced with a total output for the year of 193 401 tonnes. Initial production was by development of a new section followed by pillar extraction of part of that section during the last five months of the year. Successful extraction was achieved under a massive dolerite structure by leaving pillars of coal of a sufficient size to support the overlying strata. Regular monitoring of conditions will take place as the extracted area increases in size.

#### *Blackwood Colliery No. 2*

Pillar extraction continued and was modified in July as the workings approached the outcrop to maintain the integrity of the operation. The mine completed production in August and was sealed during September. Regular monitoring of atmospheric conditions behind the seals was conducted for the rest of the year, with the atmosphere behind the seals became inert due to lack of oxygen within two weeks of sealing. The sampling indicates no occurrence of any spontaneous combustion event. A total of 51 030 tonnes of coal was extracted during the year.

#### *Blackwood Colliery No. 3*

Pillar extraction within the mine commenced in August and continued for the rest of the year. In January the New South Wales guidelines for pillar extraction were adopted in their entirety for managing the extraction system. A total of 173 382 tonnes of coal was extracted during the year.

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

Production from Huntsman No. 2 re-commenced in January to maintain customer supplies. The open cut is operated by contract, with a total of 48 372 tonnes being mined during the year.

#### *Cullenswood open cut*

No mining took place during the year. It is expected that operations will commence during the first half of next year.

#### *Production*

Production for 2000/2001 totalled 466 185 tonnes. This coal was sourced from:

Duncan	193 401 tonnes
Blackwood No. 3	173 382 tonnes
Blackwood No. 2	51 030 tonnes
Huntsman No. 2	48 372 tonnes

An additional 4394 tonnes of coal were purchased.

Washery throughput of raw coal totalled 479 347 tonnes to produce 349 369 tonnes of saleable coal at a washery yield of 72.88%. Coal sales totalled 381 701 tonnes. Approximate washery yields of source coals were:

Blackwood	73.01%
Huntsman	81.16%
TEMCO	95.00%
Duncan	65.32%

Approximately 130 038 tonnes of reject material was deposited at the Duncan reject dump.

#### *Exploration*

Surface drilling of four holes occurred on the Blackwood site to locate suitable access to the Fenton Seam. Two further holes were drilled on the Cullenswood site to augment information about the reserve.

### *Capital expenditure*

A total of \$1.8 million was expended on plant and equipment during the year. Of this \$1.7 million was used to purchase a new 14CM15 Joy Continuous Miner which commenced production in the Duncan mine in March.

### *Rehabilitation*

Existing sown areas at Huntsman No. 2 open cut were re-seeded in areas where the initial plantings were less than acceptable.

The first two dams at the Duncan reject site were covered and test plots for re-seeding were established to determine the benefits, if any, of using paper waste as a soil additive to increase organic content and moisture retention prior to planting.

The fines stockpile at the washing plant has been reduced to 2000 tonnes.

### *Employment*

A total of 70 people were employed including 49 working underground and 13 in processing. An additional twelve contractors were employed in coal cartage and four contractors in the open cut.

### *Safety*

Four lost time injuries occurred, three at Blackwood No. 3 and one at Duncan. Regrettably a fatal accident occurred at Blackwood No. 3. The washery and surface works achieved nine years with no lost time injury in May 2001.

### *Other*

Export coal prices for thermal power increased significantly during the year, however there has been no increase in Cornwall Coal prices.

It is anticipated that a new mine, to be called Blackwood No. 4, will be started during the coming year. This mine will produce coal from the lower Fenton Seam of the Mt Nicholas range.

## **Kimbolton Coal Company Pty Ltd**

No coal was mined during the year although 2000 tonnes were sold to the Royal Derwent Hospital to complete the previous contract. An agreement has been reached with Australian Paper Ltd at Burnie to conduct further test burns.

There is an estimated resource of 1.8 million tonnes of coal at the Hamilton site. Care and maintenance of the site and existing rehabilitation continued.

## Mineral processing operations

### Australian Cement Holdings Pty Ltd

Production at the cement factory at Railton totalled 1.097 million tonnes of clinker from which 1.126 million tonnes of cement was produced. From this production a total of 1.013 million tonnes was shipped to Victoria and NSW via the bulk cement carrier MV *Goliath* through the Port of Devonport. The remaining production was sold locally as bulk product for the Tasmanian market (77 000 tonnes), or bagged for both the mainland and Tasmanian markets (32 000 tonnes).

Raw materials consumption comprised 1.65 million tonnes of limestone and 71 600 tonnes of clay extracted from the Company's quarry. In addition, 12 200 tonnes of magnetite, 20 000 tonnes of silica, 52 900 tonnes of gypsum and 165 200 tonnes of coal were purchased to achieve the yearly cement production.

#### *Employment*

A total of 138 people, including two contractors and four part-time employees, are involved with the mine and plant operations. A further 22 employees are involved with Group Administration and Information Services and local marketing functions, resulting in a total of 160 employees on site.

#### *Capital expenditure*

A total of \$3.3 million of capital expenditure was approved during the year. The majority of this was spent on smaller environmental projects including paving and upgrading of dust collection equipment. The largest project for the year was the approval of \$0.5 million for an upgrade of the rail crossing in the mine. A new electric drive was also installed on one of the two kiln exhaust fans during the annual maintenance period at a cost of \$0.7 million.

#### *Development and rehabilitation*

A total of 175 000 banked cubic metres of overburden was removed as part of the on-going development of the mine site.

Rehabilitation expenditure of \$163,000 for the year was for on-going planting of the overburden dumps and some minor repair and drainage work to existing areas at the mine site.

### Comalco Aluminium (Bell Bay) Limited

The Comalco Bell Bay smelter produced 160 869 tonnes of aluminium in the 2000/2001 year.

#### *Capital expenditure*

Capital expenditure to June 2001 totalled \$21.7 million. Major items of expenditure included:

Cell tending machine	\$7.7	in progress
Green carbon fume scrubbing	\$4.9	completed
Fume scrubbing facility	\$2.4	in progress
Anode transport vehicles	\$1.0	in progress

#### *Environmental management initiatives*

In January a scrubber was commissioned on the green carbon plant at a cost of \$5.8 million. The project delivered world's best technology for the capture and return of coal tar pitch volatiles. The scrubber, combined with new hood and ducting, has significantly reduced emissions into the green carbon work environment and reduced personal exposure in most affected areas by over 90%.

Comalco is currently investing \$12.7 million for the installation of a fume scrubbing facility for the carbon baking furnace. The state-of-the art technology will reduce the amount of fluoride emitted to the environment by 57 tonnes per year, a 99% improvement. It will also achieve a 98% improvement on particulate emissions and result in a clean stack. The scrubber is due to be commissioned in 2002 and will

operate like a conventional potline dry scrubber, using two tonnes per hour of alumina to remove the hydrocarbons and fluorides.

Rehabilitation of an historic landfill along the River Tamar foreshore is being carried out as part of the company's Waste and Environmental Management Program. The landfill was established in the 1950's and was used to dispose of a range of smelter waste materials. Work commenced during 2001 and stage one of the project is nearing completion. The total project is expected to take three years to complete at a cost of \$4.5 million. Remediation has included excavation and removal of fill material, regrading slopes to minimise future erosion and landslip potential, construction of a surface drainage network, and revegetation including extensive planting of native trees and shrubs. Recycling options have been found for excavated fill material.

Other works include on-going site beautification works with many new gardens constructed during the past year, including the planting of approximately 400 additional trees along the smelter's northern boundary.

### *Employment*

The smelter employed 735 people in June 2001, of which 602 are employees and 133 are contractors.

## **Impact Fertilisers Pty Ltd**

The production of single superphosphate at the Risdon plant totalled 152 903 tonnes for the year.

A total of 92 517 tonnes of single superphosphate was shipped to various mainland ports. This required 93 182 tonnes of phosphate rock to be processed, using 57 071 mono tonnes sulphuric acid (98%) from Pasminco Hobart Smelter. Phosphate rock was sourced from Nauru Island (21 025 tonnes), Israel (17 681 tonnes), Christmas Island (13 409 tonnes) and China (41 067 tonnes).

### *Major projects completed/in progress*

A plant to dry and screen matured single superphosphate was commissioned. A 45 000 tonne storage shed was constructed, and new parts of an integrated computer system were installed.

A new development was the production and sale of Premier – Dried Single Superphosphate.

### *Rehabilitation*

Continued landscaping of the Risdon site was carried out.

### *Employment*

A total of 96 people were employed in production and sales, including six contractors.

## **TEMCO**

Production from the Bell Bay plant totalled 124 568 tonnes of ferromanganese, 120 758 tonnes of silicomanganese and 168 077 tonnes of sinter. Sales for the year totalled 124 209 tonnes of ferromanganese, 113 500 tonnes of silicomanganese and 35 070 tonnes of sinter.

### *Employment*

A total of 277 people were employed in the operation in production and administration, including 13 contractors.

### *Rehabilitation*

A study to incorporate *Xanthorrhoea australia* into revegetation was continued. The use of clay overburden as subsoil for revegetation is being trialed on historically disturbed areas on the western flanks of Cabbage Tree Hill at Beaconsfield.

*Environmental control*

- Accreditation to ISO 14001 has been maintained.
- An ambient manganese soil sampling program has been completed. The results show that TEMCO has little impact in the region, with dolerite contributing similar levels of manganese to soils.
- Environmental acoustic modelling is in progress.
- Performance of the electrostatic precipitator has been improved by removing mixed raw spillage feed as part of the dioxin minimisation program.
- Fugitive fume emissions from Furnace No. 1 have been reduced as part of the furnace rebuild conducted during the year.

*Capital expenditure and major projects*

A total of \$8.277 million was spent on capital projects. This included relining of Furnace No. 1 costing \$5.5 million and computer and control upgrading costing \$0.8 million. Other capital expenditure included safety and environmental programs, cost reduction, and equipment purchase and replacement.

*Australian Mineral Industry Code for Environmental Management 2001*

TEMCO is a signatory of the mineral industry code and progress towards implementation is being addressed through continued certification to ISO 14001.

## ANNUAL REPORT

### Rehabilitation of Mining Lands Trust Fund

Mineral Resources Tasmania administers the Rehabilitation of Mining Lands Trust Fund for work on abandoned mines in Tasmania as provided in the *Mineral Resources Development Act 1995*. The Tasmanian Government agreed with the mining and quarrying industries to use a portion of mining royalties raised by the Act for this purpose.

#### Northeast tin mines

Erosion control and revegetation works were completed at the abandoned Endurance, Monarch and Star Hill mine sites near Gladstone. Earthworks at Cat Gully, which drains the Blue Lake, were undertaken to divert run off and re-contour major erosion gullies. The adjoining 'scraper' mined area and the earthworks were revegetated using a mix of pyrethrum trash, lime, fertiliser and local provenance seed.

Major repairs were necessary to erosion control gabion structures at the Monarch mine, which were damaged by flooding in the summer of 2000. Basalt boulders were used to re-establish the gabions and create suitable drop off structures.

At Star Hill the reseeded that was completed in the summer of 1998 has been very successful, with good growth from most plant species. An additional area of approximately 15 hectares was re-seeded with the same local provenance species.

#### Storys Creek anoxic limestone drain construction

Mine water discharging indirectly via groundwater is a major source of contamination to Storys Creek and the South Esk River. In other areas with acid mine drainage, anoxic limestone drains have been used to neutralise emissions, although these drains clog up with precipitates (mainly iron and aluminium) after a relatively short period. At Storys Creek a drain was constructed above the mine to neutralise the acid waters prior to contamination and therefore reduce metal dissolution. This is believed to be the first application of this kind, and results from initial sampling of the creek are encouraging.

#### Quarry rehabilitation

Maintenance seeding was carried out on gravel pits at Oakdeane Road near Scottsdale, which were revegetated during 1999/2000. Vegetation is now growing successfully and future maintenance requirements are anticipated to be low.

Six disused sand and gravel pits in the Beaconsfield district were rehabilitated. An initial survey of the area was carried out by the Australian Trust for Conservation Volunteers, with rubbish being cleared and seed collected during this period. The pits were contour ripped before soil was spread. Settling pits were provided on drainage channels. The volunteers then spread seed and fertiliser over the earthworks.

#### Safety and rubbish removal

Rubbish was removed from abandoned workings in the vicinity of the All Nations mine near Moina. An adit, open stope and shafts were then back filled. An archaeological survey was carried out and the Devonport and Burnie lapidary clubs were consulted to ensure that fossicking areas were not covered.

During a period of high rainfall the Arthur dam near Waratah flooded, threatening the road to Savage River. The spillway, which was blocked with vegetation, was cleared and deepened. The opportunity was taken to grade out some steep batters on a mullock pile at the Magnet mine. An area of tailings with

possible metal contamination was ripped and agricultural limestone was spread to neutralise the area.

Gorse was sprayed at the Queensbury mine near the Strahan to Zeehan road. Future spraying campaigns will be co-ordinated with other agencies as part of the planned West Coast Weed Strategy.

### **Acid drainage reconnaissance**

Support was provided to purchase field equipment for this survey, which is funded with a Natural Heritage Trust grant. Trust activities should benefit when statewide information is available and priorities for acid drainage remediation are agreed on.