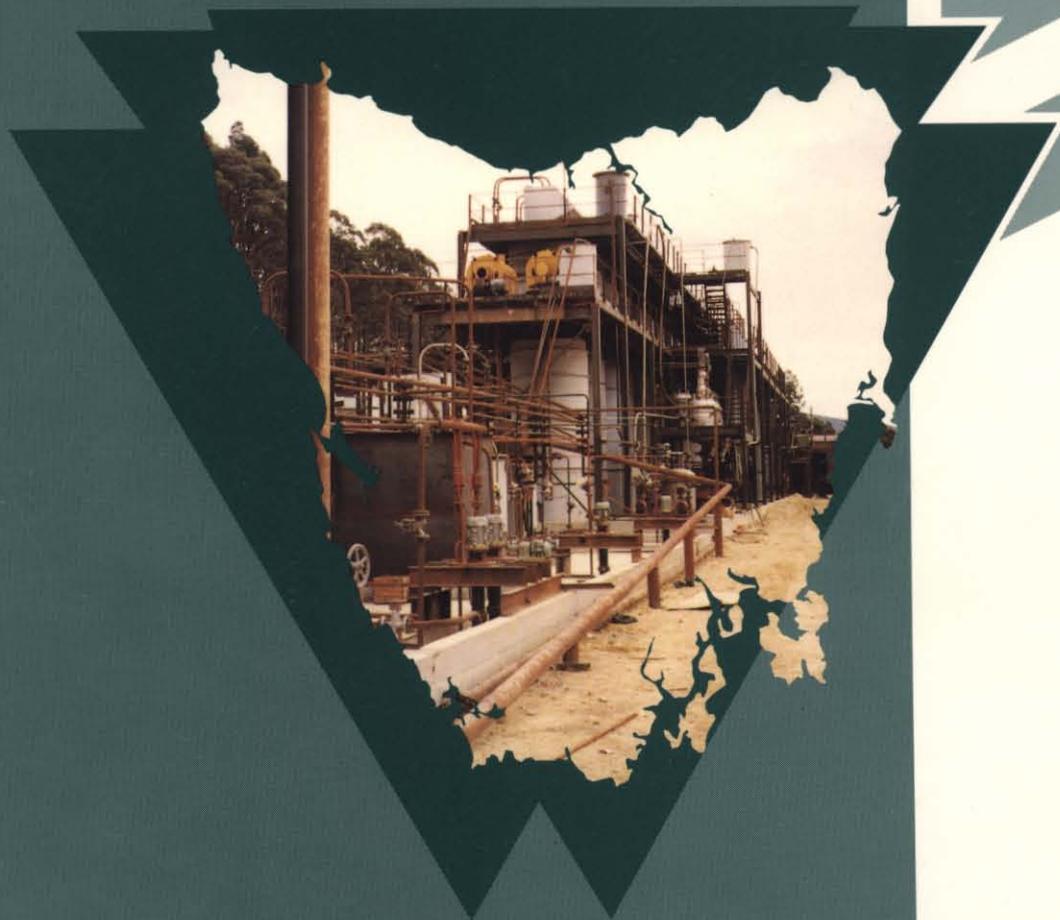


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Mineral Resources Tasmania



Annual Review 1993/94



TASMANIA
DEVELOPMENT
AND RESOURCES

709

Annual Review 1993/94



Mineral Resources Tasmania

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MISSION

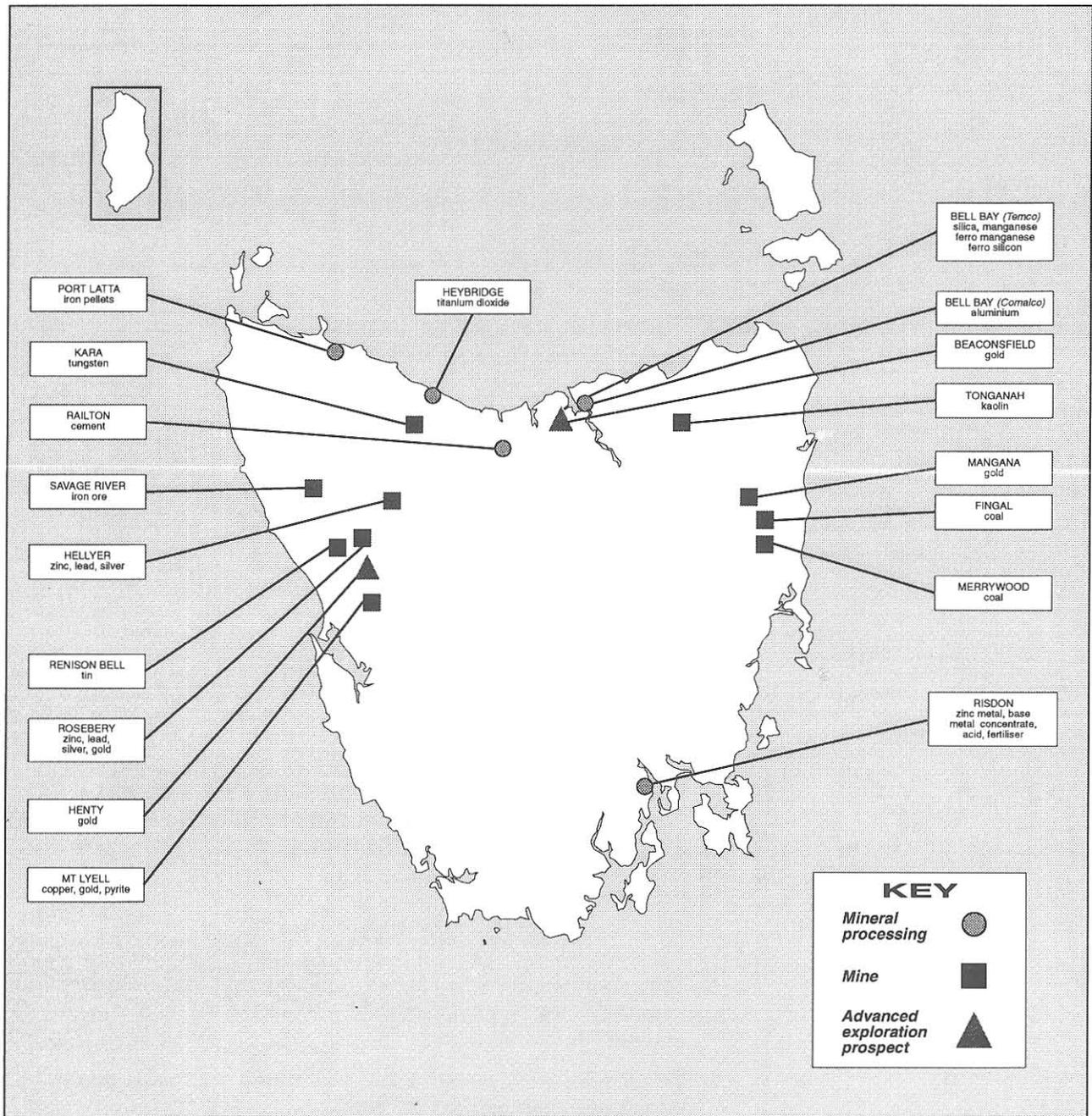
“To achieve safe, sustainable and environmentally responsible development of the State’s mineral sector and provide for geoscientific understanding in support of effective land management.”

OBJECTIVES

- To support the economic growth of Tasmania by developing and maintaining a geoscientific database of international standards.
- To promote investment in the Tasmanian mineral industry by marketing geoscientific information.
- To ensure a fair and sustainable return to the community from the mineral and petroleum industry.
- To achieve world-class standards in occupational health and safety.
- To be helpful and effective in the administration of mining and petroleum legislation.

Tasmania

Major Mining and Mineral Processing Operations



MINERAL SECTOR OVERVIEW

The 1993/94 year may well prove to have been a watershed for both the exploration, mining and mineral processing sector in the State and Mineral Resources Tasmania.

The year saw evidence of a return in commitment by mining companies to capital investment in mines and mineral processing plants, following the years of restructuring and job shedding. Access development and shaft boring operations commenced at Henty, the first capital commitment to a stand-alone gold mine in Tasmania this century. The successful restructuring of the Beaconsfield Gold Project Joint Venture preceded a stream of encouraging reef intersections and a re-commencement of dewatering of the Hart Shaft. These developments signal the strong chance of this State's second producing gold mine being established within a few years. Coupled with the investment by Riltec (Tasmania) Pty Ltd, in a tailings retreatment plant at the Golden Gate mine at Mathinna, investors must again take note of Tasmania's potential as a gold province.

Supporting this gold-based activity, encouraging drilling results at the Renison Tin mine and the Rosebery base metals operation have encouraged their owners to commit funds to mine deepening and modern infrastructure. Disappointment in the community following Renison Goldfields Consolidated Limited's confirmation of its decision to close the Mount Lyell mine after 101 years of continued operation was, in part, tempered by the commitment of Gold Mines of Australia Ltd to secure a working future for this significant resource.

In the mineral processing area, the decision of Tioxide (Australia) Pty Ltd to commit to the long-term future of its Heybridge pigment plant through the adoption of a high titanium slag feedstock not only saved this significant employment base, but provided an opportunity for future growth in Tasmania's pigment production. The year also witnessed continuing capital commitments and on-going restructuring at the Pasminco Metals-EZ smelter at Risdon, and by BHP Ltd at its TEMCO silico-manganese and ferro-manganese smelter at Bell Bay.

Investments by Comalco Ltd at the Bell Bay aluminium smelter were towards improvement in occupational health and safety and environmental performances. The long-term future of this significant Tasmanian-based enterprise remains in doubt because of long-term power supply issues.

Mineral Resources Tasmania finished the year with an establishment of fifty-four people. The restructuring has seen the emergence of a goal-oriented client-focused Division of Tasmania-Development and Resources. The highlight of the year was the success of the NETGOLD project, centred on the State's northeastern gold province. The program, which was delivered on time and under budget, was an outstanding success. The 'state of the art' data packages offered to explorers saw a resurgence in interest in this long ignored, but highly prospective, old mining area.

Active promotion of the State's mineral potential dominated the attention of the Division. Promotional teams visited Sydney, Melbourne and Perth, allowing Tasmanian geology to be taken into the corporate centres of the nation's explorers. This thrust was supported by feature articles in magazines, both national and international, and technical publications.

1994/95 will see a continuing commitment to:-

- Growth of exploration activity in Tasmania to a level of three times that of the present within the 'Decade of Growth';
- Promotion of known State resources to investors and the securing of our current mineral sector base;
- Further improvement in occupational health and safety towards zero accident rated workplaces;
- Excellence in environmental performance and to rehabilitation of damaged mining lands;

- Expansion, through funded geoscientific research, of the areas of Tasmania considered prospective for mineral discovery. The technically difficult, but exciting potential, of the Midlands and the eastern coastal areas are the prime targets for investigation.

These objectives will be achieved by full participation of the MRT staff in the strategic planning processes. The full involvement of industry in the direction of the Division's efforts will continue.

MINERAL PRODUCTION

High levels of world stocks have overhung metal markets throughout 1993/94. Despite this fact, Tasmanian mines and mineral processors maintained production at above historic levels. Of particular note was the spectacular performance of the Mount Lyell Mining and Railway Company in its last full year of production within the Renison Goldfields Consolidated Ltd (RGC) stable of companies. An all-time record of 29 000 tonnes of saleable copper was produced.

The Goliath Portland Cement Company Ltd at Railton completed the commissioning of its enlarged plant during the year. Production capacity is now above 'nameplate' production level of one million tonnes per annum.

Run of mine coal production remained reasonably static compared to previous years, despite the increase in demand from the Railton cement factory. Increases in thermal efficiencies at factories using this form of power effectively continue to cap growth in the mining of this product. The local market remains extremely competitive, which is of benefit to the consumers in this State.

Production of tin at the Renison Tin mine increased slightly as a result of improved ore grades and discoveries. The commitment to the establishment of a shaft and underground crushing facility at Renison will eventually allow this operation to surpass the record levels of metal production established earlier.

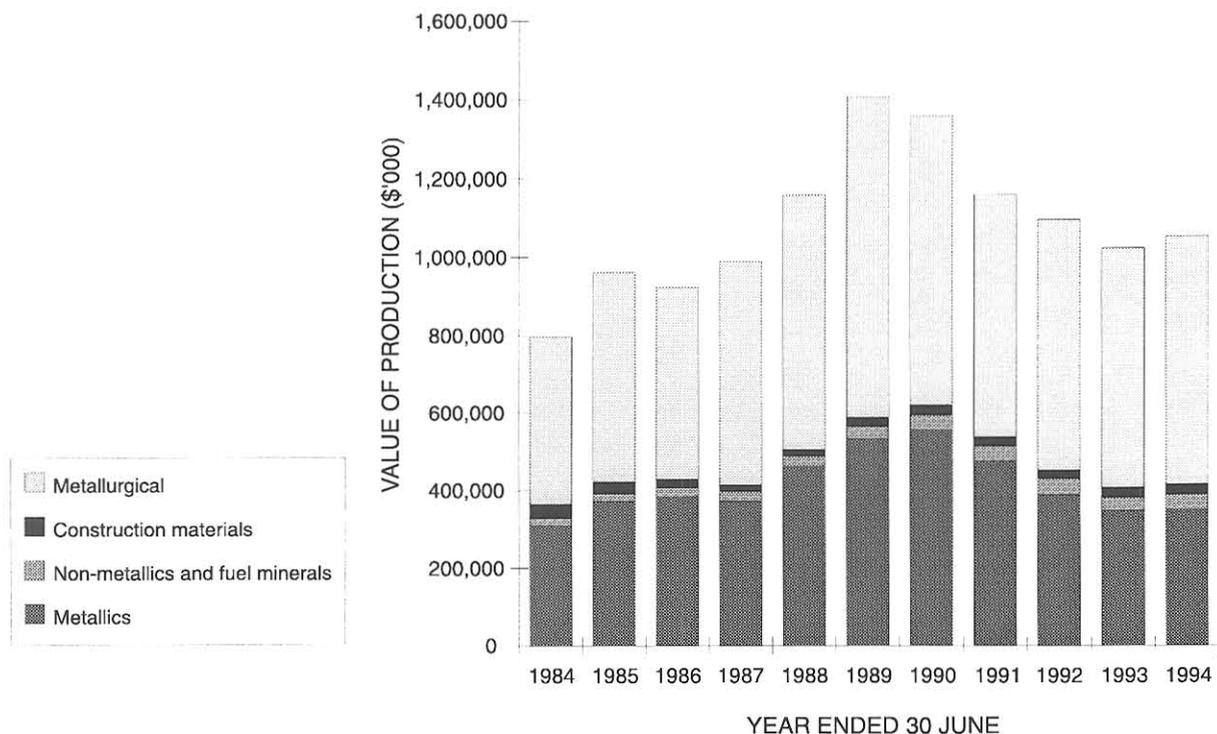
Gold and silver production remained at historic production levels. These metals, to date, have been by-products of base metal mining in Tasmania. Production rates are set to increase in 1994/95 with the commissioning of the Riltec (Tasmania) Pty Ltd tailings retreatment plant at Mathinna. From 1996/97 onwards, further increases are expected with the opening of the RGC Ltd Henty Gold mine, located in the Mount Read volcanic belt on the West Coast. This improvement will be further boosted should Allstate Exploration Ltd and its joint venture partners, Beaconsfield Gold NL and Normandy Poseidon Ltd, be successful in re-opening the old Tasmania mine at Beaconsfield. Further small increases in gold production are likely, following investigations into the re-opening of historic gold workings in the Alberton area in the State's northeast.

The value of non-metallic minerals and construction materials rose slightly. Unfortunately, the economics of establishing 'super pits' for the export of Tasmanian aggregates to world markets have not yet been established. This development remains for the future.

*Value and production
of minerals
1992/93 and 1993/94*

	1993/94		1992/93		% Change
	Tonnes	A\$'000	Tonnes	A\$'000	
Gold	1.35	-	1.4	-	-3.6
Silver	140	-	95.3	-	+46.9
Zinc	165 934	-	233 837	-	-29.0
Copper	32 822	-	28 395	-	15.6
Lead	71 752	-	66 459	-	+8.0
Tin	7 415	-	6 760	-	+9.7
Tungsten	26	-	142	-	-546.2
Iron ore pellets	1 565 882	-	1 458 909	-	+7.3
Others	199 922	-	245 083	-	-18.4
Total metallic minerals	-	350 741	-	348 169	+0.7
Non-metallics and fuel minerals	-	38 732	-	32 766	+18.2
Construction materials	-	27 088	-	26 897	+0.7
Metallurgical production from imported ores	-	639 023	-	616 908	+3.6
Value of mining and mineral processing sectors	-	1 055 584	-	1 024 740	+3.0

*Value of production
of minerals
1983/84 to 1993/94*



MINERAL EXPLORATION AND DEVELOPMENT

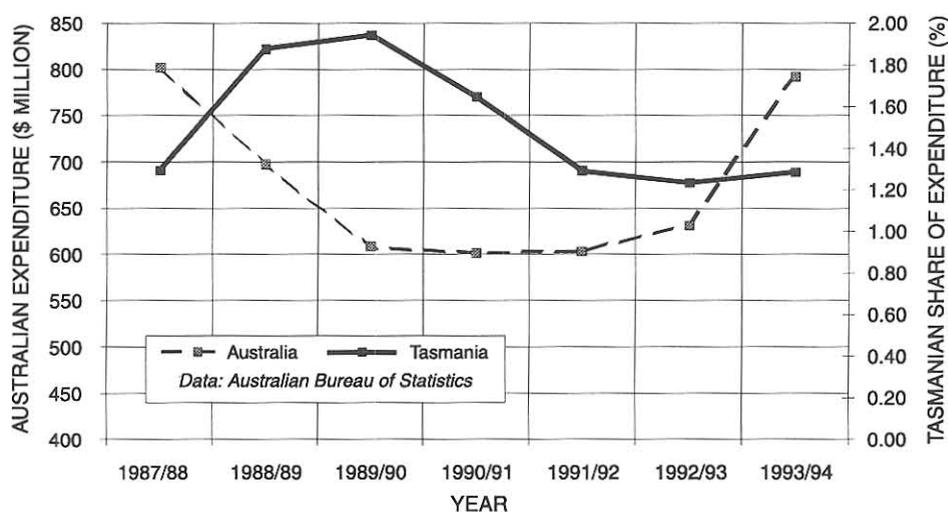
The dramatic and sustained fall in mineral exploration expenditure in Tasmania over the last ten years appears to have been reversed in 1993/94.

Australian Bureau of Statistics figures, shown in the table below, record an expenditure of \$10.2 million in 1993/94. This is an increase of 31% over the achievements of the previous two years. Market share, at 1.29%, remains relatively static.

Year	Australian Expenditure (\$ Million)	Tasmanian Expenditure (\$ Million)	Tasmania as % of Australian Expenditure
1982-83	437.9	18.6	4.25
1983-84	428.7	18.0	4.20
1984-85	437.3	17.8	4.07
1985-86	442.0	10.6	2.39
1986-87	556.8	10.9	1.96
1987-88	799.2	10.4	1.30
1988-89	697.6	13.1	1.88
1989-90	607.5	11.8	1.94
1990-91	601.7	9.9	1.65
1991-92	604.0	7.9	1.31
1992-93	631.8	7.8	1.23
1993-94	792.6	10.2	1.29

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

Total Australian exploration expenditure and Tasmanian share of expenditure 1987/88 to 1993/94



Whilst the increased interest in Tasmania suggested by these figures is heartening, the expenditure recorded is inadequate to provide for a sustainable industry through regular 'new mine' discoveries.

Over the period covered by the Government's 'Decade of Growth' strategy, Mineral Resources Tasmania must remain committed to the goal of increasing private sector exploration expenditure by a factor of three times. In simple terms, this demands cumulative increases, annually, of \$2 million. Should this target not be substantially met, the decline in mining's contribution in 'wealth generated' to Tasmania's prosperity will be confirmed.

The political foundations for a revival have been established:-

- Land access concerns have been addressed by the passing of the *Mining (Strategic Prospectivity Zones) Act 1993*.

- ❑ The 1988 'Groom/Cook Agreement' relating to full participation by Tasmania in any future World Heritage listing initiative gives added security to explorers.
- ❑ The Government remains committed to elimination of perceptions relating to sovereign risk threats in Tasmania.

These confirm that Tasmania will continue to be 'open for business'.

PROMOTION OF TASMANIAN PROSPECTIVITY

Mineral Resources Tasmania accepts that this State must demonstrate a truly competitive investment climate to attract the investment dollar against fierce competition from other Australian States and, as importantly, other nations. Towards this end, promotion will continue to rely on:–

- ❑ demonstration of genuine mineral prospectivity;
- ❑ the emergence of Tasmania as a 'born again gold province';
- ❑ high quality geoscientific data, in both digital and hard-copy format, as an aid to target selection;
- ❑ expansion of known zones of mineral wealth by funding of research and data accumulation exercises in areas of the State not presently of interest to industry; and
- ❑ funding to maintain the necessary level of geoscientific, pre-competitive data accumulation and for promotional programs overseas and interstate.

Strategic and operational planning forums will annually review progress towards the goal of sustainable growth in the State's mineral sector. Assistance and advice for industry, and from the Centre for Ore Deposits and Exploration Studies, will continue to be solicited.

Funding success, for the long-term returns associated with data gathering and geoscientific research, requires continued Government support and understanding.

REVIEW OF 1993/94

The \$600,000 NETGOLD program was the centrepiece of the Division's activity. It represented an outstanding success in that:–

- ❑ it was completed on time and within budget;
- ❑ the data sets produced were of high quality and were keenly sought by industry;
- ❑ it attracted explorers back to a prospective area of the State, ignored by explorers for over seventy years;
- ❑ thirteen out of the fourteen tenements were the subject of applications for exploration licences.

Aeromagnetic and radiometric data were also acquired over the Mount Amos area (Anomaly 13) and the Arthur Lineament, north of the Savage River mine. This work will be the subject of reports and data releases during 1994/95.

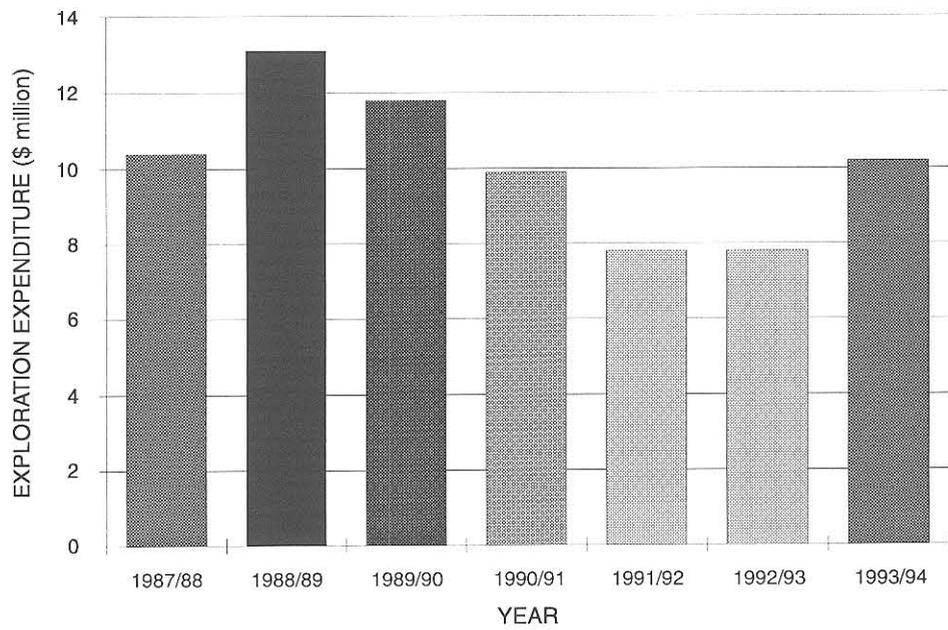
The Resource Exploration and Development Branch remains committed to completing the task of full conversion to GIS-based data storage and presentation, before regular mapping programs recommence. Goals and schedules for these tasks are defined later in the review.

The success of Government initiatives will continue to be monitored by reference to established key performance indicators. These are as follows:

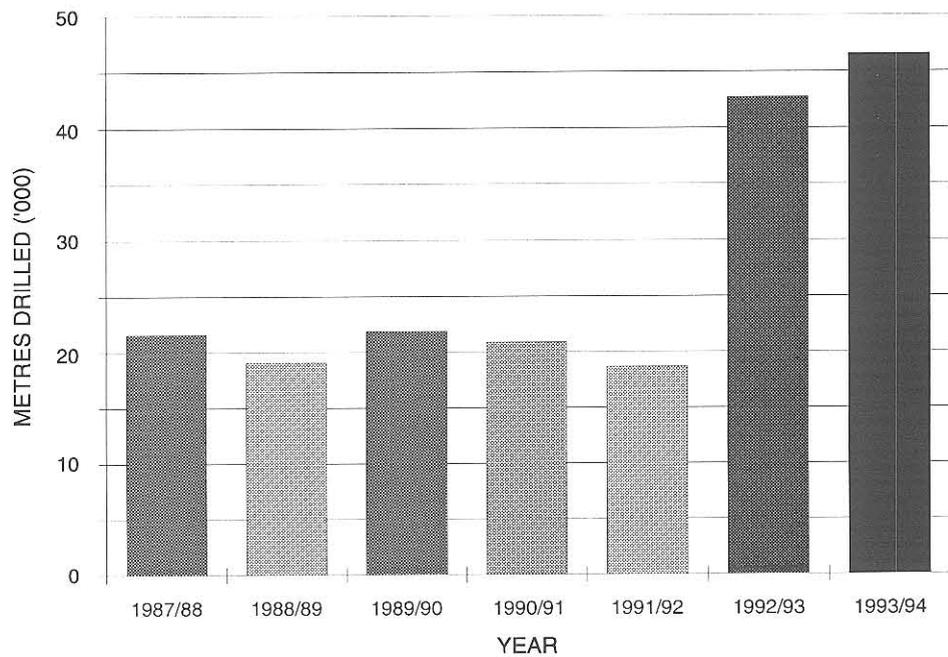
- ❑ Diamond drilling performance — 1993/94 recorded 46 580 metres, an increase of 9% over 1992/93.
- ❑ Expenditure on mineral exploration totalled \$10.2 million, 31% over 1992/93.

PERFORMANCE INDICATORS

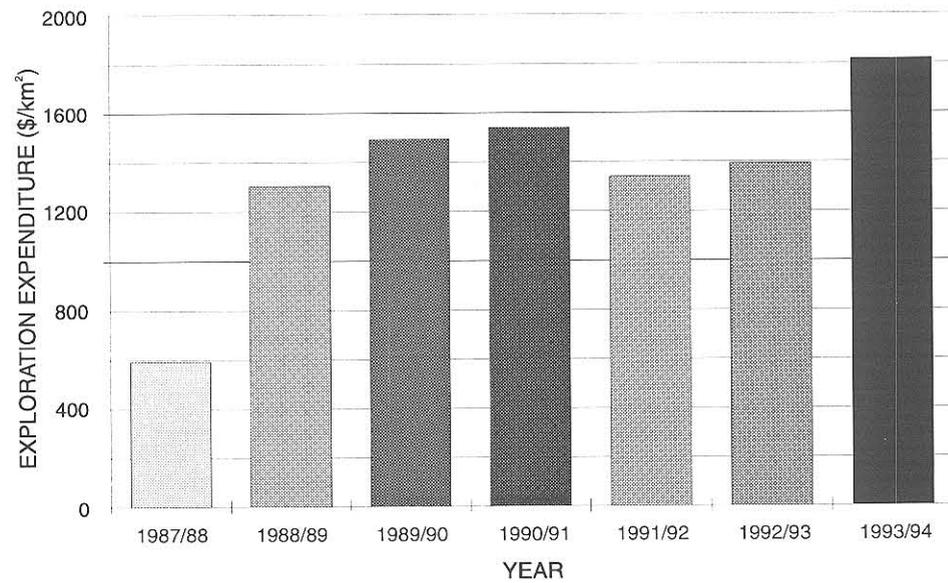
Total Tasmanian exploration expenditure 1987/88 to 1993/94 (ABS and MRT data)



Total exploration drilling 1987/88 to 1993/94 (MRT data)

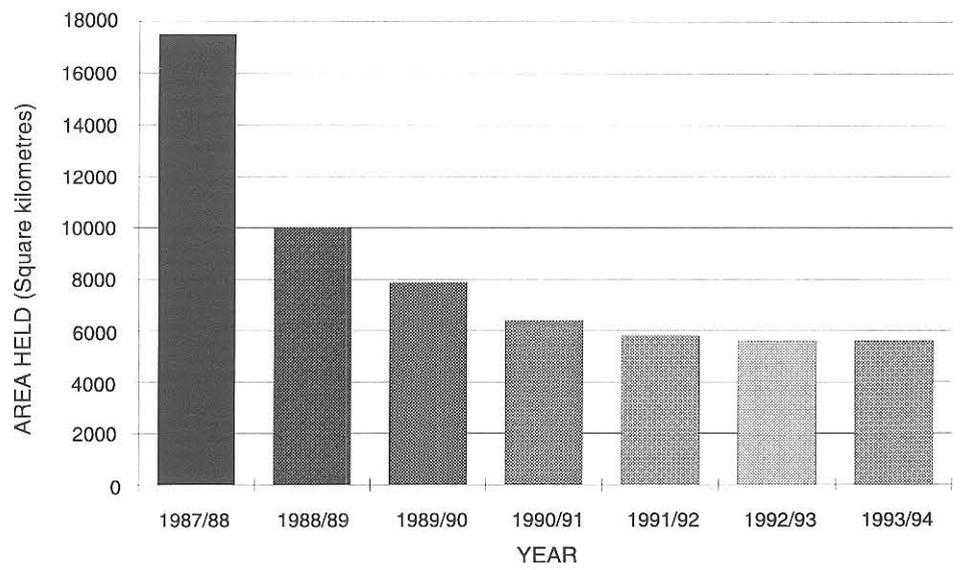


Exploration expenditure per square kilometre ground held under Exploration Licence 1987/88 to 1993/94 (ABS and MRT data)

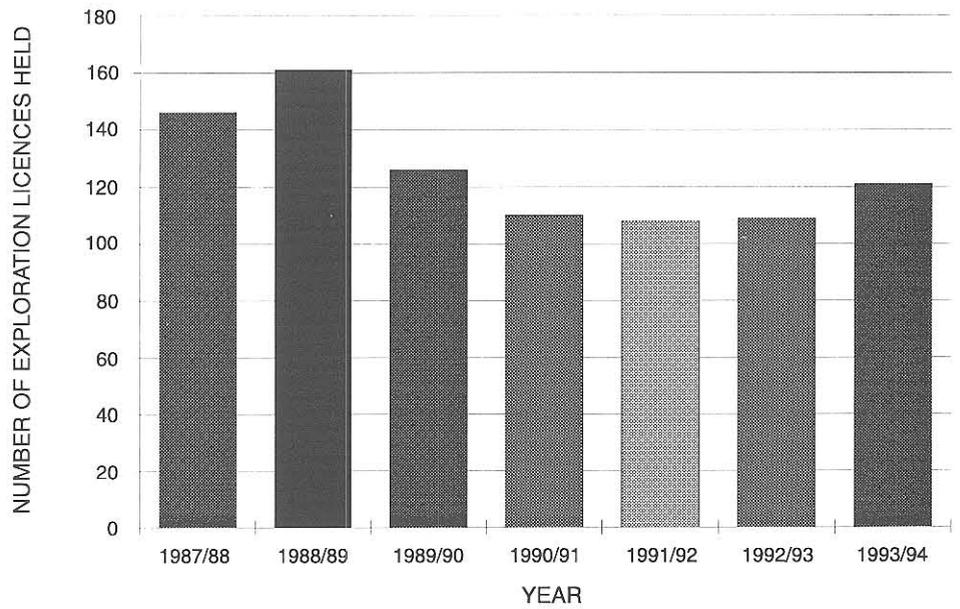


PERFORMANCE INDICATORS

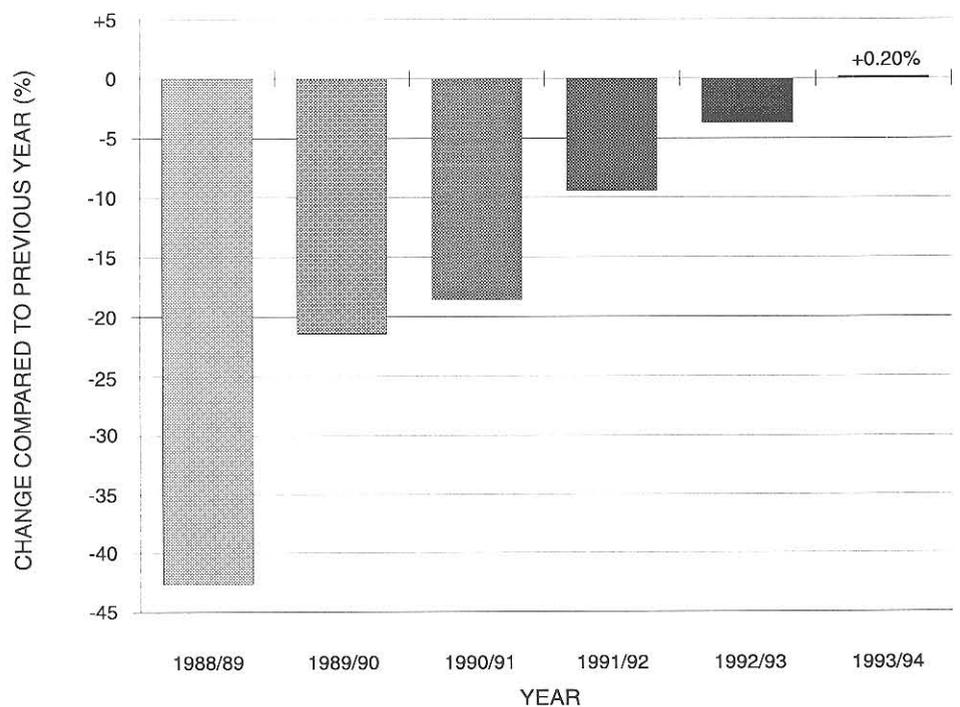
Area held under Exploration Licences 1987/88 to 1993/94



Number of Exploration Licences 1987/88 to 1993/94



Percentage change in area held under Exploration Licences compared to preceding year



Data source: Mineral Resources Tasmania

- Exploration licences held at year end totalled 125, an increase of 15% over 1992/93.
- The total area held under exploration licence totalled 8012 km² at year end, an increase of 19% on 1992/93.

Predictions for 1994/95 suggest ongoing growth in activity. Performance will continue to be subdued in dollar terms as many of the licences are new, with programs not yet progressing to the stages where heavy spending on targeted anomalies is warranted.

Mineral Resources Tasmania will continue to demand an acceptable level of performance, both in program expenditure and in environmental performance.

The Government policy of 'use it or lose it' will continue to apply.

VALUE OF THE MINING INDUSTRY

As well as the direct contribution to the Tasmanian economy through employment, the mining and mineral processing industries also contribute through taxes and charges paid to State and Local Governments.

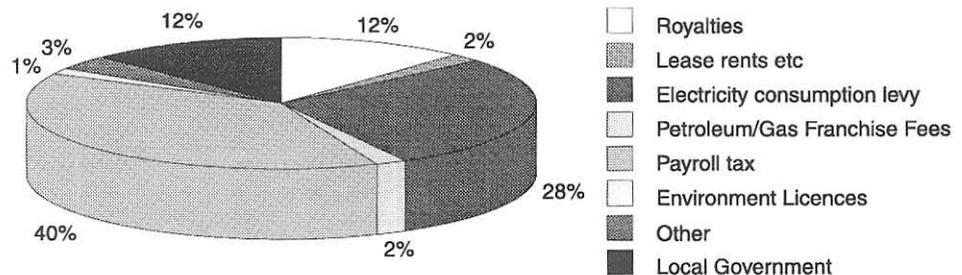
In 1993/94 these taxes and charges fell by \$6.1 million or 16%. The main components of the fall were royalties (down \$1,857,000), electricity consumption levy (down \$1,431,000) and payroll tax (down \$2,076,000).

The contribution for 1993/94 compared to the 1992/93 financial year is as follows.

	1992/93 (\$,000)	1993/94 (\$,000)
Royalties	5,795	3,938
Rents and Fees from Mineral Lands	846	628
Electricity Consumption Levy	10,499	9,068
Petroleum/Gas Franchise Fees	531	667
Vehicle Fees	210	144
Stamp Duty	266	243
Payroll Tax	14,565	12,489
Land Tax	382	371
State Debit Tax / FID	280	246
Environment Licences	661	436
Other	237	126
Total State Government	34,272	28,356
Local Government Charges	4,216	4,050
Total	38,488	32,406

Source: Tasmanian Chamber of Mines company surveys and Tasmania – Development and Resources

Distribution of taxes and charges paid by mining and mineral processing operations



METALS PRICES AND FUTURE TRENDS

Base metal prices recovered from medium-term lows reached in October 1993 to trend upwards for most of the remainder of the financial year. After an initial period of consolidation, base metals prices, with the exception of zinc, are likely thereafter to trend upwards during 1994/95.

Factors Affecting Price Movements

Stock Levels

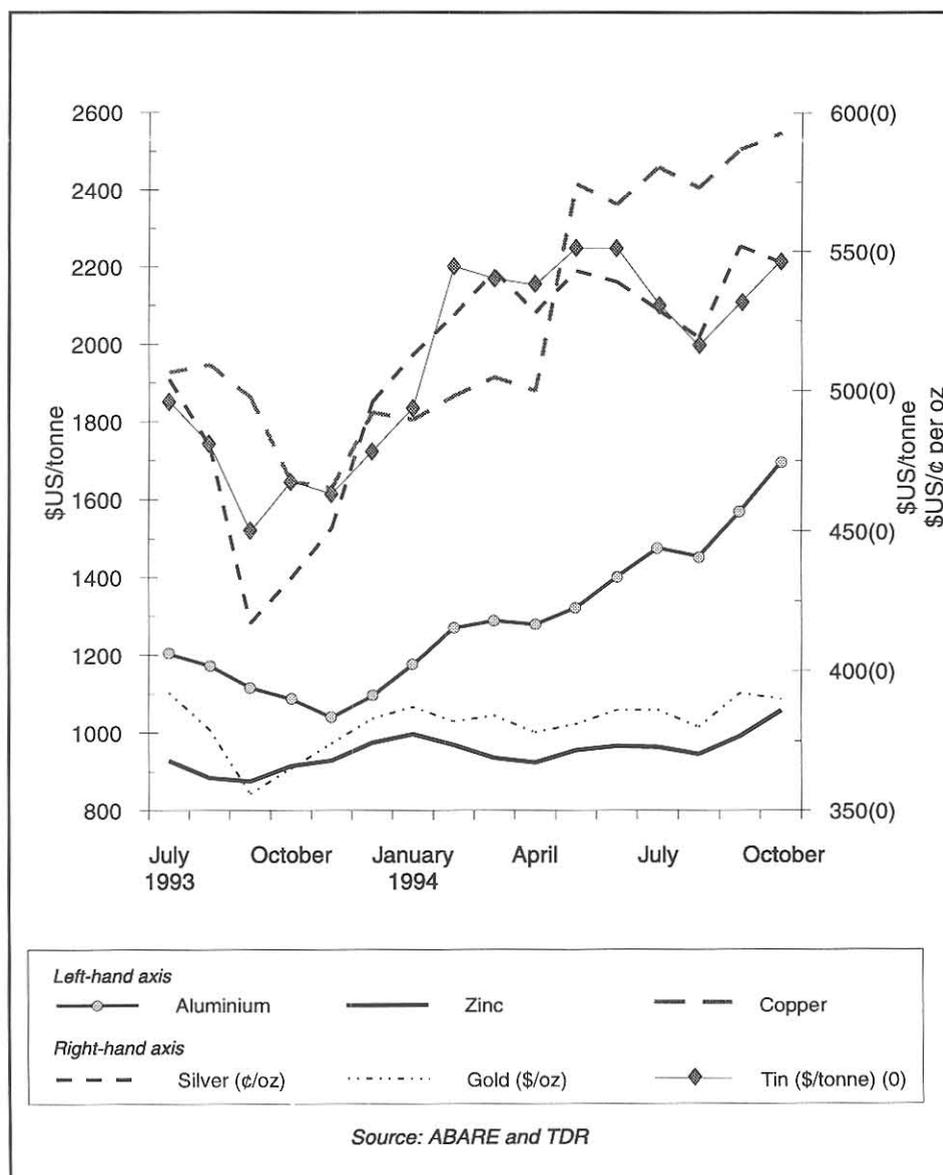
Very high base metal inventories were most prominent during the price recession of 1993/94. Towards the end of that financial year, price levels had risen sharply without a commensurate fall in visible inventory. This had partly been a result of commodity and investment fund buying (see below) as a hedge against the negative effects of rising interest rates on the equities markets.

For 1994/95, reductions in the high base metals stocks will require a combination of production cutbacks and shelving of capacity, together with a sustained increase in refined metal demand growth. This is assuming that Commonwealth of Independent States (CIS) exports do not ease off.

Investment Funds

A new factor of significance in the market affecting metals prices, has been the relatively recent emerging role of investment funds. Through their market power, these funds provided a relatively synchronised upward and downward

Average monthly LME prices, July 1993 to October 1994



impetus to short-term movements in prices during the second half of the 1993/94 year.

Their collective action over this period often appeared to stimulate prices to overshoot or undershoot underlying justifiable market levels and to lend to price instability in the marketplace. Providing that these funds maintain an interest in commodity-related instruments, it is likely that fund actions will continue to play an important role in price movement in the 1994/95 financial year.

Other Factors

Market actions from both the CIS and China have continued to play an important role in the pricing of various metals, and this role is expected to continue in 1994/95. A positive effect in terms of price movements would occur were a sustained restraint to be exercised in their exports of metals to Western consumers.

On the demand side, a strengthening recovery in major developed economies is expected to provide market impetus in 1994/95. Metals consumption (especially copper) appears to be increasing in strength in the United States. European metals usage appears to be showing signs of recovery and by the end of calendar year 1994 this should be fully underway. Japan's economic recovery is lagging behind but should pick up during 1995.

Individual Metals

The supply/demand situation for **zinc** remains clearly unbalanced and requires immediate supply-side adjustment. Inventories at the end of June 1994 represented a very high 16 weeks of usage and it is expected that they will rise further in the second half of 1994. Involuntary closures of smelting capacity, especially in Europe and Japan, are required. Zinc price performance is likely to be very muted over the next twelve months.

Lead stocks are likely to begin to show an accelerated decline during the second half of 1994, following cuts in mining and primary metal production. Deficits are expected to continue through 1995, and price recovery is expected to be the strongest of the base metals.

Copper stocks have fallen sharply since the beginning of 1994. World copper demand has been accelerating faster than expected, but this supportive market feature will likely be tempered in 1995 by the market's emerging recognition of a rapid build-up in mine capacity. Copper prices should show further gains over the second half of 1994 and during the first part of 1995.

Tin price recoveries are expected to be slow, with many counterbalancing forces continuing to operate in the market. It is unlikely that there will be any major improvement in price until later in the decade. Growth in demand for tin is expected to be only modest in 1994/95, whilst world stocks will probably only slowly decrease. An important market factor, namely Chinese shipments to both the West and the Commonwealth of Independent States, has probably peaked, and China's current membership of the Association of Tin Producing Countries may have the effect of reducing these shipment levels. World tin mine production is likely to show little change from the post-war lows of the last two years.

Concerted and price-effective actions have recently taken place in the world **aluminium** smelting industry to withdraw capacity, in view of extremely large and burdensome stocks overhanging the market. A more broadly-based and sustained recovery in aluminium demand is required before smelters should react to such price improvement by easing their supply restraint. In this respect, an overall stronger aluminium market would not be likely until 1995, with market stocks only gradually returning to more normal levels. The consequences of this are that aluminium prices are expected to increase moderately in 1994/95.

Iron ore prices, which were negotiated for 1994/95 earlier this year, are expected to be unchanged for 1995/96. A critical factor in international pricing

is the timing of an upturn in the activities of the Japanese and European steel industries. This is likely to take place during 1995/96, and thus negotiated iron ore prices will probably not show an increase until the 1996/97 financial year.

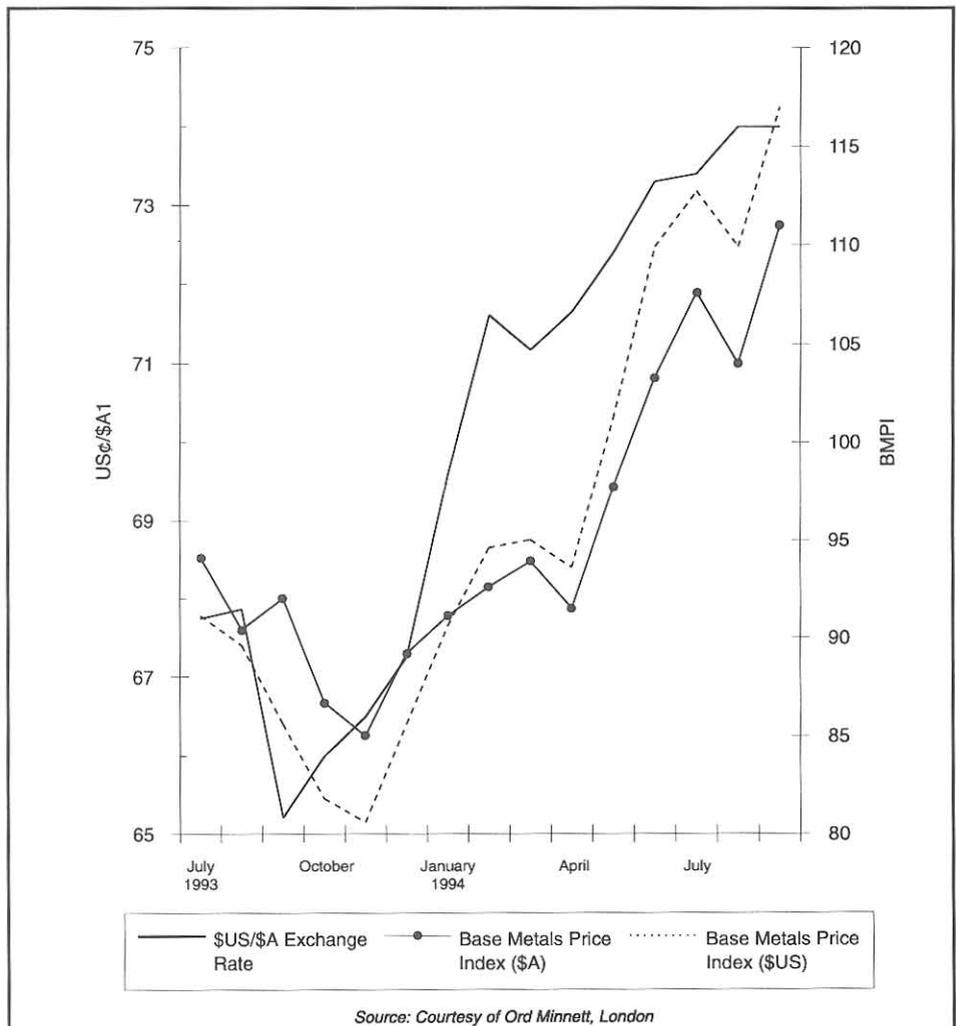
Gold has been trading within a range of US\$370/oz to US\$390/oz in recent months, with support at the lower end of the range from Far East buyers and investment funds and resistance at the upper end from producer selling and profit taking by these funds. The medium-term outlook for gold appears to be price positive, with world mine production continuing to grow only slowly, with prospects of further reductions in central bank selling, and with increasing interest in investment demand for gold in the USA and Europe. Moderate rises in the gold price are anticipated in 1994/95, with an extended breaching of the US\$400/oz level possible during the second half of that financial year.

Constraint on the supply of **silver** is expected to be the major supportive factor in the market in 1994/95, together with a moderate growth in demand. Erosion of inventories is expected to continue, and further price rises are expected, both in response to silver's own fundamentals and relative to upward movements in the gold price.

Exchange Rates

As can be seen from the chart below, there was a general tendency for the Base Metals Price Index (BMPI) in US Dollars to be relatively closely tracked by the \$US/\$A exchange rate. The result was that in the early months of the 1993/94 financial year, when international prices fell to their lowest levels for many years, the fall in the \$US/\$A rate reduced to some extent the degree of the impact upon Australian currency equivalents, and that subsequently, when prices began to rise sharply, the Australian currency equivalent of the BMPI Australian dollars rose correspondingly but to a somewhat lesser degree than in US dollars.

Base metal price indices and \$US/\$A exchange rate: Monthly averages, July 1993 to October 1994



EMPLOYMENT

Direct employment in the mining and mineral processing sector in 1993/94 continued the general downward trend of the last decade. Employment in May 1994 totalled 3767 or a reduction of 22% from the previous year. Ten years earlier the employment number was around 8000 persons; employment has thus more than halved over the last decade.

Although mine closures and a trend towards use of part-time personnel have contributed to this decline, it has been driven more by strong productivity related improvements in both mining and processing operations and reflected in manpower retrenchments.

Examples of such productivity improvements are:—

- ❑ Rationalisation of the TEMCO workforce (reduced to about 350 employees currently compared with 460 two years ago) and various modernisation and environmental improvement projects have raised the efficiency and productivity of operations, placing it amongst the lowest cost manganese alloy producers in the world.
- ❑ At Pasminco's Rosebery zinc ore mine, introduction of multi-skilling, a salary-based remuneration system and a schedule based on seven-days-a-week continuous activity, together with technological improvements, have seen a sharp rise in productivity at the mine. The workforce has been cut back from 470 five years ago to the present number of around 270.
- ❑ Productivity levels at Pasminco Metals—EZ Risdon zinc smelter have trebled over the past five years. Substantial technological modernisation is being undertaken, and together with a reduction in the plant workforce from 1200 two years ago to around 700 at present, the plant has made considerable gains in moving down the international cost curve.
- ❑ At RGC's tin mine at Renison Bell, productivity from one of the world's largest underground tin mines has more than quadrupled over the decade. Productivity per employee is scheduled to further rise by almost 50% between 1994 and 1997. The tin mine's total number of employees has roughly halved from a decade ago, currently standing at around 260. Unit costs of production have been cut substantially.

INVESTMENT

Capital investment by the mining and mineral processing sector in 1993/94 was well below that of 1992/93, with little new development having taken place. Total investment amounted to \$77 million compared with \$134 million in 1992/93, when both the expansion of the Goliath cement plant and the conversion of the furnace at TEMCO boosted outlays.

Sector investment in 1994/95 is forecast to pick up sharply, with the Tasmanian Chamber of Mines expecting capital expenditure to rise to \$146 million. The major part of these funds will be spent on plant modernisation and projects to improve environmental performance. In addition, both the Renison tin and the Rosebery base metals mines plan to undertake significant redevelopment work.

Major investment programs are outlined below.

Renison Goldfields Consolidated Limited

A total of \$53 million has been programmed for the development of the Henty gold mine, which is expected to come on stream in mid-1996. In 1993/94, \$11 million was spent on the commencement of the project, with a further \$42 million to be spent over the next two financial years.

The Renison Tin mine is undertaking further ore development work under a program called Rendeep. A total of \$34 million is to be spent on this project over the next two years, of which \$24 million is to be spent this year.

Pasminco Limited

Pasminco recently announced that it was committing itself to a deep exploration project at Rosebery. Over the next four years, \$45 million is to be spent on defining and developing 10 million tonnes of ore below current working levels. Of this amount, \$25 million is earmarked for ore access for diamond drilling and mine production purposes.

Pasminco Metals-EZ at Risdon has allocated approximately \$55 million for various investment purposes at the zinc smelter through to the 1996/97 financial year, including equipment upgrades (such as rectifier replacements in the cell room) and for process changes to meet environmental standards (such as jarosite and co-commitment projects).

A \$5 million project for the production of manganese sulphate from lead/zinc residues at Risdon was announced in September 1994. HydroMet Operations Limited is the operator of this project.

TEMCO

TEMCO is reported to be intending to spend about \$13 million in 1994/95 on furnace hot metal handling system upgrades, fume emissions controls, and de-bottlenecking of the sinter plant to lift annual output to 350 000 tonnes.

Comalco Aluminium

Investment at Bell Bay in 1994/95 is to principally comprise environmental upgrade and safety equipment expenditure totalling around \$18 million.

Other

Beaconsfield Gold announced in early 1994 that it was going ahead with a \$2.1 million program over 12 months to further advance the evaluation and development of its gold mine project.

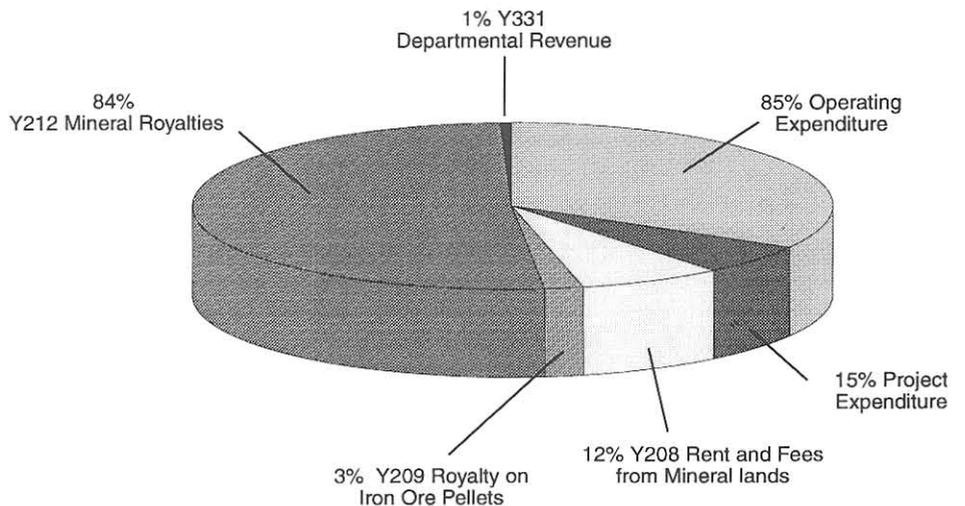
FINANCIAL PERFORMANCE

In accordance with the requirements of the *Financial Management and Audit Act 1990* the Department is required to report on the year's financial transaction against the original appropriation.

The formation of the Department of State Development and Resources resulted in the centralisation of Corporate Services and consequently only the direct operating costs of Mineral Resources Tasmania are reported.

Of a total TDR Consolidated Fund Budget amounting to \$39.04 million Mineral Resources Tasmania was allocated \$5.26 million for direct costs only.

*Estimated Financial
Position, 1994/95*



**STRUCTURE
OF MINERAL
RESOURCES
TASMANIA AND
ITS LINKAGE
WITHIN TDR**

In 1993/94 revenue amounted to \$4.8 million compared with \$7.2 million in 1992/93. The reduction in revenue of \$2.4 million was mainly due to the poor state of the mining industry resulting in a reduced flow of royalties to the State.

In 1994/95 direct operating costs will be reduced by \$1.4 million to \$3.8 million with revenue being estimated at \$5.9 million, a surplus of revenue over expenditure of \$2.1 million.

The management structure, put in place during the 1992/93 restructuring, remains essentially unchanged. A flat reporting hierarchy allows for four branches responsible to the Director of Mines:-

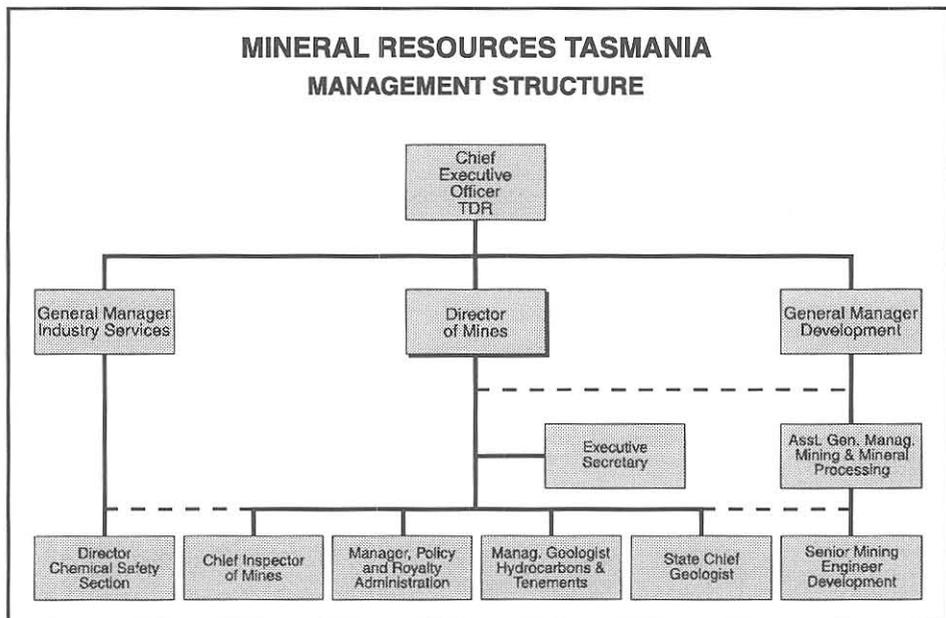
- Resource Exploration and Development;
- Hydrocarbons and Tenement Management;
- Mines Inspectorate;
- Royalty Administration and Support Services.

Close working relationships with the Industry Services Division have allowed for the transfer of the former Dangerous Goods Branch from Mineral Resources to Industry Services. The former 'Mines' Industrial Hygienists continue to provide an advisory service to the Mines Inspectorate.

The Mines Inspectorate will remain an integral part of Mineral Resources Tasmania for the foreseeable future. It is considered to be neither practical nor of benefit to Government to separate the mining engineers of the Inspectorate Service from their other responsibilities under the Mining Act and for development facilitation. To their credit, mining and mineral processing companies continue to lead the way in 'safety' improvement.

The role of Mineral Resources Tasmania continues to evolve within the Agency. Linkages with the Mining and Mineral Processing Development Section continue to strengthen. The continuum involved from data accumulation, through exploration by the private sector to mine discovery, development and mineral processing, demands full involvement of the Division with all aspects of the growth of Tasmania's mineral sector.

Significant attention has been paid to the human relations effects of the changes experienced by Mineral Resources Tasmania staff over recent years. With a reduction of establishment and budget to approximately half that of the recent past, without loss of service, employees' efforts are worthy of recognition. The coming year will see continuing attention to staff welfare in order to ensure a committed team capable of securing the future of the industry.



STRATEGY FOR THE FUTURE

Strategic planning for the Resource Exploration and Development Branch will target growth in exploration commitment by private enterprise. This will be driven by the provision of up-to-date mapping, specific initiatives and support of explorers working in the State, through the Tasmanian Chamber of Mines. During the coming year Mineral Resources Tasmania will participate with the Australian Geological Survey Organisation (AGSO) on the Tasmanian National Geoscientific Mapping Accord Project. This \$3 million program is covered later in the review.

New data releases are expected in March 1995. These will include:-

- ❑ 1:250 000 scale geological maps of the southeast and northwest areas of the State;
- ❑ New aeromagnetic and radiometric data covering the Arthur Lineament;
- ❑ Three interpretative geological map sheets over the Arthur Lineament based on the new geophysical data and unpublished geological mapping;
- ❑ 1:25 000 scale geological map sheets covering some areas in the northeast and west.

For the long term, the Department focus will be centred on the 'geologically unknown', notably the Midlands and central East Coast third dimension. This area is the major challenge facing MRT's geoscientists to the end of the decade. The work will not be cheap or easy, but potential exists for the discovery of mineral fields to rival those of the West Coast.

Industry should 'watch this space'.

- ❑ A review of mineral royalties was completed during 1993/94, at the request of the Minister. This exercise will be the subject of discussion with industry and decisions by Government in 1994/95.
- ❑ The Hydrocarbons and Tenement Management Branch will continue to devote itself to facilitating mineral development by rapid processing of tenure documents and maintaining a high standard of discipline in lease matters.
- ❑ There is some anticipation that petroleum explorers are again starting to focus on the Bass and Otway Basins, in Tasmanian waters. In the 1994 Australian ground release only the two Tasmanian releases were taken up by oil explorers. Work will continue on identifying prospective basins for future release.
- ❑ The Engineering Geology and Groundwater Branch will continue to focus on their core community service objectives of water table management and land stability monitoring. A \$70,000 program of drilling this summer will progress the 'Midlands Groundwater Study'. In co-operation with the Department of Environment and Land Management (DELM), a State policy on control of construction in relation to ground stability will be put in place.
- ❑ Talks held with local Hobart councils and sand producers in 1993/94 will continue in the coming year. The intention is to better educate the public on the issue of diminishing building sand resources.
- ❑ The Mines Inspectorate will continue to build on their achievements of 1993/94 in the field of occupational health and safety. The target, which is now in sight, is for zero accident workplaces.
- ❑ A strengthening of the linkages between the Division of Environmental Control and Mineral Resources Tasmania will be pursued.

THE MINERAL RESOURCES DEVELOPMENT BILL

A draft of this Bill will be available for discussion by October of 1994. It is anticipated that the Bill will be brought before the House in the Autumn Session of Parliament.

DEVELOPMENT OF MINING AND MINERAL PROCESSING

Excellent linkages are being developed between Mining and Mineral Processing Development Section staff and Mineral Resources Tasmania. The highlights of the year include:-

- ❑ The securing of a new developer, in the form of Gold Mines of Australia, for the remaining Mount Lyell copper-gold resource;
- ❑ The establishment of a gold plant by Riltec (Tasmania) Pty Ltd to treat old mine tailings at the Golden Gate mine at Mathinna;
- ❑ The securing of a long-term future in the State for Tioxide (Australia) Pty Ltd;
- ❑ The progressing of Savage Resources Ltd's plans for establishment of a natural pigment mine and processing plant;
- ❑ Progress on the re-establishment of the Tasmania Gold mine at Beaconsfield as a gold producer;
- ❑ Promotional visits to mainland capitals to remind mining investors of Tasmania's mining resurgence;
- ❑ Hints of a re-commencement of small tin and gold mining in the northeast.

IN SUMMARY

The Tasmanian industry is showing signs of an 'awakening'.

Government policies supportive of economic growth are in place.

TDR staff must continue the vigorous promotion of opportunities available in Tasmania. Innovative thinking and credible marketing will ensure that currently known but, to date, unexploited resources, are put to good use, for the benefit of the community.

Exploration commitment will provide for the mining and mineral processing industry of the future.

Our known resources must be put to work to provide for today.

RESOURCE AND EXPLORATION DEVELOPMENT BRANCH

The 1993/94 year marked the first full year of the operation of the Resource and Exploration Development Branch (RED Branch) under its new management, structure and charter. The RED Branch was formed in May 1993 by merging the remaining resources of the former Geological Survey Branch of the Department of Mines at the completion of the amalgamation process which formed Tasmania–Development and Resources.

The new focus of the Branch is to produce and promote up-to-date geoscientific information on Tasmania as an aid to the mineral exploration industry, other government agencies and the general public.

The Branch is managed by the State Chief Geologist who is responsible for programs which deliver the following outcomes:–

- ❑ Collection, storage, analysis, and interpretation of geoscientific information on the State and the promotion of such information to enhance the State's mineral resource potential;
- ❑ Provision of systematic regional coverage of geology, gravity, magnetic, seismic, physical property and other geophysical data for use in exploration and geological mapping;
- ❑ Collection of information and the production of maps and reports on the engineering properties of soils and rocks, land stability, waste disposal and the groundwater resources of the State;
- ❑ Provision of modern geophysical and geochemical analytical services to support the mapping and mineral resource potential investigations;
- ❑ Promotion of the State's mineral prospectivity.

Branch Organisation

The present staffing level is 25, comprising geoscientists, technical officers and a secretary. The personnel of the Branch are deployed into six sections:–

- ❑ Two Resource Investigation Sections, Central and East-West;
- ❑ Engineering Geology and Groundwater;
- ❑ Geophysics;
- ❑ Laboratory Services;
- ❑ Petrology.

Each Resource Investigation Section is led by a Managing Geologist and is required to service and regulate specified Strategic Prospectivity Zones. The other sections — Geophysics, Laboratory Services and Petrology — provide essential scientific and technical support services to the Resource Investigation Sections. The Engineering Geology and Groundwater Section assesses groundwater and construction material resources. It is also concerned with the wider community problems of land stability and waste disposal measures.

Charter

The primary charter of RED Branch is to increase the level of private sector mineral exploration in the State by:–

- ❑ Provision of current, high-quality geoscientific information to mineral explorers, other government agencies and the general public;
- ❑ Undertaking projects to obtain geoscientific information over areas of the State not already covered so as to increase the knowledge of the mineral resource potential of areas not presently under exploration;
- ❑ Conversion of all relevant geoscientific and technical data to the computer-based Geographic Information System;
- ❑ Promotion of unoccupied areas by targeting Australian and overseas exploration companies with data packages.

The NETGOLD Project has been successfully completed. The next major project to enhance our geological knowledge of the State will be a three-year

co-operative study with the Australian Geological Survey Organisation (AGSO) under the National Geoscience Mapping Accord (NGMA). TASGO, as the project is being called, has already passed the planning stage. Initial background data accumulation has commenced (September 1994) and operational plans for remote sensing surveys to be conducted early in 1995 are well underway.

Others projects are being considered over the Arthur Lineament, Midlands area, and the far northwest of Tasmania. A major planning workshop for a three-year and five-year strategic project program will be undertaken before the end of October 1994.

Regulation

During the year, 133 company exploration reports were assessed and 77 exploration licences and four retention licences were reviewed and renewed. Exploration tenders were received for 30 areas advertised under the Exploration Tender Area System, resulting in nine new exploration licences.

Industry Performance

From a historic low base in 1991/92, private sector mineral exploration in Tasmania continues to show positive growth according to most performance indicators.

- On a financial-year basis, strong growth is apparent in exploration expenditure, with \$7.8 million in 1992/93 increasing by 31% to \$10.2 million in 1993/94.
- The State recorded solid growth in exploration expenditure in the March quarter of 1994, with \$3.4 million compared with \$2.2 million for the same period last year (a 56% increase according to Australian Bureau of Statistics figures).
- The total area now held, or under application, as exploration licences has increased by 19% to 8012 km² at the end of 1993/94 from 6722 km² at the end of 1992/93. Reflecting this, the number of exploration licences has increased by 15% to 125 from 109 over the same period.
- Drilling, another important indicator of exploration effort, is also trending upwards. The total figures for the 1993/94 financial year showed an increase of 9% on the same period last year — 46 580 metres compared to 42 755 metres.

These excellent results clearly reflect an awakening by industry to the mineral potential of Tasmania. This awakening is mainly due to the production and marketing of new geoscientific data by the RED Branch, and the Division as a whole, to promote the State to investors. The uncertainty of land tenure in other States arising out of the Native Title issue is also believed to be a contributing factor.

THE TASMANIA NGMA PROJECT — ‘TASGO’

Planning is well advanced on the next major geoscientific project. This will be a co-operative project between the Commonwealth and the State, under the National Geoscience Mapping Accord (NGMA), and will provide new geophysical information, which, when integrated with existing geological data, will be used to define the major structural zones and fluid paths which make up Tasmania's numerous mineral provinces.

This three-year project will use seismic waves to map the deeper levels of the Earth's crust and define the structures controlling the location of mineral deposits. A geochronological survey will also be carried out to obtain age information on unfossiliferous rock sequences in the northwest of the State.

The benefits of the project will be:-

- improved definition of mineral and petroleum provinces;

- better three-dimensional understanding of the major structures controlling mineral and petroleum deposits;
- more reliable resource assessment procedures and land-use planning information.

The data packages flowing from the NGMA project are expected to benefit Tasmania by increasing exploration expenditure, development and investment. Future MRT projects will be designed around the results of this project.

PROMOTION

A major effort was devoted to marketing Tasmania's prospective zones to targeted mineral exploration and mining companies. This innovative and successful strategy involved the visit by promotional teams to company offices in capital cities and main regional centres on mainland Australia, as well as the circulation of technical information by mail and personal contact by telephone.

The main promotional event was the successful launch of the NETGOLD project at the Country Club Casino in Launceston on 8 April 1994, with a day of technical presentations followed by a two-day field excursion through the main goldfields of northeast Tasmania.

The main promotional visits took place in June 1994 and featured the promotional volume *Mineral exploration opportunities in Tasmania*.

On 10–13 October 1993, the RED Branch was represented in an exhibition booth at the international conference *Zinc 93* at the Wrest Point Convention Centre in Hobart.

A world-wide advertisement of State opportunities took place on 25 February 1994 with Tasmania being portrayed in the Country Supplement of the *Mining Journal of London*.

An overview of mineral exploration in Tasmania was published as part of an Australia-wide review in the *Bulletin of the Australasian Institute of Mining and Metallurgy* in May 1994.

Talks on the NETGOLD Project were also given to community, council and business groups throughout the northeast of the State at Fingal, St Helens, Scottsdale, Ringarooma and St Marys.

MISCELLANEOUS

A survey was carried out and a report prepared on mineral resources close to bulk-loading facilities and deep-water ports throughout the State.

Additional work was carried out on the draft *Mineral Resource Development Bill*.

A preliminary mineral resource assessment was completed on the potential impact of additional World Heritage proposals covering areas in Western Tasmania.

Central Tasmania Region

The Central Region includes the bulk of the highly mineralised Mt Read Volcanics belt as well as the Adamsfield and Midlands areas. Most activity has been centred on the Mt Read belt, which includes the Hellyer, Rosebery and Mt Lyell mines, and is an area of intense exploration activity. Several major companies hold large areas under exploration licence in this area, and a number of programs have reached drilling stage.

Data Compilation

Work commenced on compilation of 1:25 000 scale geological mapping of the Mt Read Volcanics belt into GIS digital format, and three maps covering the area between Hellyer and Tullah were completed. In addition, databases of stream-sediment geochemistry, drill hole locations and whole-rock

geochemistry are being prepared to accompany the digital maps as separate layers. Two temporary geologists were employed to assist with the data gathering and data entry.

Promotion

A promotional brochure detailing mineral exploration opportunities in the Mt Read belt was prepared and distributed to local and mainland companies. This was later updated and incorporated into a comprehensive brochure on exploration opportunities statewide. Numerous briefings were given to company representatives both in Tasmania and in mainland capital cities.

Anio Creek investigation

An unusual magnetic geological feature at Anio Creek, near the northern boundary of the Cradle Mountain–Lake St Clair National Park, was investigated with a helicopter-borne aeromagnetic survey and by ground-based geological mapping. Analysis and assessment of samples and survey results is continuing in an attempt to explain the phenomenon. Reports covering the work will be available by the end of October 1994.

International Volcanology Conference

Two geologists attended this conference in Canberra, and led a post-conference field trip for thirty international visitors through the Mt Read belt, including visits to several of the mines.

East–West Region (Eastern Sector)

Project Generation

The main geoscientific project during 1993/94 was NETGOLD. This year-long project was designed to attract exploration companies to look at the old gold-bearing areas in northeastern Tasmania. The project was an outstanding success, boosting the ground held by mineral exploration companies by over 2700 km² contained in thirteen new exploration licences.

The project involved the collection of high-quality regional survey information on the geophysical character, geology and mineral deposits of parts of the North-East Strategic Prospectivity Zone to encourage the development of new gold mines in Tasmania. The resulting data package, containing magnetic and radiometric data, gravity data, geological maps, structural and geochemical information, and a mineral resource index, was released to companies at a promotional conference in Launceston on 8 April 1994. In addition to the digital information, twelve explanatory reports containing comprehensive accounts of the above material were produced.

Tenders were submitted for 95% of the ground on offer. The six successful companies were Herald Resources Limited, Central Kalgoorlie Gold Mines NL, Resolute Resources Limited, Silverthorn Resources NL, Allegiance Mining NL and Major Mining Limited. Most of these companies are new to Tasmania, with the former three having a record of discovery and development of gold deposits in Western Australia.

Applications were also received for four new exploration licences, totalling 116 km², outside the original NETGOLD areas. Some of the new companies have also formed joint ventures with pre-existing licence and lease holders in the region.

The NETGOLD project will substantially increase the chances of mine discovery in the northeast of the State and will provide a template for future promotional projects.

Data Conversion

Ten 1:25 000 scale digital geological maps were captured in the Alberton–Mathinna zone in association with the NETGOLD project. These map sheets are also covered with digital databases of mineral deposits, drill holes, stream sediment analyses and rock chemistry, compiled from numerous sources, as well as the new aeromagnetic and radiometric data just acquired. An additional ten geological sheets will be captured during the coming year, together with the ancillary resource information.

Project Generation

As an initial step in the promotion of this region, a high-quality, helicopter-borne aeromagnetic and radiometric survey was carried out over the Arthur Lineament, from Savage River north to the Arthur River area. This information is available to industry. A geological interpretation of the area will be released in April 1995.

Data Compilation

Three 1:50 000 scale geological maps are being compiled to cover the Arthur Lineament area. These will take into account the existing mapping in the area and will rely heavily on an interpretation of the detailed geophysical survey. The other task in the region is to generate a 1:250 000 scale digital geological map using the existing 1:50 000 scale mapping. This has already commenced and is due for completion in March 1995.

Engineering Geology and Groundwater

The section has been reduced in size over the year as a result of redundancy and early retirement. One Project Geologist took redundancy in July 1993 while the Surveyor and the Senior Field Assistant took early retirement during September and March respectively. At the end of the year the section comprised a Chief Geologist and a Senior Geologist, with a Project Geologist from another section working on an urban mapping project as time permits. Other parts of the RED Branch provide considerable input into the work of the section, for example the soils laboratory, chemical laboratory and data management, together with other support sections.

As in previous years, land stability problems continue to be a major function of the section, with collection and collation of regional groundwater information coming into prominence in the last part of the year. Disposal of wastes and groundwater protection, together with monitoring of groundwater, are also major functions. A review of sand resources in the Hobart area was undertaken. Advice on foundation conditions and groundwater prospects has been a significant aspect of the work of the section. Compilation of the results of the urban mapping survey of Launceston continued.

Land Stability

Advice on land stability has been given in a wide range of areas throughout the State, with more emphasis on the North West Coast and Southern Tasmanian regions, with fewer enquiries from the Tamar area than in previous years.

There has been less involvement with the landslide at Rosetta as the movement has slowed considerably. Water levels in bores in the landslide area are still monitored and technical advice is given to the Glenorchy City Council at regular intervals.

Some field work was undertaken on the North West Landslide Risk survey in the Port Sorell–Stanley region.

Groundwater

The supply of information to assess groundwater prospects continues to be a major function of the section. This is confined largely to the agricultural areas.

The collection of groundwater information on a regional basis began during the year with the aim of producing the information on 1:250 000 scale sheets. Surveys have commenced in the northeast and Midlands areas with the more accurate location of bores, particularly those drilled by private contractors.

Proposals to complete the drilling for the Oatlands Quadrangle groundwater study were prepared during the year. This study is expected to be completed in the 1994/95 year.

The bores installed in the Sassafras–Devonport–Port Sorell area to monitor use of groundwater continue to be measured, as are the Statewide regional

monitoring bores. Samples are extracted from the latter bores twice yearly for chemical analysis.

Protection of groundwater quality continues to be an important function. Advice on the effects of refuse waste disposal sites at several locations has been given. The effects of contamination (from petroleum products and chemicals) on the local groundwater quality have been assessed in combination with the Department of Environment and Land Management at a number of sites.

An examination of dairy effluent disposal is being undertaken by the Department of Primary Industry and Fisheries throughout the State. Groundwater, as well as surface water, is being contaminated at some locations. There has been input into a study in the Smithton area where groundwater has been shown to be contaminated.

A review of the likely effects on groundwater of land-based disposal of jarosite in the Hobart area was undertaken.

Surveying

Surveys along lines across the landslide at Rosetta continued until the surveyor retired.

Reports were prepared on the surveys of landslide areas that have been undertaken at various locations throughout the State over the last few years.

Surveys of monitoring bores were undertaken in the northeast and Midlands, and an accurate survey of the location of an asbestos disposal site in a quarry at Coles Bay was also carried out.

Urban Mapping

Compilation of the information from the urban mapping project in the Launceston area continued as time permitted. This has included detailed slope classing, laboratory testing of samples of soil, assembly of test data from Division and private consultant reports, and plotting of information on maps.

Further work was undertaken on the report for the Ulverstone urban mapping study.

Construction Materials

With the decrease in the sand reserves on some leases in the Hobart area, a further review of resources was made. Meetings were arranged with interested parties to discuss the situation.

Foundation Conditions

General advice on foundation conditions was given for several areas. Test pits were examined at a site for a reservoir at Kingston for the Hobart Metropolitan Regional Water Board.

General

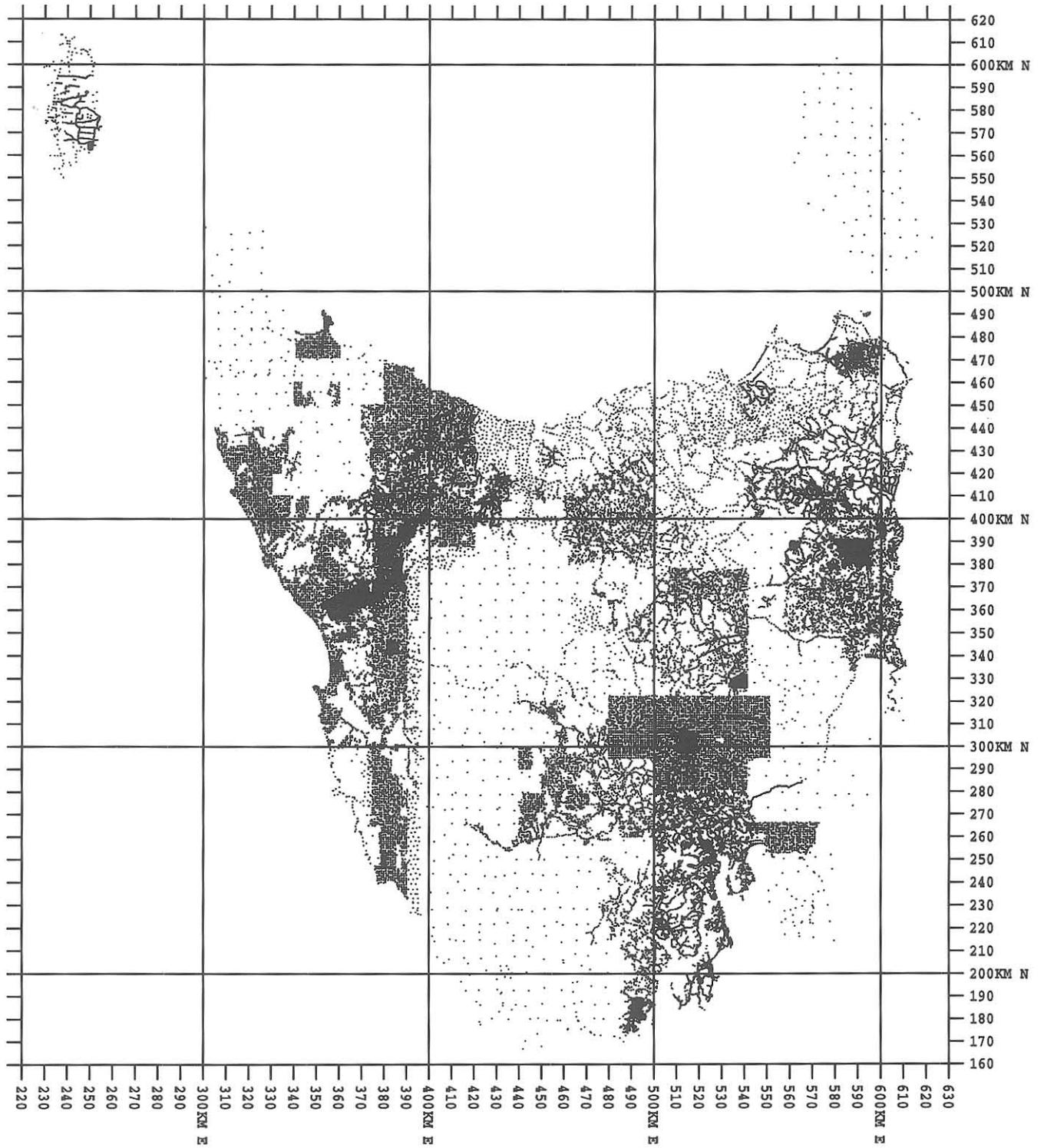
Earthquake risk and effects in the Launceston area were a subject of discussion in the latter part of the year, resulting in some input into the micro-seismic zoning survey to be undertaken by AGSO.

Various seminars were attended during the year including refuse waste disposal, hazardous waste disposal, and the Coast to Coast Conference.

Geophysics

The major project for the year was the NETGOLD project in northeast Tasmania which included the acquisition of aeromagnetic, radiometric and gravity data over a large area. The magnetic data have been integrated with pre-existing high-quality data after considerable reprocessing to make available a unified high-standard aeromagnetic data set over most areas of prospective Mathinna Group rocks. The magnetic and radiometric data show linear features within the Mathinna Group rocks that represent either

DISTRIBUTION OF TASMANIAN GRAVITY STATIONS AS AT 30 JUNE 1994



5 cm

lithological changes or alteration but have not been reported during programs of regional geological mapping. The scale of these features ranges from hundreds of metres to tens of kilometres.

The gravity data were initially collected from the Mathinna area and subsequently between Pioneer, St Helens and Upper Blessington to improve the existing coverage, of at worst one station per 200 km², to an acceptable reconnaissance standard. The new data better define the gravity high along the main Mangana–Alberton gold belt, allow modelling of the depth of the Mathinna Group rocks, and resolve more of the geological structure of the area covered.

Gravity–Magnetics

Apart from the NETGOLD project only two small gravity acquisition programs were undertaken. The first was in the Quinn Creek area of the Anthony Power Station Headrace Tunnel, and was used to assist in defining the three-dimensional shape of the zone of bad ground encountered during tunnelling. High-resolution ground magnetic data were also collected during this survey. The second survey was in the vicinity of Que River and resolved an apparent conflict between old data acquired by Mineral Resources Tasmania and more recent company data.

At Anio Creek, at the northern end of the Cradle Mountain–Lake St Clair National Park, a small high-resolution aeromagnetic survey has confirmed the presence of two isolated anomalies that are unique within the general area. Field sampling has not yet revealed any rocks that have magnetic susceptibilities high enough to allow them to be possible sources of these anomalies. A portion of the Arthur Lineament was also flown.

Computing

All applications have been transferred from the minicomputer to either the Novell network or Unix-based work stations. The minicomputer was dismantled in February 1994. A tape facility has been preserved by purchasing a 9-track tape drive for a Unix work station. Unix versions of the data processing and contouring software and image processing software have been installed and greatly extend our previous capabilities in data processing and presentation. The volumes of data now being handled are several orders of magnitude greater than those encountered previously.

Miscellaneous

Other significant tasks undertaken include:–

- review of the airborne magnetic and electromagnetic data from the National Soil Conservation Program salinity survey in the Cressy area;
- preparation for the NGMA program to study the fundamental structure of Tasmania;
- running an internal aeromagnetic workshop.

Laboratory Services

Laboratory Services have had an extremely busy year. A number of projects, including support for NETGOLD and Huminex exploration analyses, have been labour intensive due to the nature of sample preparation involved.

A study of the possible bacterial leaching of Mt Lyell ore was undertaken. Small-scale flask studies of the bacterial leaching of pulverised ore yielded up to 80% of the contained copper in one month. Column studies with large fragments of ore were less successful. Normally such studies can be expected to take twelve months but constraints on our program required the information within four months.

The X-ray Fluorescence Spectrometer has largely been held on standby since the operator was engaged in studies supporting NETGOLD. More efficient operational software has been purchased and installation/calibration

is near completion. The equipment is to have a major service and is expected to be back in operation early in 1994/95.

Preparation and analysis of 930 samples was undertaken during the year with a distribution as follows:-

Water	400
Rocks	95
Minerals and Products	435

This involved a total 8020 chemical determinations.

The major component of the work undertaken continues to be either in-house or for other Government agencies, although work for private clients has increased to 26% of the workload due largely to Huminex analyses.

Petrology Gold

Resource investigations on lode gold deposits in northeastern Tasmania were compiled into several maps and reports for the NETGOLD project, specifically for the Mt Horror and Lisle areas. A study on the nature and genesis of the gold lodes was also published. A trip to Geological Survey Victoria and the Victorian goldfields was conducted for comparative studies. Continuing studies include the nature of associated igneous rocks and wallrock alteration, and ESR and PIXE probe studies of quartz from the lodes, in conjunction with the University of Tasmania.

The database of Tasmanian gold deposits (as part of the MIRLOCH computer database) is essentially complete, with 1327 gold-bearing deposits recorded, and is being regularly updated.

Databases

The MIRLOCH database of mineral deposits in Tasmania now has 3206 entries, covering coal, metallic and industrial minerals, and is being updated steadily. Large parts of the State are now essentially complete in this regard (approximately 78 of 97 geological quadrangles, including the first 55).

The MRV Physical Property database has been essentially completed and is now available for purchase. This includes sample locations, descriptions, generalised petrology, geophysical data, major and minor element analyses, and other data for 420 samples of Mt Read Volcanics and associated rock types.

Curatorial work has included the preparation of displays for the open day, supervision of the rock stores, and updating of the TASROCK database of rock samples.

Petrology and sample testing

A total of 1296 samples was received for investigation, of which 525 were non-geological survey samples. These included 168 samples for the Centre for Ore Deposits and Exploration Studies (CODES) under an in-kind agreement, 73 for Mines Inspection, and 284 samples for paying customers. Revenue generated was \$16,115, from a wide range of external sources, including the Hydro-Electric Commission (HEC), Department of Transport and Works, and various other Government departments; various mining, mineral processing and exploration companies; and the general public and miscellaneous businesses.

Samples studied include geological materials (clays, mineral concentrates, rocks, soils, sands, and ore samples) and anthropogenic materials (asbestos, industrial materials, dusts, etc.). Quartz-bearing dusts, asbestos, and other environmental hazards are still very important; 278 such samples were described and/or identified or tested.

Departmental studies were dominated by the NETGOLD project, but included work on various rocks from Glovers Bluff, Mt Read Volcanics samples, and glaucophane-bearing amphibolite from the Savage River-Corinna district.

Mines inspection work completed included dust analyses from Fingal and other areas, and asbestos studies (fibre counting) at Tioxide and Savage River Mines.

Considerable petrological work has been undertaken as a part of the Tasmanian alkali-aggregate reactivity research project (TAARRP) in conjunction with the HEC, Department of Roads and Transport, Concrete Institute and various companies. Some of the work has been produced as consultant reports, and most of the costs are being covered by individual sponsors. The project involved investigating aggregates and concrete produced from these aggregates which are used in major structures (bridges, dams, etc.) in Tasmania, in regard to the form of deterioration known as alkali-aggregate reactivity.

The petrologist presented a talk on the carbonate minerals of Tasmania at a national mineralogical symposium in Melbourne.

Petrology Laboratories.

The lapidary laboratories prepared 115 standard thin sections, 193 polished thin sections, and 139 miscellaneous sections, making a total throughput of 447 samples. Most of these were done on a contract basis, due to the resignation of our permanent lapidary technician, and termination of our temporary. Another technician is presently being trained in this art.

The technical officer for petrological services processed 808 samples by X-ray diffraction, including 157 quantitative dust analyses and 120 quantitative clay analyses. He also conducted 211 soil tests and 49 optical asbestos identifications, a total of 1068 samples, valued at \$49,450.

The laboratories provided a total of \$58,689 worth of analyses and services (excluding NETGOLD petrology, contract lapidary and incomplete studies), 51% of this being for the RED Branch, the remainder for Mines Inspection, CODES, Industry Services Division and other outside users.

**HYDROCARBONS
AND
TENEMENT
MANAGEMENT**

The Hydrocarbons and Tenement Management Branch is responsible for the following programs:-

- promotion and registration of petroleum exploration in Tasmania and off-shore waters administered by the State;
- administration of *The Mining Act 1929*, including the issuing of legal titles to mining tenements, collation and recording of statistics relating to mining production, and the demand and monitoring of the collection of fees and rentals;
- setting and monitoring of standards for exploration performance by private companies on licences throughout the State and the technical reporting of exploration records and case histories;
- environmental control of exploration;
- management of mining heritage and land access issues; and
- liaising with the Department of Environment and Land Management, Forestry Tasmania, and municipal authorities on land planning issues.

OIL AND GAS EXPLORATION

No new offshore permits were granted for oil and gas exploration during the year. Maxus Tasmania Incorporated surrendered permit T24/P for an area off the West Coast of Tasmania.

No exploration wells were drilled but Sagasco Resources Ltd undertook extensive 2D and 3D seismic surveys in permits T/RL1, T8/P and T/25P in the Bass Basin.

Assessment commenced for bids that were received for offshore petroleum areas T93-1 and T93-2 which closed on 6 May 1994. Two new permits should result from bids tendered.

*Offshore Petroleum
Exploration Permits*

<i>Title</i>	<i>Holder</i>	<i>Blocks</i>	<i>Expires</i>
T/18P	Sagasco Resources Ltd and Others	30	22.12.1998
T/25P	Sagasco Resources Ltd and Others	43	2.12.1997
T/26P	Ansbachall Pty Ltd	94	8.7.1998
T/RL1	Sagasco Resources Ltd and Others	9	7.5.1996

Exploration licences are held onshore by Condor Oil.

COAL INDUSTRY

The State's two active coal producers adequately supplied sufficient coal for the domestic market. The Cornwall Coal Co. NL took over the tenements formerly held by the Shell Company of Australia Ltd on Mt Nicholas and over the Douglas-Apsley area. An update of the report on Tasmanian coal statistics was produced during the year.

REGISTRY

The Registrar continued his involvement with the Review of the *Mining Act 1929* and drafting of new legislation to be introduced as the *Mineral Resources Development Bill*.

REGIS, the mining tenement database, continues to be refined to meet the needs of users within the Agency.

PRODSTAT, the production database, has been further developed to produce more meaningful reports which are allowing more efficient and effective monitoring of production and royalty returns.

The Government policy of 'Use it or Lose it' in relation to mining leases and exploration licences is directed by the Registry's databases.

During the year the Section took over the task of recording bonds and guarantees on leases and licences.

The NETGOLD project involved Registry staff in increased enquiries and processing work, particularly at the time of assessment of bids of advertised areas and subsequent notifications to successful and unsuccessful tenderers.

Generally, processing of leases and licences runs smoothly due to good lines of communication with the various branches of Mineral Resources Tasmania and other Agencies.

Responsibility for administration of petroleum titles has passed to the Registry Branch and the Acting Petroleum Registrar has built up strong links with his interstate counterparts to ensure that Tasmanian procedures follow those used elsewhere in Australia.

The Section routinely provides advice to Departmental officers, enquirers from other Agencies, the mining industry and the legal profession on a wide range of matters associated with mining tenements and legislation.

COURT OF MINES

Tasmania is divided into four mining districts, each with a Warden of Mines. The wardens, who are magistrates, hear disputes arising under the *Mining Act 1929*. Three cases were referred to the warden during the year.

Various objectors v K. A. White. Objection to Exploration Licence EL27/92. Objections withdrawn.

P. G. Blakeley v R. Holden. Objection to Exploration Licence EL16/93. Objection withdrawn.

G. M. and J. A. Freeman v Mineral Holdings Aust. P/L. Objection to Exploration Licence EL20/93. Objection withdrawn.

ENVIRONMENTAL MANAGEMENT

The appraisal and monitoring of mineral exploration programs continued at a steady rate. Close liaison was maintained with companies, with regular visits by our Environmental Field Officer ensuring operations were carried out in a responsible manner.

Rehabilitation projects were completed at Rossarden–Storys Creek and at Heazlewood.

The old precipitate dam was decommissioned at Storys Creek, reducing the leaching of cadmium and zinc into the South Esk River water catchment. Removal of mining detritus at Rossarden improved the visual amenity of the site. Heritage values were considered prior to the start of both these remediation projects.

Old exploration disturbances at Heazlewood were spread with a mixture of OR-90 (an organic fertiliser) and suitable, local provenance seed.

Communication with other Government agencies continued to be strengthened by regular meetings and correspondence.

TENEMENT ADMINISTRATION

From a historic low base in 1991/92, private sector mineral exploration in Tasmania continued to show positive growth, according to most performance indicators. The area of the State covered by exploration licences and mining leases at the end of June 1994 was:–

<i>Lease Type</i>	<i>Area (km²)</i>	<i>% of State</i>
Metallic EL and RL	5 456	8.0
Non-metallic EL and RL	156	0.2
On-shore petroleum EL (pending and granted)	26 455	37.0

Mining leases cover 602 km², or 0.9% of the State.

The number of exploration tender areas offered was 30, with nine tenders resulting in exploration licences.

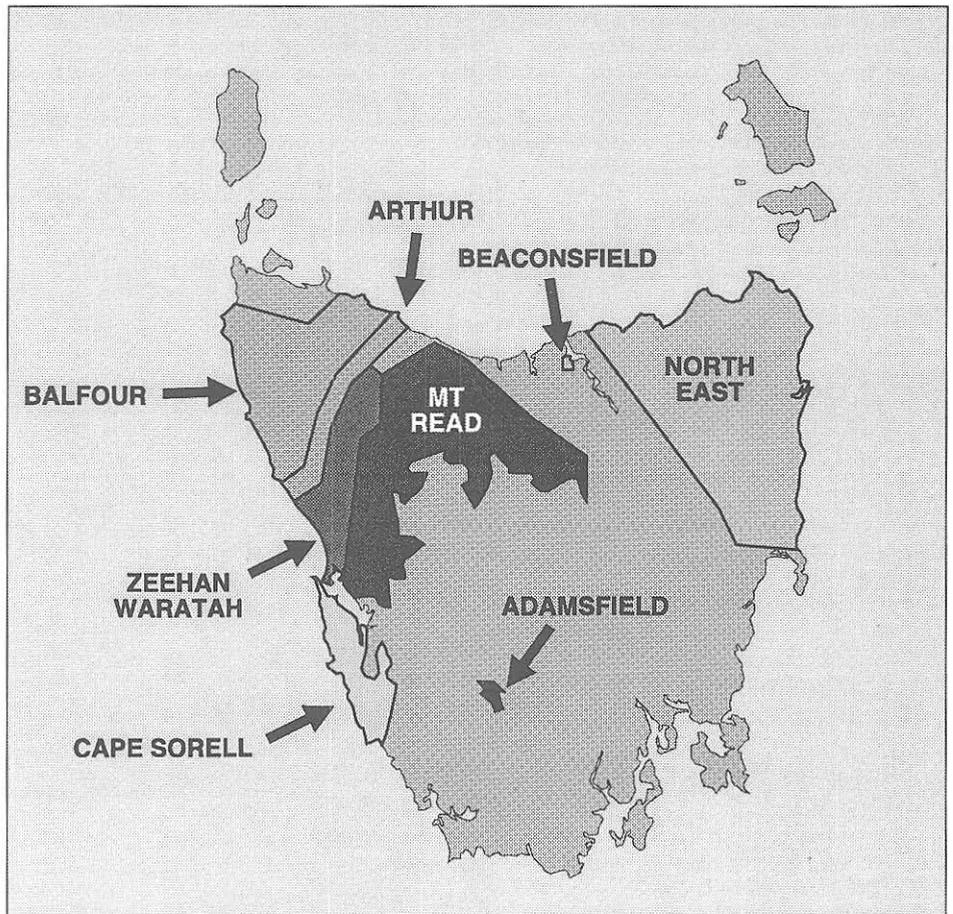
Companies submitted 133 exploration reports. These were indexed on the TASXPLORE database and incorporated in the Division's collection, which totalled 4260 reports at year's end. The reports are a valuable addition to the geological and mineral knowledge of Tasmania. Microfilming of reports continued, and microfiche of all open file reports are available.

Strategic Prospectivity Zones

Strategic Prospectivity Zones (SPZ) cover 25 200 km², or 37% of the State. The areas in each SPZ occupied by mining tenements at the end of June were:-

SPZ	Area (km ²)	% Occupied
Balfour	3912	13
Arthur	1108	12
Zeehan/Waratah	1834	36
Mount Read	7170	25
Cape Sorell	1382	54
Beaconsfield	19	100
Adamsfield	74	Nil
North-East	9708	36

Strategic Prospectivity Zones



Lease Applications

During the year, 62 mining lease applications were received. These applications included 36 on Crown Land and 26 on private property.

There are 766 mining leases held for various mining products, compared to 814 in the previous year.

Number and areas
of leases and licences
applied for during
the year ended
30 June 1994

<i>Product</i>	<i>Number</i>	<i>Area (ha)</i>	<i>Sluiceways</i>
All minerals	2	5 003	
Specimens	1	11	
Gold	2	45	
Granite	2	6	
Gravel	2	103	
Silica	1	219	
Sand	1	10	
Sand and stone	1	5	
Sand and gravel	1	100	
Stone	46	310	
Housing easement	1	9	
Pipeline easement	1	2	
Water easement	1		2
Total	62	5 823	2

Number and area
of leases and licences
granted during
the year ended
30 June 1994

<i>Product</i>	<i>Number</i>	<i>Area (ha)</i>
All minerals	3	5 556
Specimens	1	11
Dolomite.....	2	10
Gravel	7	145
Limestone	1	632
Sand	1	50
Sand and gravel	1	100
Stone	7	220
Total	23	6 724

Total number of leases
and licences in force on
30 June 1994

<i>Principal Product</i>	<i>Number</i>	<i>Area (ha)</i>	<i>Sluiceways</i>
All minerals	36	18 424	
Clay	9	180	
Coal	13	6 610	
Copper	4	1 244	
Dolomite.....	4	141	
Easements	43	268	201
Gold	29	1 275	
Granite	9	50	
Gravel	148	3 405	
Gravel and stone	8	569	
Iron	1	1 959	
Kaolin	2	373	
Lead and zinc	1	6	
Limestone	11	1 222	
Magnesite, silica and talc...	1	29	
Peat	5	772	
Sand	61	1 915	
Sand and gravel	28	3 082	
Sand and stone	12	241	
Sandstone	2	32	
Savage River Easements ...	12	2 248	
Shale	4	39	
Silica	16	1 716	
Silver and lead	1	8	
Slate	6	190	
Specimens	3	29	
Stone	258	7 645	
Tin	38	6 605	
Wolfram	1	4	
Total	766	60 281	201

Total number of all
types of prospecting
rights held as at
30 June 1994

<i>Mining Tenement</i>	<i>Number</i>	<i>Area</i>
Exploration Licences — All Minerals	113	5 456 km ²
Non Metallic	5	156 km ²
Oil	3	26 455 km ²
Retention Licences — All Minerals	13	78 km ²
Non Metallic	12	406 km ²
Prospectors Licences	22	500 ha
Miners Rights	8	2 ha
Owners Rights	2	304 ha
Permits to explore for Petroleum under <i>Petroleum(Submerged Lands) Act 1967</i>	3	167 blocks
Retention Licence under <i>Petroleum(Submerged Lands) Act 1967</i>	1	9 blocks

MINING HERITAGE

Two more policies on mining heritage, relating to mine closure and mine re-opening, were released during the year. These complement the first policy which establishes the Mining Heritage Committee and outlines procedures to be followed on the sale of old mining equipment.

A mining heritage study of the Mount Lyell Mining Lease was arranged. This project was co-ordinated and supervised by Branch staff. The study was undertaken by Sydney-based consultants Godden-Mackay Pty Ltd, and has resulted in a very useful reference document which will be used when making decisions relating to the future of the Mount Lyell Mining Lease.

A presentation was made by the Managing Geologist at the ICOMOS Conference held in Launceston on *Balancing Heritage and Safety Issues at the Time of Mine Closure*.

A sign was designed and installed at the Mt Paris Dam site in northeast Tasmania. The sign outlines the history and significance of the dam. The Branch was involved in the inter-departmental discussions which resulted in an agreement whereby the dam will be decommissioned but left on site, largely intact. Parts of two panels will be removed to prevent any danger of the dam retaining water.

One meeting was held on the Mt Cameron Water Race. Discussions were held with Forestry Tasmania and the Department of the Environment and Land Management on the possibility of the race being given some statutory protection.

**ROYALTY
ADMINIST-
RATION AND
SUPPORT
SERVICES**

In addition to the management of royalty regimes and the pricing and monitoring of fees for services, program outputs included:-

- Undertaking field audits of both mining and mineral processing entities to ensure that the State receives an equitable return for its mineral resources;
- Recording and processing up-to-date information on the status of mineral tenements (including offshore) and all land tenure which may affect mining activity;
- Providing geological and exploration information in both map and GIS formats; and
- Provision of library, editorial and publication services.

Royalties Revenue

In 1993/94 the budget estimate for royalties was based on revenue received in 1992/93. Due to poor commodity prices and the state of the mining industry generally, royalties were significantly lower than for the previous year, with the actual amount received being \$3.9 million or approximately \$2 million less than the budget estimate. The retrospective introduction of a mineral exploration rebate compounded this position, with approximately \$250,000 being returned to the industry.

Audit

The validation of production returns by the Mines Inspectorate and the ability to interrogate the mining lease database has resulted in the recovery of \$38,000 of royalty previously not returned. The appointment of an inspector covering small operations in the north of the State will be an advantage to this program.

Of the major mining companies, Aberfoyle Resources Ltd (Hellyer Division) and Renison Ltd were audited during 1993/94, with Pasminco Rosebery, Mt Lyell, The Cornwall Coal Company and Merrywood Coal to be audited in 1994/95.

Policy Review

A review of royalty regimes neared completion at 30 June 1994. The report will be submitted to the Government for consideration.

A review of fees for mineral licenses and all other fees for services will be undertaken in 1994/95.

**Data
Management
Group**

The former Geological Cartographic and Mining Tenement Drafting Sections were amalgamated in 1993/94 to form the Data Management Group.

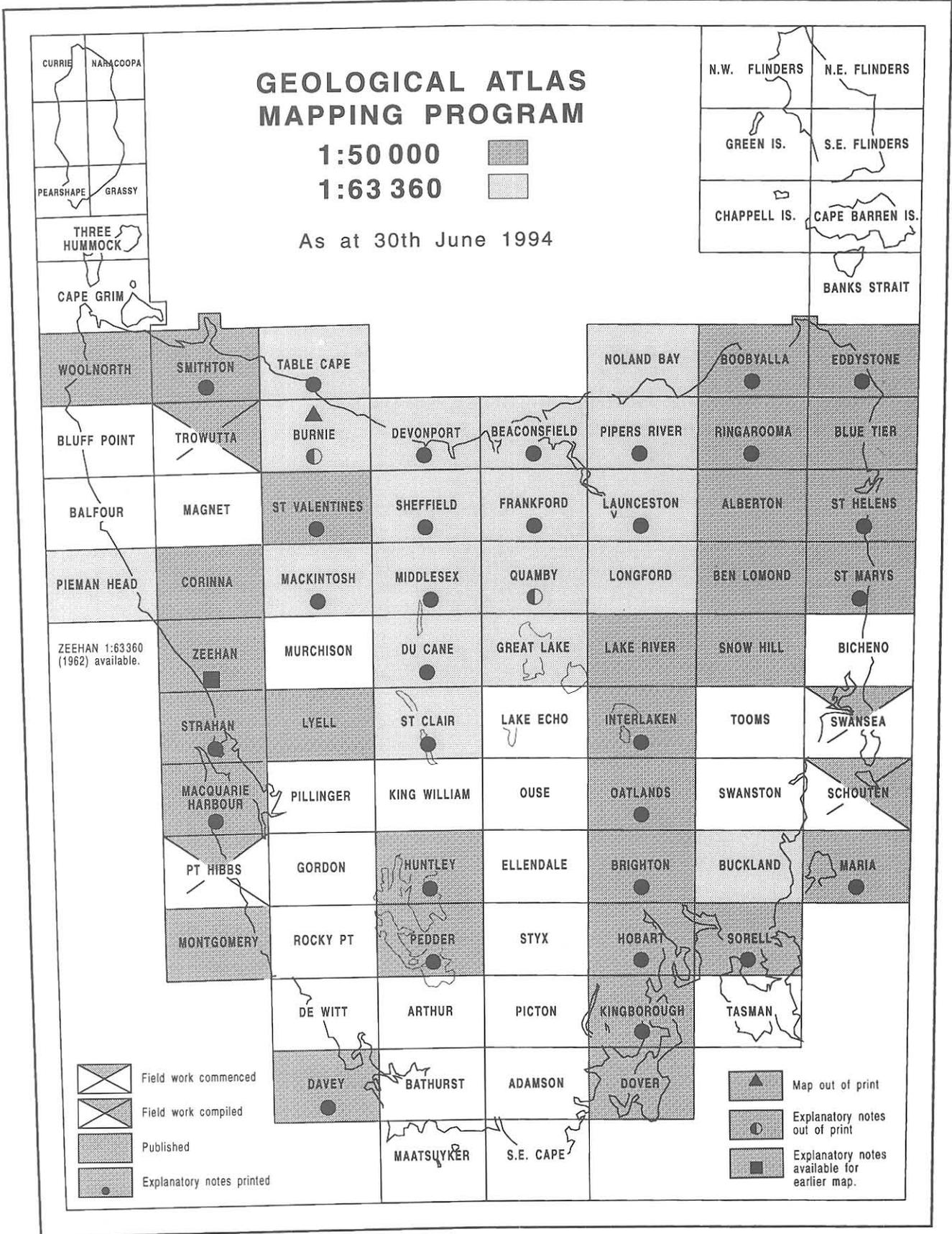
Early retirements and voluntary redundancies resulted in a 45% reduction in staff numbers.

The Data Management Group is responsible for:-

- The recording of mining tenements on the Department's maps and plans;
- The management of the department's Geographical Information System and computer-aided drafting system;
- The provision of support drafting services;

Geological maps completed and/or reprinted during the year were:

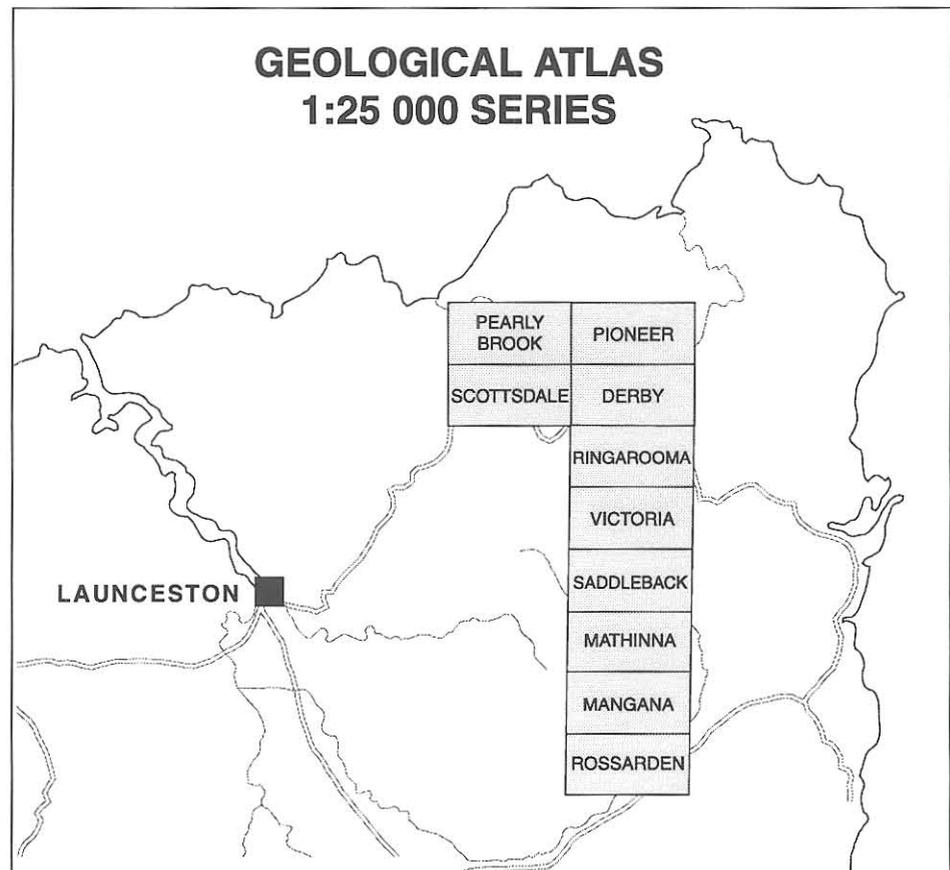
- 1:50 000 scale Geological Atlas Series — Sheet 50 (Zeehan)
- 1:63 360 scale Geological Atlas Series — Sheet 39 (Launceston) and Sheet 30 (Beaconsfield);
- 1:250 000 scale Geological Atlas Series — SK 55/5 (Queenstown);
- Northeast Groundwater (Scottsdale Basin Hydrogeology) 1:60 000 scale.



In line with MRT's GIS policy, a larger computer system was purchased and the Arc/Info GIS software upgraded to enable more staff to be involved in the GIS program. Over the last six months the development of the GIS increased rapidly, primarily because of the timing of the NETGOLD project. The commitment of staff to increase their technical knowledge in the use of GIS, including computerised map generation, is commendable and all staff within the Group are to be congratulated. The dissemination of MRT's digital data to clients using this technology is now comparable with that of our mainland counterparts.

The success of the NETGOLD project was largely attributable to the production, in digital form, of the following:–

- The completion and output of the digital geology of North Eastern Tasmania at a scale of 1:250 000;
- The capture and output of ten digital geological maps at a scale of 1:25 000;
- The capture of stream-sediment geological sample points over the project area;
- The creation of GIS data sets, covering the project area, of other databases relative to mineral deposits, drill hole locations, and rock chemical analysis sample points;
- Production of CAD diagrams and maps.



Library

Through an agreement with the State Library of Tasmania, the library at MRT has been operating as part of the State Library's Government Library and Information Service (GLIS). This agreement terminated on the 30 June 1994 with the management of the library thereafter being the responsibility of MRT.

Information Services

During the year the Library continued to provide a service to the staff of Mineral Resources Tasmania, to mining company geologists, and to members of the general public.

The number of commercial searches of the TASXPLORE database has remained at a level similar to 1992/93, with 21 searches being carried out. Reports relating to the Exploration Tender Area Service continue to be available through the Library in hard copy and on microfiche.

Technical Services

The updated version of the Library catalogue software, INMAGIC PLUS, was installed in the latter half of the year. This software is menu driven, with increased search capabilities.

A total of 238 items was added to the catalogue during the year including 88 monographs. The remaining items were annual reports and individual issues from various Geological Survey series.

Journal subscriptions continue to be reviewed, with five titles cancelled for 1995 and three new serial titles subscribed to.

Publications

The Publications Section continued to provide a wide range of services to the Division. The change in focus of the Division's activities resulted in a shift away from the traditional base work of the section, with only one geological explanatory note, for the Macquarie Harbour quadrangle, being published during the year.

Annual Review

The parliamentary reporting requirement of the Division is now included as part of the TDR annual report. An annual review of the activities of Mineral Resources Tasmania was produced and printed, replacing the old *Annual Report of the Director of Mines*.

Promotional Books

Two promotional books, *Mineral Opportunities in Tasmania* and *Tasmania: Inviting investment in base and precious metals* were produced externally but with input from the Publications Section. The former publication was produced in consultation with the TDR Public Affairs Section, with all production work by an external agency.

The second booklet was produced as a country supplement to the London-based periodical *Mining Journal*. Although being produced in the UK, MRT supplied all text, diagrams and photographs. The supplement was printed as part of the February 25 edition of *Mining Journal* and was distributed world-wide.

External Papers

Two reports were produced by the Publications Section for inclusion in external publications. A paper entitled *Mineral exploration and development in Tasmania* by M. W. D. Ayre was produced for an Australian Mineral Foundation symposium on minerals and energy investment in Australia. An excursion guide to the Mt Read Volcanics and associated ore deposits, by K. D. Corbett and J. McPhie, was produced for the General Assembly of the International Association of Volcanology and Chemistry of the Earth's Interior and published by the Australian Geological Survey Organisation as their Record 1993/63.

NETGOLD project

As part of this project the Publications Section produced 12 reports on various aspects of the northeast Tasmania goldfields. These reports were distributed as part of the NETGOLD data package as well as individually, with over 220 reports being sold. Other material produced for the project included a promotional leaflet, project updates, and a project price list.

Miscellaneous

Miscellaneous work produced during the year included:

- Two updates of the List of Publications.
- Miscellaneous leaflets and publications, including:
 - Advice to potential objectors to Exploration Licences;
 - Advice to Prospectors;
 - Mineral Tenements — Guidelines for reporting;
 - Mutual Recognition and Occupational Registration;
- An updated edition of *How to Hazchem placard premises storing dangerous goods*.
- A new edition of *Notes for the Tasmanian Shot-firer*.
- Annual Report, Dangerous Goods Inspectorate.
- Examination papers for shotfirers and transport drivers.

Material was also prepared for various displays, including Mining Week, Zinc 93, Netgold, Agfest, and Aurisa.

Reports

The following reports were produced during the year:

- 1993/10 *Notes on the geology of the Lyell Quadrangle between the East Queen River and Linda Creek*, by E. Williams [6 July 1993]
- 1993/11 *Tectonothermal evolution of the northwest part of the Zeehan Quadrangle and contact metamorphism of the Oonah Formation by the Heemskirk Granite*, by B. D. Goscombe and A. V. Brown [26 October 1993]
- 1993/12 *National Mapping Accord Programme Geochronology Component: 1993–94 batch of samples*, by N. J. Turner [16 July 1993]
- 1993/13 *Monitoring of Grooms Slip near Penguin: 1979 – 1993*, by G. Benn [19 July 1993]
- 1993/14 *Monitoring of Bovill's Slip — Brooke Street, East Devonport: 1980 – 1991*, by G. Benn [19 July 1993]
- 1993/15 *Monitoring of Ambrose's landslide at Rokeby: 1987 – 1991*, by G. Benn [19 July 1993]
- 1993/16 *Potential bulk geological commodities near Tasmanian ports*, by N. J. Turner [22 July 1993]
- 1993/17 *Monitoring of landslides at Windermere*, by G. Benn [17 July 1993]
- 1993/18 *Catalogue of data relating to King Island Scheelite Limited*, by N. J. Turner [5 August 1993]
- 1993/19 *Report on visit to Victoria, Long Struggle and Linton Mines, and to White's Alluvial Workings, Mangana, 30 June–1 July 1993*, by R. H. Findlay [4 August 1993]

- 1993/20 *Drilling at the silica mine and elsewhere around Corinna*, by N. J. Turner [24 August 1993]
- 1993/21 *Mineralogical examination of some mineral samples from Tasmania, for the Tasmanian Museum and Art Gallery*, by R. S. Bottrill and R. N. Woolley [16 August 1993]
- 1993/22 *Monitoring of house in Beach Road, Legana*, by G. Benn [17 August 1993]
- 1993/23 *General features and chemical analyses of mafic and other rocks, Corinna geological map quadrangle*, by N. J. Turner and A. J. Crawford [9 September 1993]
- 1993/24 *Landslide monitoring at Beauty Point, 1991–1993*, by G. Benn [25 October 1993]
- 1993/25 *Monitoring of Fromberg's slip, Ulverstone, 1988 to 1992*, by G. Benn [25 October 1993]
- 1993/27 *K-Ar geochronology in the Arthur Metamorphic Complex, Ahrberg Group and Onah Formation, Corinna district*, by N. J. Turner [20 September 1993]
- 1993/28 *Geological setting and petrochemistry of Eocambrian–Cambrian volcano-sedimentary rock sequences from southeast King Island*, by H. M. Waldron, A. V. Brown and R. R. Keays [15 September 1993]
- 1993/29 *Summary of structural and stratigraphic observations on the Proterozoic / Eocambrian / Cambrian and Permian units of the Zeehan 1:50 000 Quadrangle*, by R. H. Findlay [27 September 1994]
- 1993/30 *Some Tasmanian coal statistics (1993)*, by C. A. Bacon [13 May 1994]
- 1993/31 *Partial inventory of sites in rainforest used for mining or exploration purposes*, by C. A. Bacon and J. Lynch [1 October 1993]
- 1993/32 *Brown coal deposits in Tasmania (Revision 1)*, by C. A. Bacon [19 October 1993]
- 1993/33 *The age and intrusive relationships of granitoids of the Blue Tier batholith, northeast Tasmania*, by M. P. McClenaghan and N. C. Higgins [22 November 1993]
- 1993/34 *Northeast Goldfields. A summary of the Alberton Goldfield*, by J. Taheri [8 April 1994]
- 1993/35 *STRESS: a computer program for the calculation of the regional stress tensor from faults and their striations*, by R. H. Findlay [23 August 1993]
- 1993/36 *Bulk materials: Assessment of the Construction Materials Register*, by B. D. Weldon and D. J. Sloane [14 December 1993]
- 1994/01 *The Lisle–Golconda–Denison goldfields (including some adjacent gold mining areas)*, by R. S. Bottrill [8 April 1994]
- 1994/02 *Geology and mineral resources of the Mt Horror Exempt Area*, by R. S. Bottrill [8 April 1994]
- 1994/03 *A summary of the Beaconsfield, Lefroy, Back Creek and Gladstone goldfields*, by M. P. McClenaghan [8 April 1994]
- 1994/04 *Geochemical reconnaissance of the Four Mile Creek Exempt Area*, by D. McP. Duncan [8 April 1994]

- 1994/05 *A study of the nature and origin of gold mineralisation, Mangana–Forester area, northeast Tasmania* by J. Taheri and R. S. Bottrill [8 April 1994]
- 1994/06 *Structure and veining in the Devonian-aged Mathinna–Alberton gold lineament, northeast Tasmania*, by R. A. Keele [8 April 1994]
- 1994/07 *Structure of the GIS databases presented as part of the NETGOLD data package*, by M. J. Roach, M. P. McClenaghan and R. S. Bottrill [8 April 1994]
- 1994/08 *An interpretation of recent geophysical surveys, northeastern Tasmania*, by R. G. Richardson and M. J. Roach [8 April 1994]
- 1994/09 *Specification summary — aeromagnetic survey, northeast Tasmania*, by R. G. Richardson [8 April 1994]
- 1994/10 *A review of sand resources in the Hobart area*, by R. C. Donaldson and W. L. Matthews [13 May 1994]
- 1994/11 *Granitic rocks from the Montgomery 1:50 000 scale geological map sheet*, by A. V. Brown [3 May 1994]
- 1994/12 *Observations on some features of the Heemskirk Granite*, by M. P. McClenaghan [10 May 1994]
- 1994/13 *Drilling investigations of geophysical anomalies and Cainozoic deposits, Fingal–Mathinna area: Preliminary report*, by J. L. Everard [16 June 1994]
- 1994/15 *Geophysical anomalies at Anio Creek*, by R. G. Richardson [24 June 1994]

MINES INSPECTION

The Chief Inspector of Mines has responsibility for managing the following issues:

- Monitoring work environments on mines, quarries and mineral processing sites to ensure the health and safety of employees;
- Assisting with the processing and monitoring of mining leases;
- Ensuring that mining operations are conducted in an environmentally acceptable manner; and
- Liaising with the Department of Environment and Land Management, Forestry Tasmania, and municipal authorities on land planning issues.

Mines Inspectorate

GENERAL

At the beginning of the year the Mines Inspection Branch consisted of the Chief Inspector of Mines, three mining engineers, a mechanical engineer, an electrical engineer, a metallurgist and two technical engineers. The two industrial chemists, who previously made up the full complement of the Branch, were transferred to the Dangerous Goods Branch (now the Chemical Safety Section) with effect from 1 July 1993.

Mining Engineer J. W. Dempster took early retirement in July. In order to meet inspection requirements of quarries and to accommodate demands with regard to the Mining Act, Technical Officer R. Mulligan — by then appointed as an inspector of mines for small operations — was transferred to Launceston to assume these responsibilities for the northeast of the State. Mr Mulligan terminated his services with the Department in March 1994.

Mr J. G. Las commenced employment as a Mining Engineer located in Hobart in April. From the time of his appointment to the end of the year he was required to carry out the duties in the northeast previously undertaken by Mr Mulligan.

The vacancy in Launceston was filled on 1 July 1994 by Mr C. van Namen, who was engaged as a technical officer and has since been appointed as an inspector of mines.

In October 1993, Mr M. W. D. Ayre relinquished the responsibility of Chief Inspector. Mr A. S. Christianson was subsequently given that responsibility through appointment by the Minister.

FUNCTIONS OF THE MINES INSPECTORATE

The Inspectorate has responsibility for the administration of the *Mines Inspection Act 1968* and attendant regulations. Assistance is given in the application of the *Dangerous Goods Act 1976*, the *Mining Act 1929* and the *Environment Protection Act 1973*.

Through the application of regulations, and routine and special inspections, the Inspectorate ensures that safe and healthy work practices are maintained in mines, quarries and works.

Discussions are frequently held with management and employees with regard to improvement in their organisation's safety culture and the implementation of a sound safety management system. A program has been developed for the auditing of safety management systems, which will identify specific areas where the management of safety can be improved.

The Inspectorate examines plans and proposals for the operation of mines, plant and equipment and issues approvals as appropriate. This includes the examination of submissions for approval for use of diesel engines underground and applications for approval of mine winders, cranes and lifting equipment. Consideration for approval is also given to tailings dam designs, certain mine project proposals, and new construction projects.

Applications for leases and lease renewals, transfers and surrenders are processed by the Inspectorate. The positioning of marking-out notices for new leases are verified, environmental impact statements or environment

management plans are scrutinised, and realistic bond amounts, levied as assurances for the final rehabilitation of disturbed areas, are assessed.

Inspectors advise mine operators on best practices with regard to occupational health and safety and the ecological environment, and assist small operators in determining the most practical methods of operation.

ENVIRONMENTAL CONTROL MEASURES

Consideration is to be given by the Department of Environment and Land Management (DELM) to registering inspectors of mines as officers under the *Environment Protection Act 1973*.

Joint inspections by the Inspectorate and members of the Division of Environmental Management have been conducted to approve the rehabilitation progress on one of the major mines on an annual basis for several years. This procedure is to be extended to all other major mines in the future.

Mineral Resources Tasmania (MRT), assisted by the Division of Environmental Management, will produce a policy document outlining procedures to be followed by currently operating and new mines in order to prevent the discharge of acid mine water into the environment.

Following promulgation of a new *Environmental Management and Pollution Control Act*, anticipated in early 1995, Local Government will issue environmental permits for extractive industry pits and quarries producing less than 5000 m³ of product per annum and mines producing less than 1000 tonnes of minerals per annum. The Chairperson of the Land Use Planning Review Panel has consented to MRT being a nominated referral agency to ensure consistency in stipulated operating conditions for leases.

HEALTH CHECKS

The Workers Occupational Diseases Board was disbanded by means of an amendment to the *Workers (Occupational Diseases) Relief Fund Act 1954* on 31 January 1994. Employers and employees contributions remaining in the fund will be available for research by the University of Tasmania into occupational health and safety in Tasmania's mining industry. Government's contribution to the Workers Occupational Diseases Relief Fund will revert to the consolidated fund, which will meet future liabilities arising out of the *Workers Occupational Diseases Act*. Administration of the Act is the responsibility of the Secretary of the Department. The Information Officer (Workers Compensation) is the contact for all enquiries concerning compensation for occupational diseases arising within the mining industry.

There is no longer a requirement for medical examinations to be carried out prior to the commencement of employment or on a bi-annual ongoing basis under the *Workers (Occupational Diseases) Relief Fund Act 1954*. However, the *Mines Inspection Regulations 1991* include a provision whereby an employer, if instructed to do so by the Chief Inspector of Mines after consultation with the Director of Public Health, must make these medical examinations available to all employees and prospective employees. Thirty-four mine, quarry and mineral processing plant operators have been advised that they are required to do so.

WORKPLACE HEALTH AND SAFETY ACT

A Bill for a single piece of occupational health and safety legislation to provide for all industry is to be drafted by the end of the calendar year. It is anticipated that the Bill will include all of the principal provisions of the *Mines Inspection Act 1968*, such as the requirements for the appointment of managers, the qualifications of managers, the duties of managers and employees, and appointments to statutory offices (Chief Inspector and Inspector of Mines).

NATIONAL UNIFORMITY

The *Handbook for Safe Mining*, commissioned by the Australian and New Zealand Minerals and Energy Council (ANZMEC), has been delayed in drafting due to a complex consultation process with regard to its purpose, style, format and content. First draft completion has been deferred from April 1994 to September 1994.

In the interests of uniformity, various assignments were given at the Conference of Chief Inspectors of Mines, including the following Environmentally Sustainable Development tasks:-

- Task 1** Prepare guidelines for the rehabilitation of abandoned mine sites.
- Guidelines have been prepared and agreed upon by the CCIM.
- Task 2** Assess costs involved in developing a register of abandoned mine sites in each State.
- Costs have been collated.
- Task 3** Prepare papers on the following two topics:
- (i) Security Deposit Systems
 - (ii) Minimum Environmental Standards for Existing Mines.
- Papers have been tabled.
- Task 4** Prepare a position paper for the rehabilitation of operational mine sites, to support the development of a policy framework based on ESD principles.
- The CCIM have undertaken to frame a draft paper which will be finalised at the 1994 CCIM conference in November.
- Task 5** Examine the introduction of a system of professional qualifications for quarry managers.
- The CCIM will formulate a position paper at their November Conference.

MINE MANAGERS CERTIFICATES OF COMPETENCY

The following Mine Managers Certificates of Competency were issued by the Board of Examiners in accordance with the provisions of the *Mines Inspection Regulations* and the *Mutual Recognition Act*.

<i>No</i>	<i>Name</i>	<i>Mine</i>
347/93	Neville Keith Bergin	Pasminco Mining
348/93	Trevor Kenneth Coombe	Pasminco Mining
349/93	Wade Thomas Stevenson	Hellyer

MINING WEEK

The Department participated in State-wide activities, aimed at creating an awareness in the general public of the impact of mining on the economy of the State and the procedures followed to minimise and rehabilitate disturbances of the natural environment. This included an open day at the Queen Victoria Museum in Launceston and a display throughout the week in the Eastlands Shopping Centre at Rosny Park.

A total of 60 members of MRT and the Industry Services Division assisted with these two functions.

SAFETY PERFORMANCE AND ACCIDENTS

Further improvements were realised in safety performances, as indicated by the lost-time injury frequency rates for the various reporting operations. Sixty-eight percent of mines and mineral processing plants recorded improvements against the previous year, while an improvement of 27% was realised for quarries.

The overall frequency rate of 33.1 lost-time injuries per million hours exposure reflected an improvement of nearly 20%.

*Mining industry lost-time
accident statistics
1993/94*

<i>Employer</i>	<i>Manhours Exposure</i>	<i>No. of Injuries</i>	<i>Days Lost</i>	<i>No. of Employees</i>	<i>Frequency Rate</i>	<i>Severity Rate</i>
Aberfoyle-Hellyer	519 058	15	341	288	29	657
Henty	69 083	1	5	34	14	72
Mt Lyell	728 707	11	270	369	15	371
Pasminco Rosebery	674 063	7	131	345	10	194
Renison	720 291	3	22	315	4	31
Savage River	379 286	45	1 119	181	119	2 950
Tasmania Mines	53 020	0	0	21	0	0
<i>All Mines</i>	3 143 508	82	1 888	1 553	26	601
Brickworks	186 250	20	795	97	107	4 268
Comalco	1 377 439	121	1 755	774	88	1 274
Goliath Cement	472 659	6	105	218	13	222
Mole Creek	44 541	3	77	24	67	1 729
Pasminco-EZ Risdon	1 802 876	27	1 372	847	15	761
Port Latta	161 777	11	137	76	68	847
TEMCO	641 883	10	251	356	16	391
Tioxide	468 464	3	15	255	6	32
<i>All Works</i>	5 155 889	201	4 507	2 647	39	874
Cornwall Coal	180 499	0	10	106	0	0
Merrywood Colliery	25 478	2	45	13	78	1 766
<i>All Collieries</i>	205 977	2	55	119	10	267
<i>All Quarries</i>	291 456	8	533	140	27	1 829
Totals	8 796 830	293	6 983	4 459	33	794

DEFINITIONS

Frequency Rate

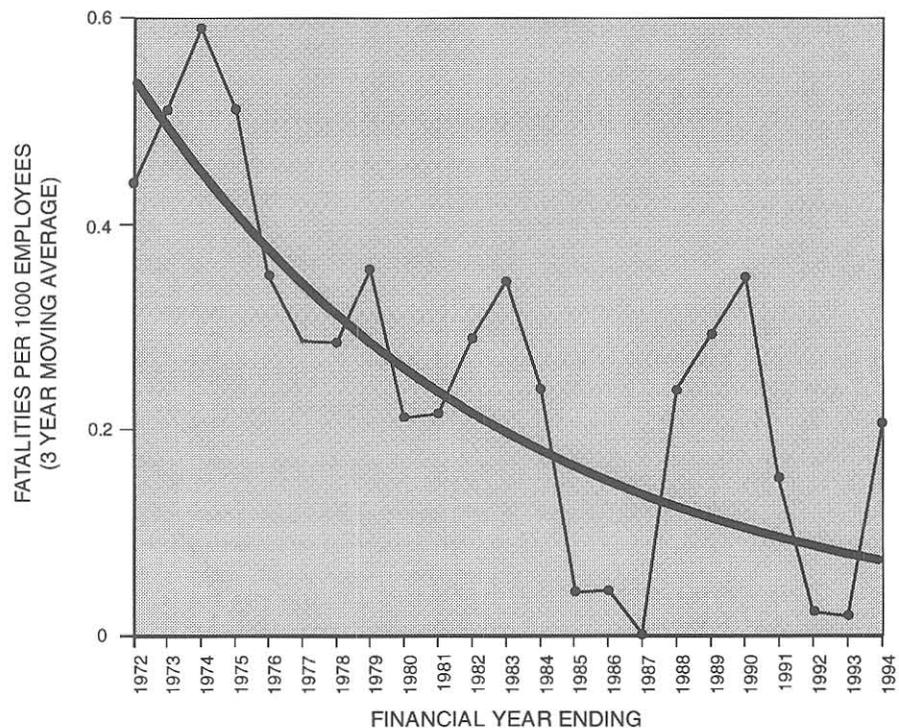
This is the number of lost-time injuries in the year, related to a million work-hour unit, as follows:

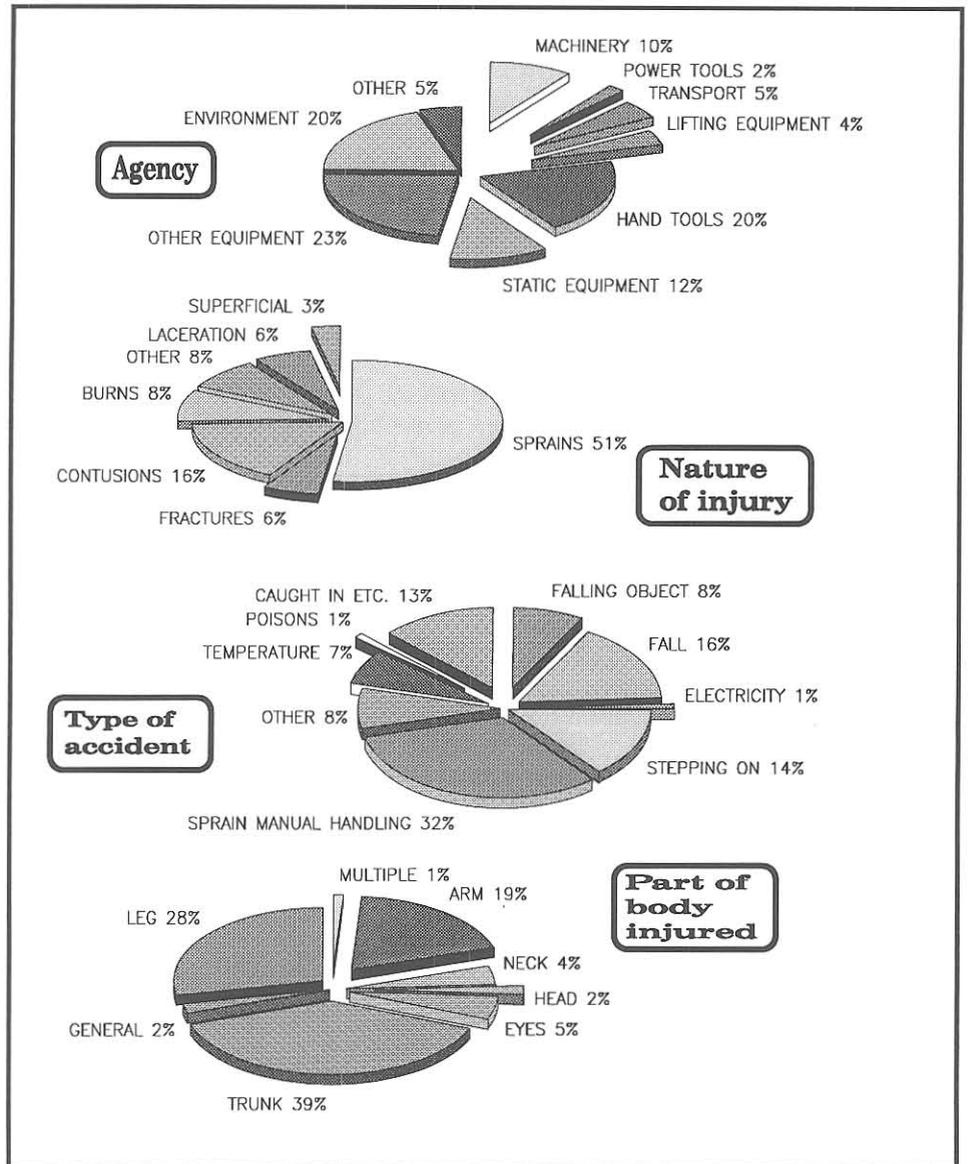
Lost Time Frequency Rate = Number of lost-time injuries × 1,000,000 / Work-hours exposure

Severity Rate

Severity rate = Days (shifts) lost × 1,000,000 / Work-hours exposure

*Fatality rate
improvement in the
mining industry
1971/72 to 1993/94*





Special Achievement Awards

The Cornwall Coal Company No Liability achieved 365 lost-time injury free days in May. In recognition of this achievement, Cornwall employees are to be presented with a Special Achievement Award.

Consideration is being given to acknowledging meritorious achievement in the rehabilitation of areas disturbed by the mining process. This will be a joint MRT/DELM initiative.

Occupational Health And Safety Seminar

The 1993 MRT/Chamber of Mines Occupational Health and Safety Seminar was held at the Sheraton Hotel in Hobart during September 1993. The theme of the Seminar was "Safety — Continual Improvement". The Seminar was attended by management and employees from the mining and other industries. Registrations, at 180, exceeded those of previous years.

During the course of the Seminar, the Intermine Safety Competition awards for 1992/93 were presented by the Minister for Mines to:—

- Renison Tin — for the major contribution to mining industry safety;
- Renison Tin — as the safest underground mine;
- Tioxide — as the safest large surface operation; and
- Beams Brothers — as the safest small surface operation.

Mine Rescue Competition

The 1993 Mine Rescue Competition was held in Queenstown on 27 November. Six teams from the four major Tasmanian mines and a team from New South Wales participated. The events which make up the competition are theory and practical exercises in mine rescue, first aid and fire fighting. The host mine team, representing Mt Lyell, was adjudged the overall winner.

SERIOUS ACCIDENTS

Fatal Accident

- A contract carpenter, Roger Langmaid, died at Pasmaenco Metals-EZ as the result of receiving an electric shock on the mezzanine floor below the cell room.

Caught in

- A truck driver received serious chest injuries when crushed between a front-end loader and a semi-trailer whilst assisting with the positioning of a container.
- While tracking a new conveyor belt, a fitter had his left arm caught between the belt and the return idler. His other arm became trapped while attempting to free himself. He suffered a broken arm and bruising.
- A stevedore, whilst in the course of his employment by a metal refinery, had the tops of two fingers severed when they were caught between an anchoring line and a bollard.
- An operator at a mineral processing plant lost the flesh from the tips of four fingers when his hand was drawn into the unguarded hook block of a hoist. The tips of his fingers were later amputated.

Struck by

- A contractor sustained head injuries when struck by the hose supplying high pressure water to a blaster lance he was using, catapulting him over a nearby handrail.
- An operator suffered broken ribs and internal bruising when the steel bar he was using became jammed in an automatic cathode stripping machine.
- A wharf worker was knocked off the wharf when two waste disposal hoses pulled out of metal spool pieces. He sustained contusions and suffered trauma.

Falls

- A mine employee received a crushed vertebra after stepping onto an unsecured ladder from the roof of a shed and falling to the ground.
- The driver of a mine truck was severely bruised as the result of the truck skidding off the haul road and rolling over.

Heat

- An operator suffered severe burns of a foot when molten metal entered his boot. His foot was later amputated.

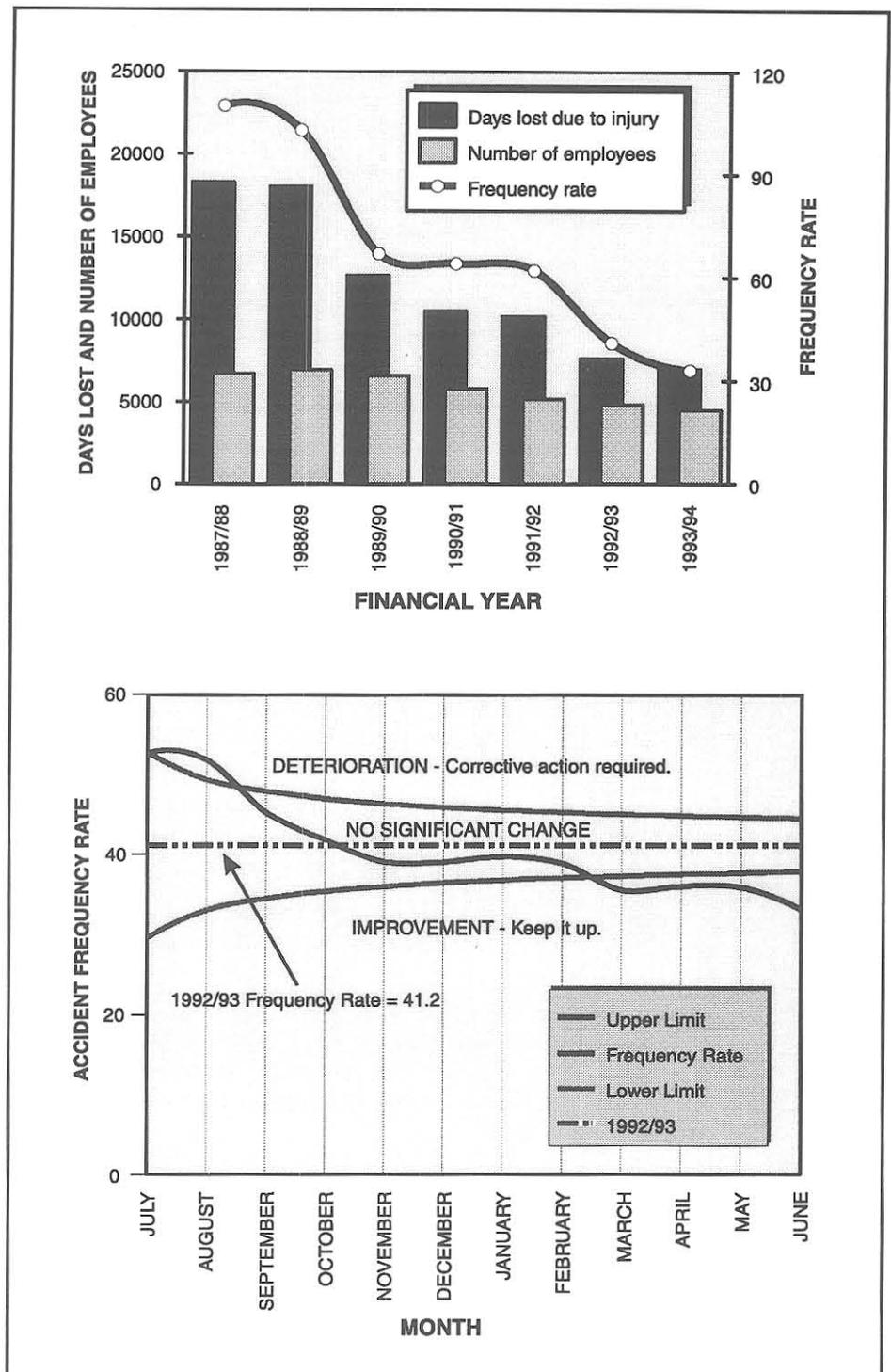
Electricity

- An apprentice electrician was burnt when a metal-banded brush shorted the incoming supply to the switchboard.

MECHANICAL INSPECTIONS

The following certificates of competency were issued:

Mine Winder Drivers	4
Stationary Engine Drivers	0
Restricted Crane Drivers	56
Crane Drivers	<u>10</u>
	<hr/> 70



Machinery and Vehicles

□ Approvals (and rejections of applications)

Cranes	4
	(+ 1 rejected)
Jib cranes	2
Monorail hoists	2
Winders	2
Lifting attachments	2
	(1 temporary)
Slag transporter	1
LHD (braking system)	1
Compression ignition engines for underground use	66

- ❑ A ventilation shaft which, it has been proposed, will also serve as an emergency exit, has been planned for the south-end of Pasmaenco Mining's Rosebery mine. The emergency egress winder is to be constructed from the old No. 2 Shaft Mary Anne winder fitted with an hydraulic drive. Control will be push-button automatic.
- ❑ The proposed winder for the Renison Tin Limited internal ore hoisting shaft will be a single skip and counterweight Koëpe winder. Control is to be fully automatic with push-button over-ride for shaft inspection. Emergency recovery will be by controlled gravity winding.
- ❑ Pasmaenco Metals-EZ is liaising with the Mechanical and Electrical Inspectors during the development of a new cathode stripping machine.

Significant Incidents

- ❑ A zinc dust fire started when an access platform was being welded onto the side of a zinc dust collector. It was determined that the bin had not been thoroughly cleaned.
- ❑ A pressure damper installed on a diamond drill water supply line exploded when a positive displacement pump was operated against a closed head. There were no injuries. This was the second such occurrence of the same nature in the same area during the past three years. The first incident resulted in a fatality.
- ❑ A tractor overturned whilst towing a trailer. There were no injuries. The trailer was not fitted with brakes and was being towed by a tractor that was too light to restrain the trailer under brakes.
- ❑ A hot-metal carrier collided with a trailer, resulting in total loss of the molten metal payload. There were no injuries or fires. Traffic routes are being revised to control this hazard.
- ❑ A Toyota utility was crushed by a reversing Elphinstone 73B truck outside a surface workshop. There was no injury.
- ❑ An unattended Avelling Barford scissor lift ran away down a declined tunnel when the parking brake failed to hold. The parking brake control had been replaced with a non-original component that was unsuitable for the system. The valve developed a slow internal air leak which pressurised the parking brake system and released the brake.
- ❑ Two trucks caught fire (in separate incidents) when oil from a failed steering hose sprayed on the engine. The hose separated at a union when a relief valve in the steering system failed to relieve on over-pressure. There were no injuries and all similar valves have been checked or replaced.
- ❑ A truck caught fire at an underground crusher tippie. The fire was extinguished by the operator using the truck's on-board AFFF system. The fire was caused by hydraulic oil being sprayed on the engine when the hydraulic pump feeding the tipping rams split. First indications are that this occurred due to the relief valve failing to relieve after the hoist actuating valve failed and blocked.
- ❑ An engine fire occurred on a truck when an injector pipe came loose. The fire was extinguished by the operator using the on-board AFFF system. Minimal damage and no injury occurred. Routine checking of the injector pipe securing nuts at service intervals has been implemented.
- ❑ A skip was wound into the ultimate limit following a mid-shaft overcurrent trip. There was no injury or damage. The winder driver mistakenly raised the wrong skip. Poor operating procedures at the load station, lack of procedures for dealing with mid-shaft trips, and bad decision making by the winder driver all contributed to this incident. Procedures have been revised and personnel have been re-trained.
- ❑ A guide wheel fell off a skip at the dump pocket of a shaft and fell through an unoccupied cage below. Falling rock is believed to have bent a wheel when the skip was at the load station and the wheel is thought to have been dislodged by contacting shaft steelwork at the dump pocket.

Development of the Tasmanian Safety Auditing System

Considerable time was invested in developing the beginnings of an auditing system for use in the deregulated industrial environment that is currently being created. The system benchmarks an organisation's performance at one of five levels. It is a self audit and the product is an agreed improvement plan.

The main difficulty being experienced in developing the system is that there is no existing comparable system in use. The closest is an American system, developed by A. D. Little and Associates. The system is to be tested by using it to determine the winner of the 1993/94 intermine safety competition major award.

ELECTRICAL INSPECTIONS

Safety Incidents

- Down-river crane 11 Kv reeling cable was cut by a loader. There were no injuries.
- At a gravel pit, a lead acid battery exploded when jumper connections ignited hydrogen from the battery.
- The Industry Services Division was assisted with investigating burns to a Hydro-Electric Commission (HEC) employee at Butlers Gorge, an electrocution of an HEC linesman on 22 Kv line, and the amputation of an operator's feet at Sorisdale, Burnie.

Equipment Approvals

There were no equipment approvals during the year.

Investigations

- Alternative power generation:** Further National Grid documents were issued, but the complexity and cost of proposals for breaking-up State electricity monopolies was widely criticised. The HEC confirmed a capacity surplus of 150 MW (12%) with the commissioning of the Anthony Scheme, although storages are only 50% full. Coal-fired generation is not likely in these circumstances. A National Grid Seminar was attended in Hobart on 2 August and a Tasmanian power options seminar was attended in Launceston on 8 May.

Assistance with HEC contract negotiations relating to mining companies was given.

Legislation and Standards

- SAA EL/38 meetings on mining equipment electrical systems, held in Sydney and Melbourne in August and November, were attended. A draft is out for comment.
- The Electrical Engineer participated in Working Parties for the new Tasmanian Occupational Health and Safety Act, promotion of new legislation, and major hazard facilities.

Sundry

- Coal mine flameproof equipment workshop TRCR lost its approval when its competent person left. Approval was restored when the manager gained a NSW certificate of competency.
- A proposal to set up an Electrolysis Committee to monitor extraneous corrosion from cathodic protection systems and possible Basslink DC cable was deferred indefinitely due to lack of interest.

METALLURGICAL INSPECTIONS

Significant Incidents

Significant incidents investigated during the year included a fatal accident and several other serious accidents, all of which are reported elsewhere.

In addition, the following incidents were investigated:-

- 500 m³ of concentrated acid spilled into a river when the bottom cone of a thickener collapsed.
- An operator had a hand trapped in a conveyor whilst attempting to remove a jammed lump from the belt. He was not injured but the accident could have had very serious consequences.
- A fire in the baghouse of a fine zinc dust plant (referred to in Mechanical Inspections).

Inspection Visits

Safety inspections were carried out during the year at Temco, Comalco, Pasminco Metals-EZ, Tioxide, IMP Silica, Port Latta, Mole Creek Limestone, and Currie River Mining at Lefroy.

Metallurgical advice and visits were made to the Forester Gold mine at Scottsdale, Riltec tailings plant at Mathinna, and Tasmania Mines at Hampshire. Tasmania Mines have started producing a finer ground magnetite and were having trouble with filtration, a problem which has now been overcome.

Several significant new engineering projects were inspected. These included:-

- new crust breakers;
- course butt cleaning;
- plant associated with changing of feedstock from ilmenite to a high titanium slag;
- a new Hazemag Impactor and Micro Pulsaire dust collector for limestone;
- a hot slag pouring area to produce aerated slag;
- an upgrade in a cement works of 250 000 tonne/year.

INDUSTRIAL HYGIENE

Fifty inspections and surveys of mines, works and quarries were conducted by the Occupational Health Unit during the year. Only seven of these assessments were comprehensive monitoring programs, the remainder being inspections.

The Occupational Health Unit's role has changed from being mining orientated to one encompassing all workplaces in Tasmania. One of the main activities was to encourage major mines to conduct their own Occupational Health and Safety programs. This has only been partly successful, with only six of the major mines carrying out limited surveys. Because of implementation difficulties and the restructuring of resources, four of these mines have engaged mainland consultants to conduct audits and carry out monitoring.

- Comalco has maintained its OH & S structure but the emphasis has been directed towards safety and engineering, while occupational health has taken a low profile. At present all surveys are conducted by outside consultants.
- Temco is the only mine with a qualified occupational hygienist. Nevertheless the major priority has been safety matters, although a program for occupational health has been promulgated.

- ❑ Pasminco Metals-EZ at Risdon carries out basic occupational health surveys, and atmospheric samples are now analysed by outside analysts. The company employs mainland consultants to conduct particular surveys of its plant environment.
- ❑ Pasminco Mining at Rosebery uses mainland consultants for all of its surveys.
- ❑ Tioxide employs mainland consultants.

It is envisaged that the smaller mines, works and quarries will encounter problems in obtaining expert occupational health advice.

The surveys of note were conducted at:-

- ❑ Pasminco Metals EZ Risdon: Acid mist, cadmium, lead, antimony;
- ❑ Savage River Mines, Savage River: Asbestos;
- ❑ Tioxide Australia: Asbestos;
- ❑ Aberfoyle Resources (Hellyer Division): Total dust, lead, noise;
- ❑ Cornwall Coal NL: Respirable dust, quartz;
- ❑ Industrial Sands and Silica: Respirable dust, quartz;
- ❑ Tonganah Clay: Sulphur dioxide, hydrogen sulphide, sodium dithionite.

**REVIEW OF
MINERAL
SECTOR
OPERATIONS
1993/94**

**Base Metal
Mines**

**ABERFOYLE RESOURCES LTD
(HELLYER DIVISION)**

Mining

Ore mined totalled 1.31 million tonnes at 13.5% Zn, 6.7% Pb, and 173 g/t Ag. Production was from sub-level open stopes and from pillar recovery.

Milling

The concentrator throughput for the year was 1.13 million tonnes. Concentrate production totalled:-

- Zinc concentrate — 232 922 t @ 50.2% Zn, 3.3% Pb;
- Bulk concentrate — 57 518 t @ 35.1% Zn, 10.9% Pb, 190 g/t Ag;
- Silver/copper concentrate — 10 808 t @ 4437 g/t Ag, 11.0% Cu;
- Lead concentrate — 62 327 t @ 57.1% Pb, 7.2% Zn, 600 g/t Ag

Exploration and Reserves

No exploration drilling was conducted on the mine lease during the year.

Infill drilling of the south end of the ore body was carried out from both surface and underground locations. A total of 1930 metres was drilled in sixteen holes.

At 30 June 1994, the Hellyer ore reserves were 8.4 million tonnes at 0.3% Cu, 5.9% Pb, 12.0% Zn, 140 g/t Ag and 2.1 g/t Au.

Employment

At 30 June 1994 the workforce totalled 287. Nine production days were lost underground due to industrial disputes.

Capital Expenditure

Capital expenditure for the year totalled \$4.63 million. An amount of \$2.76 million was spent on underground development, \$0.87 million on a pebble crushing mill, and \$1.0 million on other capital works.

PASMINCO MINING, ROSEBERY

Low ore and high production grade concentrate recovery were realised for the year. Metal prices remained depressed.

Employment in June totalled 272 people. A good safety performance was recorded. Hearing conservation, lead in blood, employee health assessment and upgraded dust monitoring programs were developed during the year. A site industrial agreement was negotiated and submitted to the State Industrial Commission.

In March Rosebery celebrated 100 years of mining in the district.

Mining

Ore production from underground was 536 643 tonnes averaging 9.7% Zn. The main producing areas were J and H lenses with some remnant mining in E and F lenses. Production from B lens above 15 level was terminated due to low grades and ore pinching out.

Improvements to the truck fleet were achieved through replacement of DJB400 trucks by new Elphinstone AE40 trucks and upgrading two Caterpillar D400 trucks. Improvements in the rock handling system were made to the rock sizer and shaft tip station.

Development work totalled 2456 metres, primarily in the Main Decline, 20 and 21 levels of J lens, and 19 level B Haulage.

The Southern Upcast Shaft project continued throughout the year, with a successful grouting program permitting a 1.8 m diameter pilot shaft to be raise-bored without any increase to mine water inflows. The contract for stripping and concrete lining the pilot rise to a four metre diameter shaft was awarded at the year's end.

Exploration

A total of 46 650 metres of diamond drilling, both underground and from surface, was carried out to increase Probable Reserves to Proven category and to increase Inferred Resources, particularly in K lens. Elsewhere on the lease, 1320 metres was drilled in seven holes, surface samples were assayed for gold, silver and base metals, and down-hole electro-magnetic surveys were done in two holes.

Reserves

Ore reserves at 30 June 1994 were:—

	<i>million tonnes</i>	<i>Pb (%)</i>	<i>Zn (%)</i>	<i>Cu (%)</i>	<i>Ag (g/t)</i>	<i>Au (g/t)</i>
Proven ore	2.1	3.6	10.4	0.42	127	2.4
Probable ore	1.9	3.6	12.0	0.42	127	2.0
Total	4.0	3.6	11.2	0.42	127	2.2

Milling

The processing plant treated 539 066 tonnes of ore including 6940 tonnes imported from the South Comet mine. Head grade was 9.8% Zn, 3.17% Pb, 0.38% Cu, 97.39 g/t Ag, and 1.85 g/t Au. Production for the year was:—

- Zinc concentrate — 83 567 t at 55.01% Zn;
- Lead concentrate— 7709 t at 65.71% Pb, 1156 g/t Ag;
- Bulk concentrate — 14 235 t at 53.46% Pb, 1229 g/t Ag;
- Copper concentrate — 4409 t at 24.44% Cu, 6.74% Pb, 2778 g/t Ag, 64.33 g/t Au.

In addition, 294.025 kg of doré containing 27% silver and 66% gold were produced in the gold plant.

Plant improvements included the installation of a sound-proof crusher control cubicle, completion of reagent lines in stainless steel, and the commencement of new reagent warehouse facilities. Process improvements included zinc recovery, zinc and lead concentrate grade, installation of a full automatic Knelson concentrator for gold recovery, and redesign of the gold doré plant.

Environmental

The No. 2 tailings dam wall was extended and reinforced, the No. 5 dam wall was completed, and the Bobadil dam wall was extended and raised by 1.5 metres. Dams were surveyed to ANCOLD criteria. Drainage control and rehabilitation work was progressed on despoiled areas around the mine and mill, and extensive drainage control and rehabilitation work commenced in the former Rosebery open cut.

SOUTH COMET MINE

Payable ore resources were depleted early in the year and the rehabilitation of disturbed areas and protection of precipitous slopes were almost completed at year end. A total of 6940 tonnes of ore was delivered to the Pasmacon concentrator for treatment.

Copper THE MOUNT LYELL MINING AND RAILWAY CO. LTD

The company announced that the mine will close in mid-December 1994 after over 101 years of continuous mining. In its final full year of operation the mine has achieved a record production of 29 000 tonnes of saleable copper and its best ever safety performance.

Mining

Ore mined totalled 1 695 464 tonnes at a grade of 1.91% Cu; 95 411 tonnes were extracted from 50 Series with the remainder from 60 Series production and development areas. All but 5927 tonnes were hoisted via the Prince Lyell Shaft. Prince Lyell pillars 67, 63 and 62 were blasted during the year. Production from the final 60 Series stoping block commenced.

A total of 1387 m of development and 290 m of raise boring were completed. All development was carried out by contractors.

Milling

Ore treated totalled 1 700 054 tonnes which produced 112 924 tonnes of copper concentrate and 84 786 tonnes of pyrite concentrate. Copper concentrate contained 30 416 tonnes of copper, 635 kg of gold and 4446 kg of silver. The high ore grade necessitated a 10% reduction in mill feed rate and corresponding increase in plant utilisation to achieve a fine grind and increased retention time. Copper recovery was excellent at 93.7%.

Capital Expenditure

Capital expenditure totalled \$964,000. The greater part of this related to underground development and installations, including a loading station and pumping.

Ore Reserves

Proven ore reserves at 30 June 1994 totalled 811 000 tonnes at 1.75% Cu, 0.57 g/t Au and 3.4 g/t Ag.

Employment

Permanent employee numbers were reduced from 369 to 229 during the year. An additional 80 contractors were employed throughout the year.

Safety

Eleven lost-time injuries were incurred compared with 36 in the previous year. Reduction of the LTI frequency rate to 15.1 reflects an excellent attitude in the workforce given the imminent mine closure.

General

The Tasmanian Government announced on 28 June 1994 that it had reached agreement with Gold Mines of Australia Ltd to take over the Mt Lyell leases on their relinquishment in 1995 by the current operators. GMA have committed to carry out a full resource, processing and environmental assessment leading to a feasibility study for a new mining operation.

Iron Ore SAVAGE RIVER MINES

A study is being undertaken to investigate the feasibility of an underground mining operation to follow on from the open-cut operations. A further study is being undertaken to establish ore reserves which, because of the continuing steady market for the product, have extended the operation of the mine to the end of 1996/early 1997.

Increased sales to both the Australian and Asian markets have required an increase in production to 1 500 000 tonnes of concentrate per annum.

The waste stripping program in the Northern Deposit open cut continued throughout the year, with only small tonnages of waste remaining at the

southern end. There was little production from South Lens, and production from Central Pit will be completed by July 1994. Production for the year was:-

All material mined	8 271 647 t
Rock to waste	4 771 680 t
Crude ore	3 499 967 t
Concentrate produced	1 631 488 t
Concentrate pumped	1 634 136 t
Pellets produced	1 565 882 t
Pellets shipped	1 460 562 t
Concentrate and chip sales	97 598 t

The slopes on the Central Deposit open cut were relatively stable, with only minor failures occurring due to ore extraction. A major wedge failure occurred in the north wall of the Northern Deposit open cut but did not pose a threat to operations.

As part of a feasibility study in connection with a possible underground operation, a diamond drilling program of 2951 metres was completed on the Northern Deposit.

Capital expenditure related to waste stripping, pit stabilisation, vehicle replacement and the feasibility study. Work continued on plant corrosion control, pipeline and offshore maintenance, and mine site rehabilitation.

Employment was reduced from 289 to 229 by a voluntary redundancy program.

TASMANIA MINES

Mining

Ore mined for the year was:-

- Kara No 1 — 159 595 tonnes
- Kara No 2 — 82 301 tonnes

Concentrate production was 132 433 tonnes of magnetite and 27 tonnes of scheelite. Sales of magnetite concentrate totalled \$4,239,662, while sales of scheelite totalled \$81 552. Sales of high grade magnetite ex Kara No 2 to TEMCO totalled 23 857 tonnes.

Capital Expenditure

An amount of \$160,800 was expended on work associated with the new coal washery circuit. \$14,751 was spent on work associated with tailings dams.

Employment and Safety

The average number of employees for the year was 24. There were no lost time accidents for the period.

Tin RENISON LIMITED, RENISON BELL

Continued low tin prices have marred the achievements made by Renison during the year.

Following completion of feasibility studies, the Renison Goldfields Consolidated Board gave approval in June for the construction of an ore crushing and hoisting system including a shaft to 600 metres. Commissioning of the shaft hoisting system is planned for August 1996. The project includes developing the Renison North Decline into the Rendeep area over the next five years at a total cost of \$34 million. Additional reserves in this area are expected to extend the life of the mine from six to a minimum of thirteen years.

Employment totalled 235 people, a decrease of 22 over the previous year. Accident performance continued at highly satisfactory levels.

Mining

Ore production from underground was 619 880 tonnes at 1.54% Sn.

Development completed during the year totalled 1356 metres. An additional 258 metres of development was carried out by contractors for the extension of the southern 1650 hanging wall crosscut which has been used as a drilling horizon. One hundred and fifty-four metres of rising was done for ongoing ventilation connections, including starting the raise boring of the 7B Exhaust Rise.

Mineral Processing

The processing plant treated 623 770 tonnes to produce 7525 tonnes of concentrate at a grade of 55.1% Sn.

The plant benefited from the introduction of a continuous twelve-hour shift roster. Additional J1300 Kelsey Centrifugal Jigs were introduced into the gravity tailings circuit which has resulted in increased concentrate recovery. A record tin recovery of 81.53% was achieved, which is 2.5% better than recovery from the former gravity and acid leach process.

Areas above water level in 'B' tailings dam have been covered with tin flotation tailings to provide a barrier against oxidation of tailings and as a plant growing medium. Two hectares of 'A' dam, which was covered with flotation tailings in 1992/93, were sown to pasture with encouraging results.

Exploration

Diamond drilling totalled 29 421 metres. This included ore reserve definition and Rendeep exploration below the 600 metre level in the north of the mine.

Ore Reserves

Ore reserves at 1 January were:—

- Proved ore — 2.8 million tonnes at 1.51% Sn
- Probable ore — 4.4 million tonnes at 1.34% Sn

The Rendeep resource has not yet been published.

ANCHOR TIN MINE

Option Agreement

Mancala Pty Ltd has entered into an Option Agreement which provides access to inspect and review all information and records regarding ML 55M/89 and the associated EL5/88 at Royal George near Avoca.

Feasibility

A review of the existing plant and equipment, previous operating records, and the remaining resource formed the basis of a full feasibility study that investigates the viability of continued operation. The work has included:—

- 173 metres of underground diamond drilling;
- 151 metres of surface augering in the tailings dams;
- metallurgical review of the concentrator;
- engineering review of the crusher plant

The Royal George geological information has also had an initial review but has taken a lower priority relative to the Anchor project.

Subsequent presentations to Tasmania – Development and Resources and the Hydro-Electric Commission have confirmed project funding and operating parameters which make the commencement of mining and milling operations favourable.

Commencement of Operations

The Anchor Environmental Management Plan has been updated and submitted to the Department of Environment and Land Management for re-establishment of a Licence to Operate Scheduled Premises to cover a 150 000 tonnes per annum mine. Mancala is currently working on a strategy regarding the start-up of operations at the end of the 1994 calendar year.

Coal THE CORNWALL COAL COMPANY NO LIABILITY, FINGAL

Coal sales for the year were 307 837 tonnes. Total coal production was 480 404 tonnes, with a washery throughput of 478 756 tonnes yielding 301 080 tonnes of saleable coal (62.89% recovery).

Direct employment has fallen to 84, allowing for the closure of the Duncan Colliery and the anticipated loss of the Australian Newsprint Mills' contract. Cartage contractors employ nine people and seven are employed intermittently to work the Huntsman open cut. The company achieved a year without any lost-time accidents.

Negotiations were successfully completed with The Shell Company of Australia Limited which resulted in Cornwall Coal acquiring the Shell lease over Mt Nicholas and retention licences in the Harefield, Dalmayne and Douglas River area.

Duncan Colliery

Production was 249 759 tonnes won exclusively from 1200 metres of pillar retreat. Mining conditions were not favourable with faults, igneous intrusions and a mudstone roof restricting sections of pillar recovery.

Blackwood Colliery

Production was 191 608 tonnes. Development extended workings by approximately 1650 metres, although 500 metres of development along the western lease boundary to the northern boundary was in difficult mining conditions caused by faults, a mudstone roof and rib failure. The area was unsafe for pillar recovery and has been abandoned. Further development was undertaken closer to the original entry headings, extending these by 500 metres. When the Shell lease became available the area was abandoned for the time being.

The current workings have developed 650 metres northwest into the former Shell lease. Roof conditions have been variable. Rib bolting was essential because the overlying cover has varied between 300 to 400 metres in depth.

Open Cuts

The Blackwood open cut produced 23 799 tonnes. The Huntsman open cut, formerly operated by the Tasmania Coal Company on the Shell lease, is now operated by Cornwall Coal who produced 15 238 tonnes.

MERRYWOOD COAL COMPANY PTY LTD, ROYAL GEORGE

Coal sales for the year were 64 115 tonnes, with raw coal production totalling 85 500 tonnes. Overburden removal was 609 000 cubic metres.

Thirteen people are employed at the mine and three full-time and one part-time employee service the operation from a workshop at Longford. The contract trucking operator employs another six people full time. A safety instruction program was commenced in the year employing an independent consultant.

Selective mining has improved raw coal recovery to 83%, which includes a very dirty top ply. Second quality coal is stockpiled for future washing. Investigations during the year have proved the viability of upgrading the

treatment plant and washing raw coal to increase coal recovery. A 75 tonne excavator was commissioned in June.

Exploration has continued at Mt Puzzler, Royal George and Mt Rex. Drilling at Mt Puzzler and Mt Rex are likely to reveal viable but limited open-cut resources.

Kimbolton Coal Joint Venture, Langloh

Initial bulk sampling and drilling have been carried out over several years. A five-hole drilling program was completed in June and a more substantial bulk sampling program was started with 2500 tonnes stockpiled for washing at Merrywood for shipment to Australian Newsprint Mills.

MINERAL PROCESSING OPERATIONS

COMALCO ALUMINIUM (BELL BAY) LTD

A total of 113 761 tonnes of aluminium was processed. Raw materials used were alumina, coke, furnace oil, pitch, aluminium fluoride and cryolite.

Employment at 30 June totalled 655 people, a reduction of 208 people for the year as production had been reduced by 25% due to an oversupply of aluminium worldwide. Parts of No. 2 and No. 3 potlines were shut down.

Capital expenditure for the year was \$13.5 million with the greater part of this being spent on improvements in the areas of safety and the environment. Major projects included:-

- Coarse butt cleaning — \$4.3 million
- Crust breakers — \$2.2 million
- Cell hooding — \$2.1 million
- Potline automation — \$0.7 million
- Fume tower upgrades — \$0.5 million

The average number of employees for the year was 774. Lost-time accidents totalled 121, with 1755 lost-time shifts recorded.

IMP SILICA HEYBRIDGE

Index Mineral operated with four people for the year, producing high quality silica, mainly for overseas markets. Bagging of fine silica dust commenced and a market for this product is being sought. There was no capital expenditure during the year and there were no lost-time accidents.

TIOXIDE AUSTRALIA PTY LTD, HEYBRIDGE

Titanium dioxide pigments were produced from ilmenite imported from Western Australia and high titanium slag from Canada. Employment at 30 June totalled 280 people. The average number of employees for the year was 255. Three lost-time accidents and 15 lost-time shifts were recorded.

The capital expenditure for the year was \$1.37 million which was mainly associated with converting the plant to utilise low iron feedstock to meet environmental requirements. A three-part strategy for achieving full compliance with both current and anticipated environmental legislation was developed during the year and involved:-

- Changing to low iron feedstock;
- Design and fitting of a diffuser to the effluent pipeline;
- Developing markets for TIOLEACH (weak acid).

The first 20 000 tonne shipment of titanium slag from Canada arrived at Burnie in late May and the plant was converted to this feedstock on 17 June.

Tioxide has adopted the International Safety Rating System as the standard for site safety. Work associated with developing this system is progressing and certification will be sought during the coming year.

MOLE CREEK LIMESTONE

Overburden and quarry waste removal totalled 413 726 tonnes. Crushed limestone and quicklime tonnages produced were less than last year, whereas hydrated lime production increased slightly.

There were 23 permanent employees and four part-time casuals employed at 30 June. The average number of employees for the year was 24. There were three lost-time accidents and 77 lost-time shifts.

Capital Expenditure

Capital expenditure for the year totalled \$622,000. Major improvements were made to the quarry mobile plant fleet, with the addition of a new Caterpillar 330ME excavator and a new Terex 3305B dump-truck.

Additional grinding plant was installed at the crusher, with the addition of a Hazemag SAP-2 impactor. A micro-Pulsaire dust collector was also installed at the crushing plant to improve environmental conditions.

Minor capital expenditure included a new colorbond store for bagged products, a roof over the hydrate plant dust collector, and an additional mobile diesel tank for the quarry.

TEMCO (Tasmanian Electro Metallurgical Company)

Alloy production for the year amounted to 105 066 tonnes of ferro-manganese and 88 731 tonnes of silicomanganese. Of this output, 76% was exported to the Middle East, South East Asia and the USA.

At 30 June employment totalled 360 persons, including 40 contractors. The average number of employees for the year was 356. Ten lost-time accidents and 251 lost-time shifts were recorded.

Capital expenditure

Capital expenditure for the year was \$5.514 million, of which \$1.5 million was directly related to occupational health and safety and environmental improvement.

- \$238,000 was spent on employee health. The major project was the establishment of an Employee Fitness and Rehabilitation Centre. In line with BHP/TEMCO's commitment to employee welfare, this facility is equipped with state-of-the-art equipment, and supported by trained fitness advisers and an Occupational Health Nurse and Medical Officer. It is available for the use of all employees and their families, and is an integral part of the accident reduction strategy.
- \$704,000 was spent on many safety-related projects. Major projects included the procurement of pan conveyors to replace rubber conveyors in the sinter plant. This initiative is designed to overcome the fire risk to plant and equipment in the crushing module of the sinter plant.
- \$336,000 was spent on improving slag handling at F1, 2 and 3. A slag transporter transports molten slag from the furnace building to a new dump station. This reduces the manual tasks of furnace operators as well as improving hygiene aspects.
- \$112,000 was spent on upgrading fire detection and protection systems.
- \$601,000 was spent on minimising the impact of plant water emissions on the environment. The environmental improvement project was the design and construction of a wetlands system to treat plant run-off water. This project was the final phase of a five-year Environmental Improvement Program costing \$6 million.

With the commissioning of the Wetlands in May 1994, TEMCO fully complies with licence conditions.

PASMINCO METALS-EZ

Zinc concentrates roasted from Tasmanian and imported ores during the year totalled 404 939 tonnes, from which 193 763 tonnes of marketable zinc was recovered. In addition 354 tonnes of cadmium, 2542 tonnes of copper sulphate, 23 386 tonnes of lead residue and 361 959 tonnes of sulphuric acid were produced. Production of single superphosphate, using phosphate rock and sulphuric acid, totalled 75 000 tonnes.

Employment at 30 June totalled 704 people, a reduction by 421 achieved by restructuring. The average number of employees for the year was 847. There were 27 lost-time accidents resulting in 1372 lost-time shifts.

Capital Expenditure

Capital Expenditure for the year totalled \$3.738 million and was spent on the following projects:-

- ❑ Completion of No. 5 Gas purification plant required \$1 million. The new plant offers superior environmental and production performance compared to the four older plants it replaces.
- ❑ Expenditure on machine designs for a second fixed stripping machine for the cell room was \$800,000.
- ❑ An initial expenditure of \$400,000 was required to replace eight of the cell room rectifiers with four new larger units.
- ❑ Two new loaders, valued at \$313,000 were purchased for the Fertiliser Department.
- ❑ The PLC System on No. 1 wharf crane was upgraded for \$141,000.
- ❑ A facility to allow ammonia supplies to be stored in aqueous form was instituted at a cost of \$257,000.
- ❑ Site drainage improvements, costing \$275,000, were made to improve the environmental performance of the plant.
- ❑ A system to transfer manganese from the cell room to leaching was carried out for \$126,000 and eliminates the need to stockpile manganese mud.
- ❑ A sump tank costing \$176,000 was installed within the fertiliser plant to hold liquors and improve the environmental performance of the plant.
- ❑ Vehicles to a value of \$130,000 were purchased.
- ❑ Fire protection systems costing \$120,000 were installed in the Roaster Distribution Control System, the Power Control Centre and high voltage substations.

GOLIATH PORTLAND CEMENT CO. LTD

Overburden removal for the year was 44 000 cubic metres from the old quarry and 807 000 cubic metres from the new quarry. Production for the year was:

Limestone	1 100 000 tonnes
Clay	44 000 tonnes
Clinker	743 000 tonnes
Cement	773 000 tonnes

There were 227 people employed as at 30 June. The average number of employees for the year was 218. Six lost-time accident and 105 lost-time shifts were incurred.

Capital expenditure for the year totalled \$16.7 million for the new plant upgrade and \$16.0 million for the new ship *Goliath*. Expenditure on minor projects totalled \$0.7 million.

CERAMICS K & D BRICKS AND PAVERS

Production

Production of fired clay bricks and pavers for the year June 1993 to May 1994 was 13.65 million units.

Capital Expenditure

Capital expenditure over the same period was \$850,000. This was made up of:-

- Installation of green sawdust dryer;
- Installation of a new mixer and clay grinding plant;
- New brick display area.

Health and Safety

K & D enjoyed a greatly improved safety record over the last nine months of the year, believed to be due to an incentive scheme which commenced in November 1993.

A new safety committee completed a two-day training course. K & D is endeavouring to improve the working environment for employees in the interests of safety.

General

Work is continuing on the rehabilitation of the Oyster Cove property and the quarry at Forcett. Both sites have been improved significantly. Further improvements are to be implemented in future years.

NUBRIK

Production

Material quarried totalled 40 360 cubic metres with material processed totalling 41 600 cubic metres.

Employment and Safety

The average number of employees for the year was 46.6. There were six separate incidents involving four employees, for which total time lost was 72 days. A safety improvement program, started in 1992, was finalised.

QUARRIES AUSTRALIAN PAPER (TONGANAH MINE)

Production came from the No. 4, 4s and 8 pits. Sales, at 35 369 tonnes, were the highest ever recorded.

All material mined	347 976 tonnes
Raw clay mined	236 405 tonnes
Waste/overburden mined	111 571 tonnes
Concentrate produced	35 442 tonnes

Mine development waste was transported as backfill to the old No. 3 mine, which is now in an advanced stage of rehabilitation.

The waste silica dam was divided in two, and excavation of the front half provided further storage and a source of fill for rehabilitation. Capital expenditure was only \$22,000, as no major works were carried out during the year.

BORAL RESOURCES

Boral Resources produced a total of 804 425 tonnes of material from its Tasmanian operations. Capital expenditure on improvements and alterations totalled \$1,092,000 for the year.

BEAMS BROTHERS PTY LTD, FLOWERY GULLY

Beams Bros Pty Ltd produced 42 413 tonnes of Aglime, 34 860 tonnes of crushed stone, and 11 152 tonnes of ironstone.

Capital expenditure totalled \$180,000, with \$120,000 spent on a mobile crushing and screening plant and \$60,000 in establishing the dolomite quarry at Cressy.

Major improvements include a new hammer mill, which was commissioned at the end of June.

BRAMBLES EQUIPMENT QUARRIES

Production from Brambles' various quarries was as follows:-

Base/sub-base	315 000 tonnes
Ballast	33 000 tonnes
Aggregates	220 000 tonnes
Miscellaneous	32 000 tonnes
Total	600 000 tonnes

Tree planting continued at Ridgley and Western Junction, and a major rehabilitation project was completed at the Sisters Creek pit. Rock breakers were installed above the bins at Ridgley and Talisker.

HOBART BLUE METAL INDUSTRIES, LESLIE VALE

Production from all crushing plants was:-

Crushed rock	539 000 tonnes
Gravel	12 000 tonnes
Sand	3 500 tonnes

Twenty-two people was employed. Continual minor plant upgrading progressed. A sand washing and classification plant was commissioned at Huonville.

THE READYMIX GROUP, CSR LIMITED, MORNINGTON

Total production of crushed stone and gravel was 204 081 tonnes. Ten people were directly employed at the quarry with drilling carried out by contractors.

COMINEX

Silica flour production was 7000 tonnes from the Corinna leases. The material was refined at Heybridge, with sales of 6600 tonnes. Road gravel production totalled 3900 tonnes of which 3000 tonnes were sold and the balance held in stockpile.

OTHER OPERATORS

<i>Operator</i>	<i>Production (t)</i>	<i>Capital Expenditure(\$)</i>
Hazell Quarry, Ulverstone	100 872	66,000
Besser Tasmania Pty Ltd	43 000	-
Circular Head Dolomite	80 058	354,000
G. J. Cresswell Transport P/L	171 451	65,000
Caroline Quarries	28 800	186,146
Pioneer, Flagstaff Gully	196 000	400,000
Stornoway-Hewitt, Beauty Point	100 000	20,000
Stornoway Gravel	100 000	-
Industrial Sands, Eagle Point	20 000	10,000

Declared gold production for the year was principally from two sources:-

- ❑ Pasminco Mining-Rosebery; 194 kg in doré, 283 kg in copper concentrate;
- ❑ Mount Lyell Mining and Railway Co Ltd; 635 kg in copper concentrate.

HENTY GOLD PROJECT

Development of the Henty Gold mine is proceeding on schedule. The mine is planned to start production in mid-1996 at 110 000 tonnes/year to produce 100,000 oz/year Au. Projected mine life is 4.5 years based on the current probable reserves of Zone 96.

Underground Development

Eltin Mining was selected as the prime contractor for underground development. During the year the exploration decline was de-watered and all development for access and ventilation of the underground shaft collar was completed. The shaft brace area, sky shaft and winder chamber were excavated and civil construction work completed. Sky-shaft steelwork was installed in preparation for shaft drilling.

A 575 metre deep pilot hole was drilled from surface which will be used to guide the shaft reaming heads. The drilling contractor, Zeni Drilling, was on site at the end of the year. The sub-vertical shaft will be mined at 3.2 metre diameter to a depth of 440 metres below the collar.

Surface Installations

The mine access road was upgraded, administration offices constructed and main ventilation fan installed. The mine water treatment system, comprising pipeline, settling ponds, flocculation plant and wetland filter, was completed.

Capital Expenditure

Total expenditure on the project for the year was \$10,985,000.

Ore Reserves

Zone 96 Probable Ore Reserve was stated as 506 000 tonnes at 26.9 g/t Au.

Employment

The average number of employees on site for the year was 35. Over the year more than 200 personnel were inducted to work for the various contractors.

Safety

One lost-time injury was incurred resulting in a LTI frequency rate of 14.5.

NORTH EAST TASMANIA

Beaconsfield Gold Joint Venture

During 1993/94 a five-hole diamond-drilling program was completed from surface to test the reef to 200 metres below the old workings. All holes intersected the reef and assays averaged above 20 grams/tonne. The results of this program were sufficiently encouraging for the Joint Venture partners, Beaconsfield Gold Mines NL and Allstate Exploration NL, to approve commitment of \$2.1 million to a further phase of exploration. The project involves drilling of a further six holes from surface to test the reef to 400 metres below the old workings, and to recommence dewatering of the Hart Shaft to 200 metres below surface.

By the end of the year dewatering had progressed to approximately 150 metres and rehabilitation of the shaft from 160 metres should recommence by late August 1994. This stage of the project should be completed by mid-1995.

Tas Tiger Mines (Alberton area)

During the year, Mancala Pty Ltd entered into an Option to Purchase Agreement with Tas Tiger Mines regarding three tenements. Upon completion of an agreed exploration program, Mancala has proceeded with exercising its Option over the leases as of 27 June. Tas Tiger Mines have acknowledged that the transfer is to be completed, and the associated formalities are in progress.

The scope of exploration work has included the re-establishment of mine accesses for inspection, geological mapping and diamond drilling (TT46), with all work carried out in these leases centred around the Ringarooma United, Long Struggle, and Mount Victoria mines.

A summary of drilling is as follows:-

Ringarooma United Mine	255.0 metres
Long Struggle Mine	530.8 metres
Mt Victoria Mine	228.8 metres
Total	1014.6 metres

All drilling was carried out from underground under quite difficult conditions due to the limited work space available. Holes were designed to test the extension of known reefs and appear to show reasonable continuity along strike and down dip. Assay results have been encouraging although not conclusive. A follow-up exploration program is currently being drawn up.

Riltec

At year end, construction of a plant for the treatment of gold tailings from the old Golden Gate mine at Mathinna was well advanced. The operation will employ twenty people for approximately two years.

The method of gold recovery to be employed is based on Russian resin-in-leach technology and if it is as successful as expected, there is opportunity for its application to other mine tailings deposits.

Small Operators and Prospectors

Small quantities of gold were recovered in the Mangana, Forester, Lefroy and Lisle areas of the northeast.

**MINING AND
MINERAL
PROCESSING,
DEVELOPMENT
DIVISION**

A specialist mining and mineral processing section operates within the Development Division of Tasmania—Development and Resources. This Section provides the Development Division with a linkage to the technical activities of Mineral Resources Tasmania, ensuring a high level of co-operation and interaction between the two Divisions.

The group directly promotes development of the mining and mineral processing sectors and supports Mineral Resources Tasmania through joint promotion of exploration activity in the State.

The major objectives of the Division are:—

- Develop an internationally regarded and competitively sustainable mining and mineral processing sector in Tasmania;
- Promote investment and employment opportunities in existing and potential new value-adding industries;
- Create a stable and secure investment environment in the industry;
- Facilitate infrastructure development to increase Tasmania's competitive advantages.

**PROMOTION OF RESOURCE DEVELOPMENT
OPPORTUNITIES**

Active promotion of the North East Tasmania Gold Province (NETGOLD) exploration package took place with direct targeting of companies in Sydney, Melbourne, Adelaide and Perth. The program was successful, with bids being received for the majority of areas.

Promotion and discussions took place during the year with companies concerning base metals and industrial minerals development opportunities.

Bids for the oil/gas exploration rights to offshore acreage in blocks T93-1 and T93-2 were received and were being evaluated during June 1994. These blocks are situated in the Bass Basin and are considered geologically gas prospective. The section was directly involved in the evaluation process.

Mt Lyell

Following the announcement by Renison Goldfields Consolidated (RGC) that they would cease operations at Mt Lyell at the end of their current mining program and relinquish the lease, efforts were begun by TDR to market the potential remaining resource.

Promotion of this opportunity was done through direct contact with a small number of targeted companies followed by company submissions and extensive negotiation.

On 28 June 1994, the Premier announced in Queenstown that the State government had signed a Memorandum of Understanding with Gold Mines of Australia Limited (GMA) to take over the Mt Lyell lease on the departure of the current operator.

GMA have committed to spend a minimum of \$5 million by 31 December 1995 on an assessment of the resource. This work will include geological, mining, processing and environmental studies. A full feasibility study will be completed should the initial testing and exploration prove successful.

Renison Limited

RGC announced in June 1994 that a \$34 million project had been approved at the Renison Tin mine. The project, known as Rendeep, is based on ore bodies delineated by a diamond-drilling program which commenced in 1989. Mine life will be extended from a minimum of seven to at least thirteen years. TDR were actively involved in facilitating RGC's decision to undertake the project.

Renison has undergone a major restructuring over the last five years with substantial reductions in workforce, radical changes in work practices,

stringent cost control and increased control of ore dilution. Mine life with the current system of ore haulage was estimated at only three to four years.

The project will employ an additional 50 people. The new shaft, which is scheduled to commence operations in 1996/97, will allow an increase in production to 9000 tonnes of tin per annum, and will significantly reduce mine operating costs and lower the mine's position on the international tin mining cost curve.

Tioxide

Tasmania-Development and Resources has been actively working with Tioxide Australia Pty Ltd for some years to secure the long-term future of the Heybridge plant. Direct support by TDR and substantial efforts by company management have resulted in an operation that is now competitive in terms of cost, quality and safety.

The change-over from ilmenite to high titanium slag feedstock during June 1994 has enabled the company to meet full environmental requirements. Tioxide is now planning to increase production to 40 000 tonnes per annum and an environmental monitoring program is to be put in place to support this expansion.

Beaconsfield Gold Project

During 1993/94 a diamond-drilling program confirmed continuation of the gold-bearing reef for 200 metres below the old workings. Intersections averaged over 20 grams/tonne Au.

Two of the joint-venture partners, Beaconsfield Gold NL and Allstate Exploration NL, have approved expenditure of \$2.1 million on continued project evaluation. Work has commenced on both deeper dewatering of the shaft and a further drilling program to test the reef to 400 metres below the old workings.

The project is expected to take 12-15 months to complete. A decision is expected by mid-1995 on major expenditure to complete shaft rehabilitation and underground development for deeper resource drilling.

The Department has worked closely with Beaconsfield management to facilitate the current project.

Port Latta

The formal establishment of the Port Latta Industrial Zone in the northwest was nearing completion by the end of the financial year. TDR has been actively working with the Circular Head Council towards the zone's establishment.

The establishment of two secure Heavy Industry Zones, at Bell Bay and Port Latta, supported by environmental and development guidelines, is part of a long-term strategy of TDR to support industry development.

The Port Latta Industrial Zone offers investors long-term site integrity. As with Bell Bay, the Zone includes buffer areas to separate industrial and residential development. The Zone is situated next to a deep-water port and has an established rail and road network.

CHEMICAL SAFETY SECTION

The past financial year has seen the evolution of the former Dangerous Goods Branch into the Chemical Safety Branch and finally, with the transfer to Industry Services Division, to the Chemical Safety Section as part of the new-look Workplace Safety Branch of Industry Services Division.

The transfer to Industry Services Division occurred on 16 May 1994 with the appointment of Dr Peter Drygala, Director of Dangerous Goods, to the new position of Director Workplace Safety Branch. The Workplace Safety Branch is a combination of the former Occupational Health and Safety Branch of Industry Services Division and the Chemical Safety Branch of Mineral Resources Tasmania.

The integration of these two inspectorates had been planned for some time as a result of the recommendation for integration contained in reviews of Occupational Health and Safety in Tasmania, first in 1991 by Ernst and Young, and then again in August 1993 by Peter Drygala's 'Future Directions'.

The integration has been facilitated by the co-location of the inspectorates at Rosny Park and the active support of all senior management in Tasmania – Development and Resources.

The Chemical Safety Section has provided, and will continue to provide, advisory services in the broad area of occupational health and the specific area of chemical safety to both the Mines Inspectorate and the regional inspectorates of the Workplace Safety Branch. The Section will be increasingly active in the implementation of the pending Worksafe/National *Control of Workplace Hazardous Substances* regulations which will become Tasmanian legislation in both the mining and general industry sometime in 1995.

The Section has a role as a support unit for advisory services to the Mines Inspectorate and Workplace Safety Branch with respect to the Occupational Health and Safety legislation but also has a direct service provider role to the industry and the public with respect to the *Dangerous Goods Act*.

The section philosophy is to advise, assist, encourage and educate our clients to maintain a high level of safety in Tasmania. We endeavour to seek rapport with our clients in order to develop trust, respect and co-operation, and we therefore consider prosecution only as a very last resort.

Industry will be encouraged to self-regulate, whilst at the same time receive our technical and statutory support and guidance.

MANAGEMENT

The efficiency of the section has been improved along the principles of Best Practice, with more policy decisions being devolved to the inspectors. Core business has been divided into four sub-programs run by self-managing working groups:–

- Explosives;
- Storage and handling of Dangerous Goods;
- Transport of Dangerous Goods; and
- Occupational Health.

The Chemical Safety Section also participates with other sections of the Workplace Safety Branch in the implementation of three first-priority Worksafe Standards:–

1. Control of workplace hazardous substances;
2. Control of major hazardous facilities;
3. Storage and handling of Dangerous Goods.

STAFF EDUCATION

Chemical Safety Section staff are broadening their knowledge from traditional dangerous goods hazards of flammability and explosivity into

occupational health issues, especially issues such as toxicity and corrosivity hazards, in readiness to advise industry on the identification, assessment and control requirements of the pending 'Hazardous Substances' national standard. This has involved staff participation in a number of courses at various Tertiary institutions.

NEW DANGEROUS GOODS REGULATIONS 1994

It is expected that new *Dangerous Goods Regulations 1994* will be issued sometime in August 1994. A lot of work over the last financial year went into discussions, consultations, drafting and research. The new regulatory changes required a Cabinet Minute and involved a regulatory package consisting of *The Dangerous Goods Regulations 1994*, *The Dangerous Goods (Fees) Regulations 1994* and the *Dangerous Goods Order 1994*.

Criteria used in the review

All amendments have been thoroughly discussed with affected industry clients and within Mineral Resources Tasmania over the past year. Regulatory controls often incur substantial costs to industry and the community, and these costs should only be accepted after reasoned debate about the risks and benefits involved. Ideally, resources should be directed to health and safety problems in which the costs to society justify the expense of control, and where the quality of life for all Tasmanians is enhanced.

The proposed changes achieve a reduction in unnecessary legislative burden on business. The review has been systematic and thorough. Inconsistency, redundancy and overlap between pieces of legislation have been resolved to considerably reduce the overall volume of regulation, and inconsistencies which made some provisions unenforceable have been resolved.

The following additional criteria have been applied:-

- Commonwealth, other State and Local Government legislation have been considered and harmonisation has been achieved whenever possible;
- The amendments harmonise with all the standards endorsed by the National Occupational Health and Safety Commission;
- Regulations have been drafted so that they can be easily understood by the community;
- Regulations must achieve their purpose with minimum impact on business.

Policy changes

Quantities of Dangerous Goods requiring licensing

Higher licensing exemption limits will apply in the 1994/95 financial year for the Licence to Keep Dangerous Goods, which is the major licence administered by the Chemical Safety Branch. This measure will considerably reduce the number of domestic dangerous goods sites which require approval and licensing. The threshold level for licensing will be aligned with Hazchem Placarding exemption limits, which will simplify the licensing system and will aid compliance.

The major effect will be in the LP gas industry, where the threshold quantity will be raised from 91 kg to 500 L (205 kg). These installations are already regulated, as only licensed gas fitters can install and start work notices are supplied to the inspectors. The gas industry has been very supportive of this initiative.

The change to exemption limits will result in a refocusing of the Inspectorate's effort towards commercial and industrial dangerous goods installations and towards an increased emphasis on educational and advisory programs. This is in harmony with the major finding of Lord Robens' report that the inspectorate's activity has to be selectively and effectively targeted to the more serious problems.

The opportunity has also been taken to simplify the Licensing Exemption Limits to the extent that the public will know, without any further recourse to relatively inaccessible Standards, whether licensing is required or not. Currently, this question can often only be resolved by an Inspector's site visit and by consulting the relevant Standard applicable to the specific dangerous goods.

Amendments to Fees Regulations

The following fees will be abolished:-

- Landing permit fees for loading/unloading explosives, fireworks and ammonium nitrate from a vessel or aircraft;
- Licence fee to convey explosives;
- Licence fee for manufacture of dangerous goods other than explosives.

The fee structure for the Licence to Keep will be simplified, and all dangerous goods will now have the same fee structure. This will result in a small fee increase to our commercial and industrial clients.

An administrative charge of \$30 will be introduced for the registration of tanker drivers of bulk dangerous goods and a \$50 charge will be introduced for the registration of autogas installers.

The overall revenue generated under the dangerous goods legislation is not expected to change because of the amendments.

Explosives Regulations — Deregulatory steps

The following deregulatory steps have been taken:-

- Abolish Explosives Landing Permits and abolish the Landing Permit and Import Licence for ammonium nitrate. These initiatives have met with the approval of the Launceston and Burnie Port Authorities which are most affected;
- Allow night-time transport of explosives;
- Abolish special speed limits for explosives transport;
- Abolish the Licence to Convey Explosives but retain and give more prominence to the registration requirements for drivers of vehicles carrying explosives;
- Abolish Regulations 31, 33(2), 34, 32(4) which are in conflict with, and better covered by, the Australian Explosives Code;
- Abolish the requirements for a Licence to Manufacture Explosives at blast sites.

Explosives Regulations — Regulatory initiatives

Blasting in a Municipal area: It is proposed that Local Councils be given the power to issue blasting permits, a power which they had until the introduction of the new *Local Government Act 1993*. This will help in resolving frequent blasting complaints in the community. The proposed regulation will also put added responsibility on shotfirers in regard to blast criteria parameters, which should prevent damage to property as well as annoyance to the community from blast noise.

Farmer Training: Farmers will be required to have had some training in blasting before they use explosives. Agreement for these changes has been obtained through discussions with the Tasmanian Farmers and Graziers Association. An 18 month change-over period to the new system is desirable. A short course, specifically designed to allow farmers to qualify for a Farmer's Shotfiring Permit, will be offered.

Introduction of a registration system for drivers of explosives in larger quantities: This is a responsibility of the competent authority according to the *Australian Code for the Transport of Explosives by Road and*

Rail. Tasmania was the first State to adopt this national code into legislation two years ago but the registration system has not been implemented due to a lack of a nationally-accredited training course. The Tasmanian inspectorate is now developing such a course in conjunction with the Tasmanian Road Transport Industry Training Board.

Licence to Manufacture

The Licence to Manufacture Dangerous Goods Other Than Explosives will be abolished. There are currently only four licences held out of potentially a hundred or more. The regulations have not been applied equally to everyone and this has created an uneven playing field. A decision has been made to abolish this licence in recognition of the current unsuitability of the Dangerous Goods legislation both here and interstate to deal meaningfully with manufacture. There are no currently available standards to give guidance to the safety of manufacture.

Future Worksafe legislation will be able to deal more appropriately with this subject. National Standards already endorsed by the National Occupational Health and Safety Commission which deal with the subject are *Major Hazard Facilities* and the *Hazardous Substances Regulatory Package*.

Consequential Amendments

The new *Local Government (Building and Miscellaneous Provisions) Act 1993* has now been proclaimed together with consequential amendments to the *Dangerous Goods Act 1976*. Section 19 of the *Dangerous Goods Act* is now amended to exclude construction requirements of buildings from the mandate of the Chemical Safety Branch. This has resulted in the Branch drafting special construction requirements for dangerous goods buildings at the request of Local Government to be part of their building regulations. It has also resulted in the deletion of all the construction requirements from the *Dangerous Goods Regulations 1994*.

Corrections

Dangerous Goods Order 1994

The *Dangerous Goods Order 1990* needs to be rescinded to allow for an amendment to its Schedule 1. This Schedule currently defines a dangerous good as a substance listed in the IMDG Code when it should refer to the Australian Dangerous Goods (ADG) Code in harmony with all other Australian States and Territories. The ADG Code is much more up to date with the *United Nations Recommendations on the Transport of Dangerous Goods* as it is constantly revised with input by all States. The ADG Code is harmonised with the IMDG Code, but this is not the case *vice versa*.

The ADG Code is by far the most important mandatory standard of the Dangerous Goods Regulations. The *Dangerous Goods Regulations 1994* have been amended to reflect the above change in definition.

Approved Chemist

The term "approved chemist" is a redundant term and conflicts with the definition of the term "responsible person". Both terms are currently used in the regulation to describe a person who manages the entry into a confined space possibly containing toxic or flammable gas. The term "approved chemist" has been deleted as it contradicts the duty of care that employers and employees have and makes the government responsible for selecting a suitably qualified person.

Diesel fuel

A licence fee currently applies to the storage of diesel fuel. Under the classification of the ADG Code diesel fuel is not a dangerous good, and there have been doubts expressed as to the legality of the fee. To remove that doubt a new provision has declared diesel fuel to be a dangerous good.

Oil-Fired Appliances Regulation

This regulation is deleted as the *Dangerous Goods Act* does not give a mandate to regulate combustible liquids in isolation from other dangerous goods. Inspectors have had very little involvement in the area of these appliance codes.

Standards Association of Australia

Numerous standards are currently called up by reference in full without dating the edition of the standard. It is important that the latest standard is applied to all new installations and a mechanism for this must be found. One such mechanism is the addition of a definition of "AS" — this means a standard published by the Standards Association of Australia and amended from time to time.

A new list of all referenced codes and standards has been included in the back of the regulation as a quick reference to any standard that may apply under the Regulation. Some new standards have been included and some superseded standards have been deleted.

The new standards included are:-

- Tankers for toxic and corrosive cargoes, Part 4 AS 2809;
- Tankers for bitumen based products, Part 5 AS 2809;
- Tankers for cryogenic liquids, Part 6 AS 2809;
- Safety in laboratories — Storage of Chemicals AS 2243.10;
- The storage, handling and transport of liquid and liquefied poly functional isocyanates AS 4081;
- Pressure piping AS 4041.

Fireworks Type 4

Any reference to this type of fireworks has been removed as it has only meaning in the British legal context. These are in fact synonymous with type 3 fireworks in the Australian context.

Hazchem Placarding

The current regulations on Hazchem Placarding are totally incomprehensible. In order to implement Hazchem Placarding in the community, total reliance was placed on the Chief Inspectors guidance document on Hazchem Placarding.

This guidance document, updated with small adjustments to the Placarding Exemption Limits and a simplified way of determining the requirement to placard, will be republished. Instead of attempting to write Hazchem Placarding guidelines into regulation the guidance note will be adopted by reference.

WORKING GROUPS

Explosives Working Group

The Explosives Working Group was officially formed within the Chemical Safety Section during January 1994. The following aims and objectives of the group were formulated:-

- Promote the safe use and storage of explosives in Tasmania by the provision of training courses, seminars and news bulletins;
- Interact with other working groups to cross reference relevant information;
- Review and attend to issues concerning the use and storage of explosives within Tasmania;
- Assist the Chemical Safety Branch to develop and implement standards and codes of practice in accordance with national uniformity requirements.

Specific programs were targetted and completed for the 1993/94 financial year. Other important issues relevant to the Explosives Working Group have been identified.

Dangerous Goods Storage Working Group

The Dangerous Goods Storage Working Group was formed during the year. The aims and objectives of this group are:—

- To promote the safe storage of dangerous goods within Tasmania and to protect people, property and the environment by:
 - Developing policy at the request of the Manager, Chemical Safety Section or the Section as a whole;
 - Producing guidance notes, newsletters and bulletins;
 - Conducting educational seminars for the public and industry to encourage participation, feedback and comment;
 - Assessing sites which may be extraordinary or politically sensitive;
 - Monitoring the progress and development of the *Draft National Standard for the Storage and Handling of Dangerous Goods* prior to its possible inclusion in a redraft of the current *Dangerous Goods Act* in the near future;
 - The review and attention of all relevant correspondence.

The following new initiatives will be carried over into the 1994/95 year:—

- Assist in the introduction and implementation of the *Dangerous Goods Regulations 1994*;
- Revise all existing 'internal policies' relating to storage;
- Review of the *Pesticides Storage Guidelines*;
- Review of the *Warehouse Storage of Dangerous Goods* document.

Transport Working Group

The Transport Working Group was formed in January 1994. The group held a seminar in Hobart where the manager of the Transport Branch of the West Australian Division of Dangerous Goods talked on the principles and policies in use in Western Australia. Other activities of the group included:—

- Transport of Explosives Course for Drivers — First draft of competency standards completed.
- National Road Transport Commission:
 - Progress was made with the new *Transport Reform (Dangerous Goods) Bill* and Regulations.
 - A proposal for accreditation of carriers of dangerous goods was prepared. The accompanying Regulatory Impact Statement was being prepared by consultants.
 - Second Draft Bill sent for public comment and this, plus the draft Regulatory Impact Statement, has been commented on by the Chemical Safety Section.

OCCUPATIONAL HEALTH UNIT

The role of the Occupational Health Unit has changed from being mining orientated to one encompassing all workplaces in Tasmania. This has come about through the change in administration of Occupational Health and Safety within the Tasmania—Development and Resources, with the Industry Services Division, Mines Inspectorate, Dangerous Goods (Chemical Safety Branch) and the Occupational Health Unit having been rationalised. The Unit has been incorporated in the Chemical Safety Branch, which is now part of the Industry Services Division.

The activities of the occupational hygienists for the 1993/94 year are reported under the Mines Inspectorate section of this report.

**Significant
Incidents,
1993/94**

- 1. DATE: 1 July 1993**
LOCATION: Youngtown
DANGEROUS GOODS INVOLVED:
Nitric acid and methylated spirits, Class 8 and 3.1

A solution of nitric acid and methylated spirits known as 'Nital' exploded whilst being transported in the cabin of a utility. The driver required hospitalisation.
- 2. DATE : 5 July 1993**
LOCATION: Tarleton
DANGEROUS GOODS INVOLVED:
Petrol, LP gas, oxygen and acetylene, Class 3.1, 2.1 and 2.2/5.1

A fire started in a diesel mechanic's workshop spread to nearby cool stores containing cheese and fruit. The workshop contained oxygen, acetylene and LP gas in cylinders and flammable/combustible liquids in packages. Prompt action by the fire service in relation to the dangerous goods prevented a serious accident developing. Damage was estimated at \$1.3 million.
- 3. DATE : 13 July 1993**
LOCATION: Lindisfarne
DANGEROUS GOODS INVOLVED:
Oxygen and acetylene, Class 2.1 and 2.2/5.1

Thieves were disturbed while using oxy/acetylene equipment to try and cut open a safe at the Lindisfarne newsagency. The cutting torch was left on in their hurry to leave and this started a fire which gutted the building. The Hobart Fire Brigade requested the assistance of the inspectorate in determining the safety of the cylinders after the fire had been extinguished. Damage was estimated at \$200,000.
- 4. DATE: 13 August 1993**
LOCATION: Kings Meadows
DANGEROUS GOODS INVOLVED:
Petrol, Class 3.1

A disused and hitherto unknown underground tank containing a significant amount of petrol failed and contaminated surrounding soil at a nursing home in Kings Meadows. A rising water table allowed contamination of nearby stormwater drains. The tank was removed and the contaminated soil disposed of.
- 5. DATE: 27 August 1993**
LOCATION: Murchison Highway
DANGEROUS GOODS INVOLVED:
Sodium hypochlorite, Class 8

A 200 litre drum of sodium hypochlorite was lost from a vehicle during transport from Devonport to Strahan. The spill was cleaned up by a unit from the Tasmania Fire Service and the residue placed in an overdrum.
- 6. DATE: 6 September 1993**
LOCATION: Mona Vale
DANGEROUS GOODS INVOLVED:
Sulphuric acid, Class 8

The derailment of three rail tankers near the township of Ross resulted in the loss of 3000 litres of sulphuric acid. The spill was contained and later neutralised with lime. There were no injuries as a result of the incident, but property damage and recovery costs were estimated at \$70,000.
- 7. DATE: 30 September 1993**
LOCATION: Scamander
DANGEROUS GOODS INVOLVED:
Petrol, Class 3.1

Petroleum product from the BP Scamander service station contaminated stormwater drains and ended up in a nearby lagoon as a disused underground tank and old piping was removed. Drill tests confirmed heavy contamination of the site. The issue of the site cleanup is ongoing. Leachate from the soil continues to enter drains. The Division of Environmental Management and BP Australia are considering remedial action.
- 8. DATE: 20 October 1993**
LOCATION: Wynyard
DANGEROUS GOODS INVOLVED:
Class 1.1D

The principal of Wynyard High School requested the assistance of the Inspectorate after two students had purchased the ingredients to manufacture gunpowder at their homes. It had been alleged by other students that the material may have been later used at a school social. After interviewing both students and their parents, the inspector destroyed the gunpowder and remaining ingredients. This was done with the consent of all parties and the situation was satisfactorily resolved.

9. DATE: 9 November 1993 (approx.)

LOCATION: Wynyard

DANGEROUS GOODS INVOLVED:

Powergel and Detonating Cord, Class 1.1D

Three cases of 25 mm Powergel and three rolls of detonating cord were stolen from the Forestry Commission's Oldina Reserve. Access was gained by forcing the hinges on the magazines. The inspector investigating the incident recommended that the Forestry Commission's Licence to Keep Explosives be cancelled, as the magazines did not comply with AS2188.

DATE: 12 November 1993

LOCATION: North Hobart

DANGEROUS GOODS INVOLVED:

LP Gas, Class 2.1

The Tasmania Fire Service and Tasmania Police fire investigation officers requested the Inspectorate's assistance in determining if two LP gas cocks on a cooking appliance involved in a restaurant fire were in the 'on' position. The inspection confirmed that they were. At the time of the request arson was suspected as the cause. Damage to the restaurant was estimated at \$80,000-\$100,000.

10. DATE: 17 December 1993

LOCATION: South Hobart

DANGEROUS GOODS INVOLVED:

LP Gas, Class 2.1

The Tasmania Fire Service sought the Inspectorate's assistance when a safety relief valve associated with an LP gas automotive dispensing system began to discharge. The valve was located in a section of pipework between a liquid transfer pump and the dispenser. After isolating the section of pipe from the tank and securing the area, the Safety Relief Valve was allowed to continue discharging pending the arrival and repair of the system by a gasfitter from the Gas Corporation of Tasmania.

11. DATE: 15 January 1994

LOCATION: Newnham

DANGEROUS GOODS INVOLVED:

Petrol, Class 3.1

A man died of severe burns he received at his home in Newnham. It was first thought the incident occurred while he was refuelling his lawn mower, but police investigations indicate that he may have committed suicide. A coronial enquiry has commenced.

12. DATE: 21 January 1994

LOCATION: South Hobart

DANGEROUS GOODS INVOLVED:

Petrol, Class 3.1

A customer at a service station emptied two 20 litre containers of petrol onto a neighbouring property. The fuel travelled underneath a doctors surgery and the resulting vapours caused the evacuation of three occupants in the building. The Tasmanian Ambulance Service and Tasmania Fire Service attended the incident. The contaminated soil was removed and deposited at the Hobart City Council tip at McRobies Gully.

13. DATE: 8 February 1994

LOCATION: Prospect

DANGEROUS GOODS INVOLVED:

Blasting explosives, Class 1.1D

A shotfirer had a 12 month suspended sentence placed on his permit after one of his shots showered the surrounding area with flyrock. Luckily there were no injuries or serious property damage.

14. DATE: 2 June 1994

LOCATION: South Hobart

DANGEROUS GOODS INVOLVED:

LP gas, Class 2.1

The Tasmania Fire Service requested the assistance of the Chemical Safety Section after an LP gas leak was reported at a service station in South Hobart. Investigations revealed two leaks associated with a 7.5 KL Autogas system, one at a valve spindle and the other at a flared connection. The tank was isolated while repairs were carried out. There were no injuries or damage as a result of the incident.

15. DATE: 4 June 1994

LOCATION: Lindisfarne

DANGEROUS GOODS INVOLVED:

Acetylene, oxygen and thinners, Class 2.1, 2.2 and 3 (PG11)

A small galvanised-iron workshop was gutted by fire after the owner emptied ashes from his wood heater onto leaves and other combustible materials near the workshop.

Oxygen and acetylene cylinders inside the workshop at the time of the fire were intact, although the fusible plug on the acetylene cylinder had melted and the gas vented off. All other contents inside were completely destroyed; damage was estimated at \$5,000.

16. DATE: 9 June 1994
LOCATION: South Hobart
DANGEROUS GOODS INVOLVED:
 LP gas, Class 2.1

Dry 'O' rings in the swivel joint of an Autogas fill nozzle was the most likely cause of an LP gas leak at a South Hobart service station. The Tasmania Fire Service and Chemical Safety Section attended the incident which occurred late at night. The LP gas supply tank was isolated pending repairs to the dispensing nozzle the next day.

*Imports of Explosives
1993/94*

<i>Product (cartons)</i>	<i>Bell Bay</i>	<i>Burnie</i>	<i>Total</i>
Blasting explosives 1.1D	2 223	1 887	4 110
Detonators 1.1B	683	8 025	8 708
Total cartons	2 906	9 912	12 818
Ammonium nitrate (tonnes)	-	575	575
1.4S, 1.4G, 1.3S explosives (crates)	5	-	5
Number of shipments	47	18	65

*Imports of Flammable
Gases and Liquids
1993/94*

<i>Product (tonnes)</i>	<i>Hobart</i>	<i>Burnie</i>	<i>Devonport</i>	<i>Bell Bay</i>	<i>Total</i>
Super petrol	95 098	46 939	63 422	24 197	229 656
Unleaded petrol	63 461	16 354	45 423	14 867	140 105
Aviation turbine kero	7 126	-	-	407	11 196
Distillate	67 992	22 426	56 839	31 952	179 209
Heating oil	6 798	-	500	1 071	8 369
LP Gas	14 559	-	19 536	6 969	41 064
Bitumen feed stock	14 337	-	-	417	14 754
Fuel oil	-	21 587	18 660	14 160	54 407
Gas oil	11 683	14 643	11 998	1 758	40 082
Jet A1	3 188	-	-	5 164	8 352
Light fuel oil	-	-	-	2 490	2 490
Kerosene	-	-	-	920	920
Shipments	31	7	36	20	94

*Licences, permits and
approvals issued for
the import,
manufacture, storage,
use and sale of
Dangerous Goods,
1993/94*

	<i>1992/93</i>	<i>1993/94</i>
Licences to keep flammable liquids and dangerous goods	2639	2639
Licences to sell explosives and safety cartridges	140	139
Private magazine licences	72	74
Import explosives licences	27	27
Convey explosives licences	14	14
Manufacture explosives licences	6	6
To sell fireworks licences	1	1
Applications for shot-firers permits	88	65
Applications for plan approvals	400	311
Landing permits (fireworks and explosives)... ..	11	78
Transfers and information retrieval requests	-	30
Manufacture dangerous goods licences	3	4
Import dangerous goods licences	16	16
Gas suppliers licences	66	66
Exemptions	-	-
Fireworks permits	59	42
Export explosives permits		2

Mineral production from Tasmanian sources since 1880
Quantity of production as at 30 June 1994

<i>Commodity</i>	<i>Unit</i>	<i>Quantity in Current Year</i>	<i>Total Quantity</i>
METALLIC MINERALS			
Antimony	(tonne)	-	3
Bismuth	(kilogram)	-	110 080
Cadmium	(tonne)	-	5 155
Chromite	(tonne)	-	2 687
Cobalt oxide	(tonne)	-	165.3
Copper (blister) to 1918 (now shown under Silver and Copper)	(tonne)	-	169 273
Copper matte	(tonne)	-	6 326
Copper ore to 1918 (now shown under Copper)	(tonne)	-	42 439
Copper (from 1919)	(tonne)	32 822	1 138 153
Gold	(kilogram)	1 350	126 637
Ilmenite	(tonne)	-	558
Iron ore pellets	(tonne)	1 565 882	53 420 826
Iron in iron oxide (including hematite, limonite and magnetite)	(tonne)	119 991	1 321 357
Lead (from 1919)	(tonne)	71 752	1 152 043
Manganese	(tonne)	-	1
Manganese dioxide (from 1957)	(tonne)	-	13 521
Mercury	(kilogram)	-	7 697
Molybdenum	(tonne)	-	162
Monazite	(tonne)	-	34
Nickel	(tonne)	-	237
Osmiridium	(kilogram)	-	960
Pyrite (to 1971)	(tonne)	-	2 124 070
Pyrite (from 1972)	(tonne)	87 931	1 891 775
Rutile	(tonne)	-	1
Rutile (concentrates)	(tonne)	-	40 027
Scheelite (concentrates)	(tonne)	-	57 261
Silica for silicon alloy production	(tonne)	-	1 137 705
Silicon	(tonne)	-	36 987
Silver-lead ore to 1918 (now shown under Silver and Lead)	(tonne)	-	1 101 295
Silver (from 1919)	(kilogram)	140 422	3 706 932
Tin	(tonne)	7 415	315 105
Tungsten (as tungstic oxide)	(tonne)	26	35 241
Zinc	(tonne)	165 934	3 175 790
Zinc sulphate (from 1957)	(tonne)	-	4 306
Zircon (concentrates)	(tonne)	-	39 001
NON-METALLIC MINERALS			
Asbestos	(tonne)	-	4 044
Barite	(tonne)	-	2 240
Clay (from 1958)	(tonne)	150 033	4 683 998
Dolomite	(tonne)	26 069	441 112
Graphite	(tonne)	-	41
Kaolin	(tonne)	40 034	549 396
Limestone—			
Agricultural and other	(tonne)	138 783	2 871 832
Carbide	(tonne)	-	1 081 509
Cement	(tonne)	1 096 926	20 359 465
Chemical and metallurgical	(tonne)	29 773	6 265 087
Ochre	(tonne)	-	2 949
Pebbles (from 1957)	(tonne)	-	31 757
Sulphuric acid	(mono tonne)	361 959	6 278 743
Sand (moulding)	(tonne)	-	1 442
Silica	(tonne)	-	701 248
Talc	(tonne)	-	338

<i>Commodity</i>	<i>Unit</i>	<i>Quantity in Current Year</i>	<i>Total Quantity</i>
FUEL MINERALS			
Coal (run of mine)	(tonne)	564 282	18 876 567
Shale	(tonne)	-	42 239
Peat	(m ³)	16 056	47 290
CONSTRUCTION MATERIALS			
Building stone—			
Freestone	(tonne)	460	33 040
Granite	(tonne)	1 555	134 884
Other stone	(tonne)	188	38 917
Sandstone (from 1993)	(tonne)	149	149
Crushed and broken stone (from 1958)—			
Basalt	(tonne)	665 629	19 269 783
Dolerite	(tonne)	1 276 237	32 467 408
Limestone	(tonne)	41 415	1 213 060
Sandstone	(tonne)	11 867	310 846
Other	(tonne)	214 511	11 414 026
Gravel (from 1958)	(tonne)	78 481	48 390 391
Sand (from 1958)	(tonne)	546 346	10 072 441
Other road-making material	(tonne)	1 243 708	14 102 851

*Value of the
Tasmanian mineral industry*

<i>Year ended Commodity</i>	<i>Unit</i>	30 June 1994 Total Quantity	30 June 1993 Total Quantity
METALLIC MINERALS			
Cadmium	(tonne)	0	209
Cobalt oxide	(tonne)	0	0
Copper	(tonne)	32 822	28 395
Gold	(kilogram)	1 350	1 404
Iron ore pellets	(tonne)	1 565 882	1 458 909
Iron (in magnetite)	(tonne)	111 991	150 094
Lead	(tonne)	71 752	66 459
Molybdenum	(tonne)	0	0
Pyrite	(tonne)	87 931	94 484
Silicon (metallic or as alloy)	(tonne)	0	296
Silver	(kilogram)	140 442	95 332
Tin	(tonne)	7 415	6 760
Tungsten as tungstic oxide	(tonne)	26	142
Zinc	(tonne)	165 934	233 837
Value of metallic minerals		\$350 740 980	\$348 168 965
NON-METALLIC AND FUEL MINERALS			
Clay-			
Cement	(tonne)	52 300	24 567
Brick	(tonne)	85 463	60 968
Other	(tonne)	12 270	14 507
Kaolin	(tonne)	40 034	22 059
Dolomite	(tonne)	26 069	20 815
Limestone-			
Agricultural	(tonne)	85 122	72 078
Cement	(tonne)	1 096 926	679 469
Chemical and metallurgical	(tonne)	29 773	25 205
Other	(tonne)	53 661	57 865
Sulphuric acid	(mono tonne)	361 959	352 498
Coal (run of mine)	(tonne)	564 282	494 873
Coal (washed)	(tonne)	316 047	250 736
Peat	(m ³)	16 056	4 864
Value of non-metallic and fuel minerals		\$38 732 242	\$32 766 542
CONSTRUCTION MATERIALS			
Building stone-			
Freestone	(tonne)	460	1 600
Granite	(tonne)	1 555	162
Other	(tonne)	188	209
Sandstone	(tonne)	149	-
Crushed and broken stone-			
Basalt	(tonne)	665 629	903 037
Dolerite	(tonne)	1 276 237	1 468 895
Limestone	(tonne)	41 415	49 399
Sandstone	(tonne)	11 867	14 775
Other	(tonne)	214 511	96 979
Gravel	(tonne)	78 481	46 815
Sand	(tonne)	546 346	495 278
Other road materials	(tonne)	1 243 708	1 134 570
Value of construction materials		\$27 088 140	\$26 896 931
TOTAL VALUE WITH AUSTRALIAN METAL PRICES		\$416 561 362	\$407 832 438
METALLURGICAL PRODUCTION FROM OTHER THAN TASMANIAN ORES			
Aluminium)		
Aluminium sulphate)		
Cadmium)		
Cobalt oxide)		
Ferro-manganese)		
Ferro-silicon)	\$639 023 140	\$616 908 492
Silico-manganese)		
Sinter)		
Superphosphate)		
Titanium dioxide)		
Zinc)		
VALUE OF MINING AND METALLURGICAL PRODUCTION		\$1 055 584 502	\$1 024 740 930
REPORTED AVERAGE NUMBER OF EMPLOYEES¹		5033	5086

(1) Not all operators report full details