REPORT OF THE DIRECTOR OF MINES

1984 – 1985

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Cover: Semi-submersible drill rig 'Diamond M Epoch' in Hobart for refitting prior to oil exploration drilling in Bass Strait.

Backcover—photo from 'Mines & Mineral Resources of Tasmania'.

1986 (No. 25)

1986

PARLIAMENT OF TASMANIA

DIRECTOR OF MINES

REPORT FOR THE YEAR ENDED 30 JUNE 1985

Presented to both Houses of Parliament by His Excellency's Command

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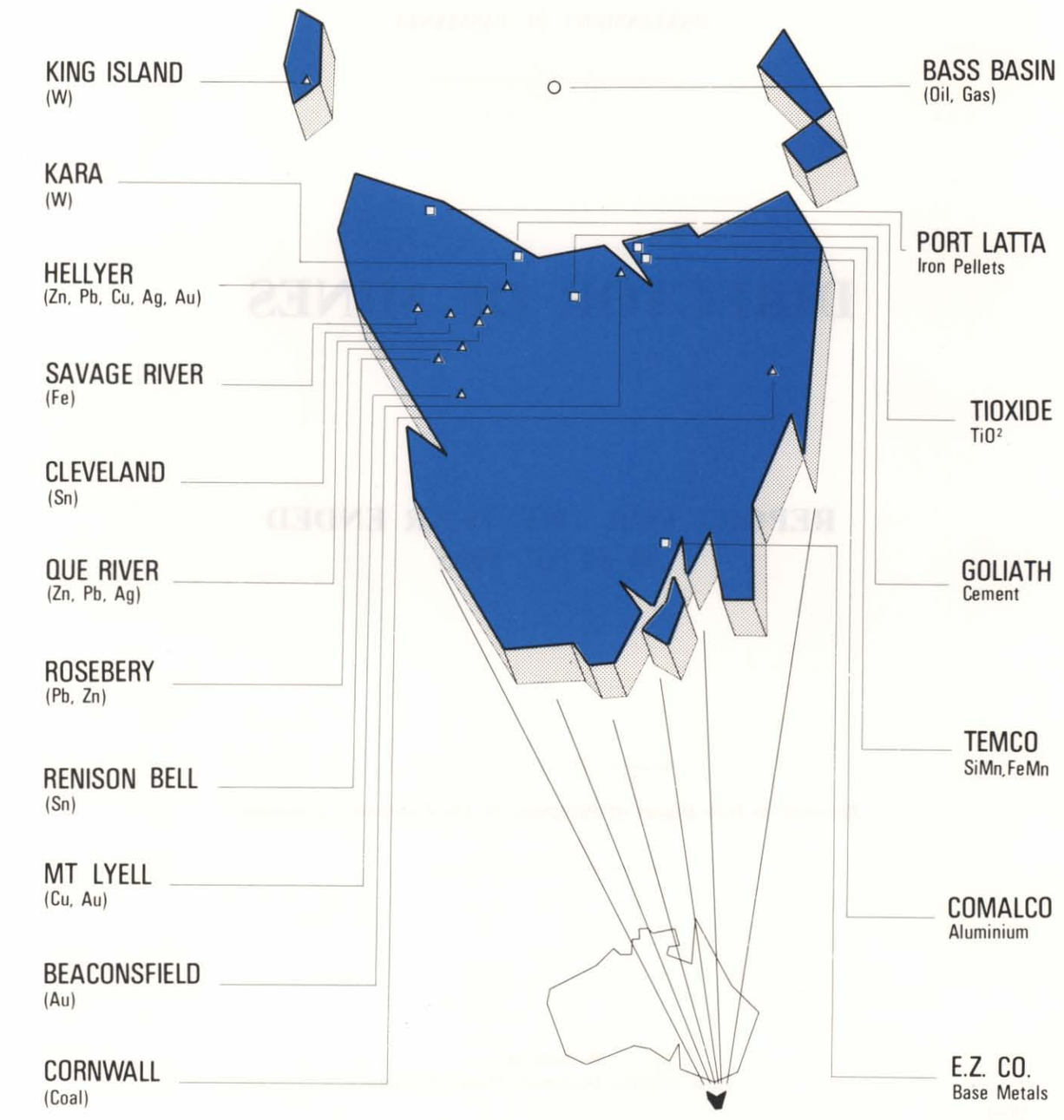
TASMANIA

THE MOST MINERALISED STATE

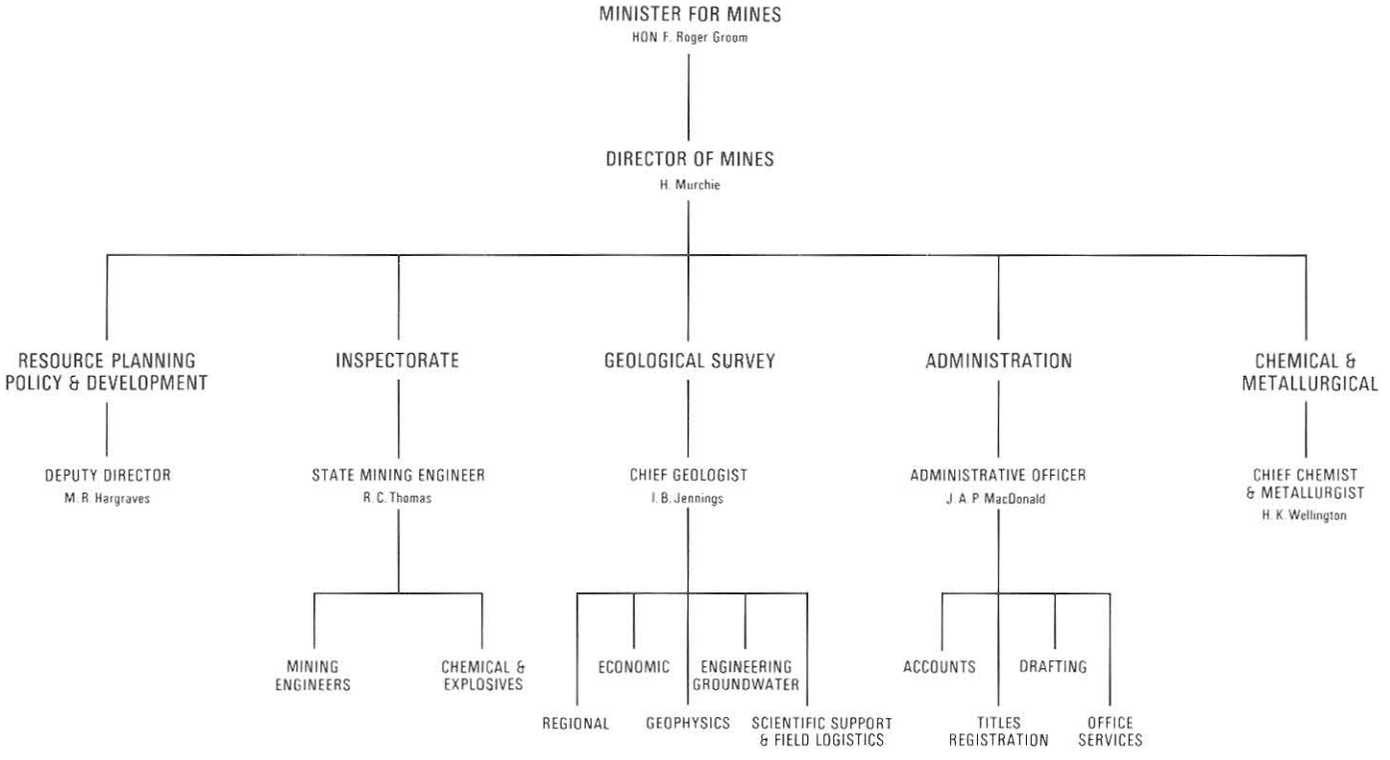


REPORT OF DIRECTOR OF MINES 1984-85

Department Functions

- the administration of the State's mineral lands and the regulation of exploration activities onshore and offshore.
- the regulation of mines and works, and the enforcement of safety and occupational health standards.
- the regulation of the transport, storage and use of dangerous goods.
- the systematic assessment of the geology of the State and the provision of a geological data base.
- the responsible development of the State's mineral and energy resources.
- the provision of chemical and metallurgical research facilities.

DEPARTMENT OF MINES ORGANISATION CHART 1984/85



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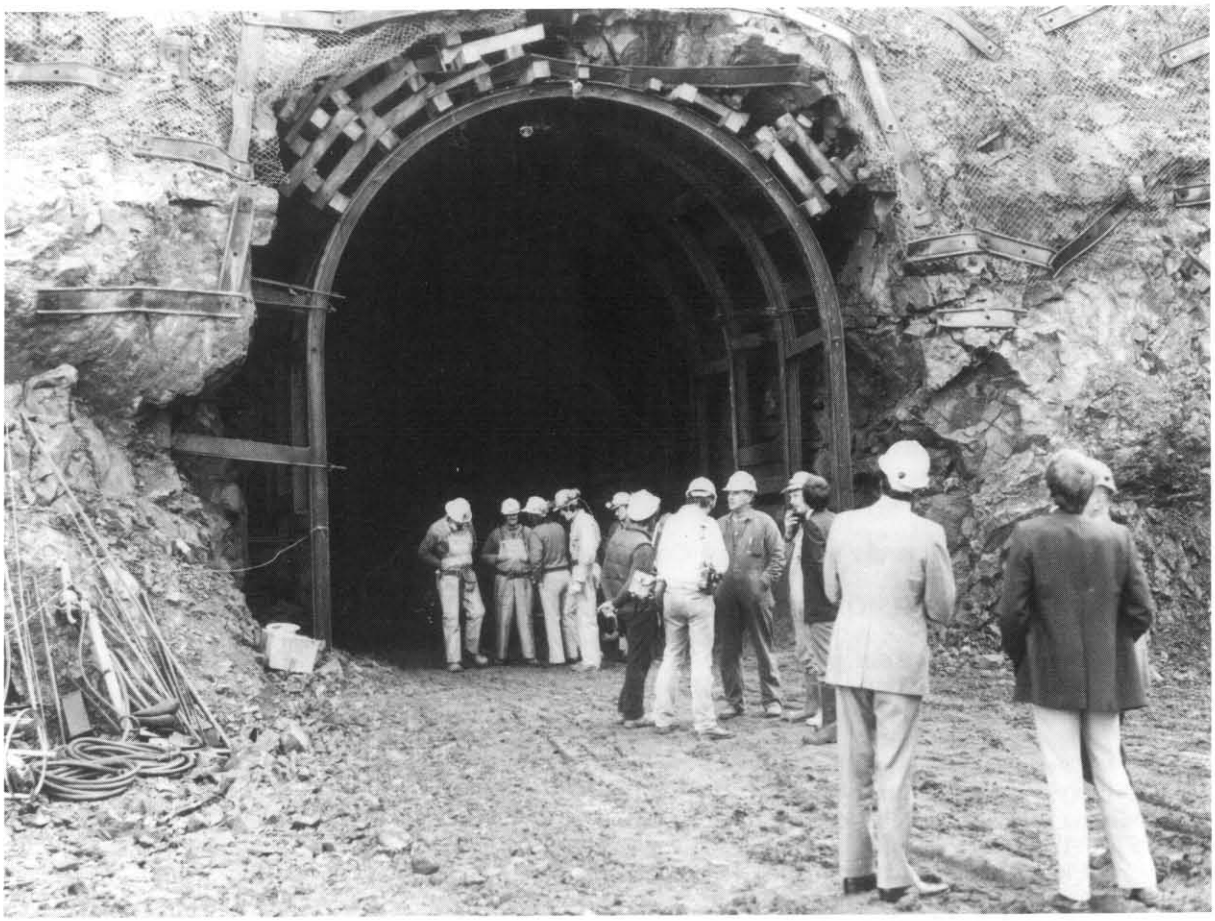


The portal of the exploration adit at the Hellyer Mine. The works at this prospect were officially opened by the Minister for Mines on 24 May 1985. [Photo courtesy of The Advocate]

REPORT OF THE DIRECTOR OF MINES

TO THE MINISTER FOR MINES

Annual Report of the Department of Mines for the year 1984–85 submitted by the Director of Mines, Mr H. Murchie.

OVERVIEW

In the late 1960's and 1970's the Tasmanian mining industry experienced boom years. Total value of production rose steadily each year due to buoyancy of world markets.

Unfortunately this resulted in the international policies and philosophies from which we now suffer today. There was steady growth in demand and world-wide, industry saw no need to promote campaigns to sell mineral products.

To meet an anticipated world growth in demand, new projects were developed and production expanded. The optimism was not justified and we are now paying for earlier decisions which hindsight shows were mistaken judgements.

Demand is no longer growing and in many countries we have excess production capacity with economic ore bodies awaiting development. In this climate it is difficult to obtain viable prices for mineral products and marketing competition becomes fierce.

Our industry has countered this dilemma by implementing drastic cost cutting measures and is now more efficient as a result.

Tasmania's mining industry employment peaked at 10 853 persons in 1971 and has decreased to an average of 7 946 persons for the year ending 30 June 1985. Improved technology coupled with extensive mechanisation has reduced labour costs without reducing production.

Downward market pressures have prevailed for over three years now and all measures taken to remain competitive will count for little if demand and prices remain weak.

Our base metal industry, which accounts for almost all mining production, is at a turning point, and must continue to fight hard to survive in these difficult times.

It is important that everyone in the industry and all others who are involved or dependent upon it are made aware of the situation, and pull together to safely steer this vital sector of our economy into the 1990's.

I believe there is much work yet to be done to achieve that goal.

REVIEW OF THE YEAR

The past year has seen mixed fortunes for the Tasmanian mining industry, with new development initiated at the same time as older operations reach the end of their economic life. Metal prices continue at depressed levels, but the devaluation of the Australian dollar has had a positive economic effect.

The most significant event for the West Coast community was the announcement in December 1984 that the future of the Mt Lyell mine of Renison Goldfields Consolidated Limited hung in the balance. Immediate closure of the mine was forestalled by Tasmanian Government action to inject $5 million to maintain operations until mid 1989.

In recognition of the dependence of the West Coast on mining, and of the need to accelerate exploration and discovery of new resources, the Tasmanian Government approved the commitment of $2 million to geophysical and geochemical investigations, and an interim programme of geological mapping of the Mt Read mineral province. These funds were allocated from the Commonwealth Government compensation for the curtailed Gordon-below-Franklin power scheme. The Mt Read mineral province, stretching from Elliott Bay to Guildford, contains the Mt Lyell, Rosebery, Que River and Hellyer deposits and has great potential to host further deposits.

The discovery of additional reserves at the Hellyer prospect underlines the potential of the West Coast to foster new mining development. The Hellyer polymetallic orebody has proved to be world class, and development of a 1·3 km exploration adit is proceeding to allow detailed evaluation of the orebody. The nearby Que River mine is to increase output in consequence of the firm precious metal prices.

In another development, re-treatment of the Beaconsfield tailings has commenced with a $3 million carbon-in-pulp gold recovery plant.

Tin markets remain unstable, supported only by continuing quotas on production and management of a substantial buffer stock by the International Tin Council. The future of the tin industry is far from encouraging, with large tin stocks, unchecked production from countries that are not party to the International Tin Agreement, and dwindling resources of the Buffer Stock Manager to maintain the floor price of the market.

The Renison mine continues to produce at 60 per cent of capacity in consequence of quotas, and at the Cleveland mine, also limited by production quotas, no further development is being carried out. Tin production from Cleveland is expected to cease in about twelve months when the plant may be converted to investigate treatment of the Hellyer ore.

Production of lead-zinc from the Rosebery mine rose during the year, though economic reserves at the Hercules mine will soon be exhausted. Low cost bulk mining methods now account for nearly 60 per cent of mine production.

Tungsten markets continue to be depressed, but production from the King Island mines has shown an increase for the first time in many years.

The Cornwall Coal Company has been successful in negotiating supply agreements with industries converting to coal for fuel.

Production of iron concentrate from the Savage River mine was marginally higher than in the previous year. Increased production from the Northern Deposit meant longer haul distances but a higher grade of ore mined.

Despite the general cut-back in Australian exploration budgets, considerable interest is being shown in Tasmania because of the release of highly prospective ground from long-standing Exploration Licences. Awarding of licences on the basis of work programmes is a departure from the previous system, and it is now possible for intending applicants to review results of all previous work and formulate an exploration programme before making application. As a result of this approach, a number of areas formerly held under one licence have been subdivided to permit licensees to pursue their particular commodity interest.

Petroleum exploration received an impetus this year with considerable offshore seismic activity and plans for a three-well programme to be carried out by the Amoco Consortium. Initial results from the first of these wells are particularly encouraging and further developments, which will be of great significance to the State's future energy needs, will be watched carefully.

The Department had discussions with the Pioneer Group concerning the proposal to re-open the Electrona Carbide plant as a silicon smelter. Technical matters of plant operations and design and the location of feed stock were dealt with.

Guidelines for mining leases in the South-West Conservation Area have been developed following discussions with other Departments and have been forwarded to the Government for approval.

A Departmental display was conducted at the agricultural shows in Hobart and Launceston with the emphasis on the safe handling of dangerous goods.

A fire involving chemicals in a transport warehouse developed into an environmental hazard when some fire fighters became unwell and the surrounding vegetation exhibited ill-effects. The goods were seized under the Dangerous Goods Act and disposed of by burial. A settlement has been reached to recover the cost of the disposal from the owners under Section 14 (1) of the Dangerous Goods Act. This incidence highlighted the need for disposal sites for dangerous goods and a working group has been convened to advise on this issue.

The geochemist devoted much of the year to the development of a new method of geochemical exploration by using the organic content of soil samples.

With some concern it is noted that the data from the detailed BMR aeromagnetic survey of north-west Tasmania, flown in 1984, is still awaited and the indications are that the results of the 1985 survey of a large part of Tasmania will not be available for another two years.

A staff appraisal and personal development system was introduced towards the end of the year and is progressing well. Better communication and staff counselling will result from these initatives.

A review of the Mines Inspection and Dangerous Goods Branch was conducted by Mr N. A. Gilberthorpe, the former Chief Executive of Aberfoyle Ltd. Mr Gilberthorpe's recommendations included splitting the Branch into two separate divisions and devoting more resources to occupational health matters. His recommendations have been accepted and will be implemented in the coming financial year.

A review of the Administration Branch was conducted by officers from the Public Service Board. The review recommended the restructuring of the Branch into three sections covering resources, personnel and finance and this restructuring will commence shortly. The reviews have been worthwhile and well received by staff generally.

Tasmanian mining and smelting companies, together with those involved in exploration and other associated activities, formed the Tasmanian Chamber of Mines in February 1985. This initiative is welcomed as a positive step to present a single voice from industry when addressing contentious issues. The Department maintains regular contact with the Chamber, especially on matters concerning legislation, regulation, occupational health, exploration and environmental issues. Regular contact is also maintained with employee groups through their union secretaries, organisers and local representatives.

VALUE AND PRODUCTION OF PRINCIPAL MINERALS

The value of production from Tasmanian sources for the year was $422·8 million, an increase of $56 million from last year. Production from imported ores was $540 million, an increase of $108 million from last year. Total value of production at $962·8 million showed an increase of $164 million which was up 20·5 per cent on last year.

TABLE 1

VALUE AND PRODUCTION OF PRINCIPAL MINERALS

Commodity	*Quantity*	*Value*
		$m
Copper (tonnes)	40 292	45·0
Gold (kilograms)	1 842	25·3
Iron ore pellets (tonnes)	2 258 014	69·6
Lead (tonnes)	23 028	12·4
Silver (kilograms)	97 784	27·8
Tin (tonnes)	3 458	60·3
Tungsten as tungstic oxide (tonnes)	1 430	13·5
Zinc (tonnes)	72 799	83·9
Coal (tonnes)	495 726	12·3

REVIEW OF INDUSTRY DEVELOPMENT AND STATISTICS

COPPER

Although nearing the end of its life, the Mt Lyell mine yielded 38 301 tonnes of copper in concentrates, 14 830 tonnes more than last year. Cleveland Tin produced 216 tonnes of copper in concentrates and the Electrolytic Zinc Company produced 1 775 tonnes in concentrates.

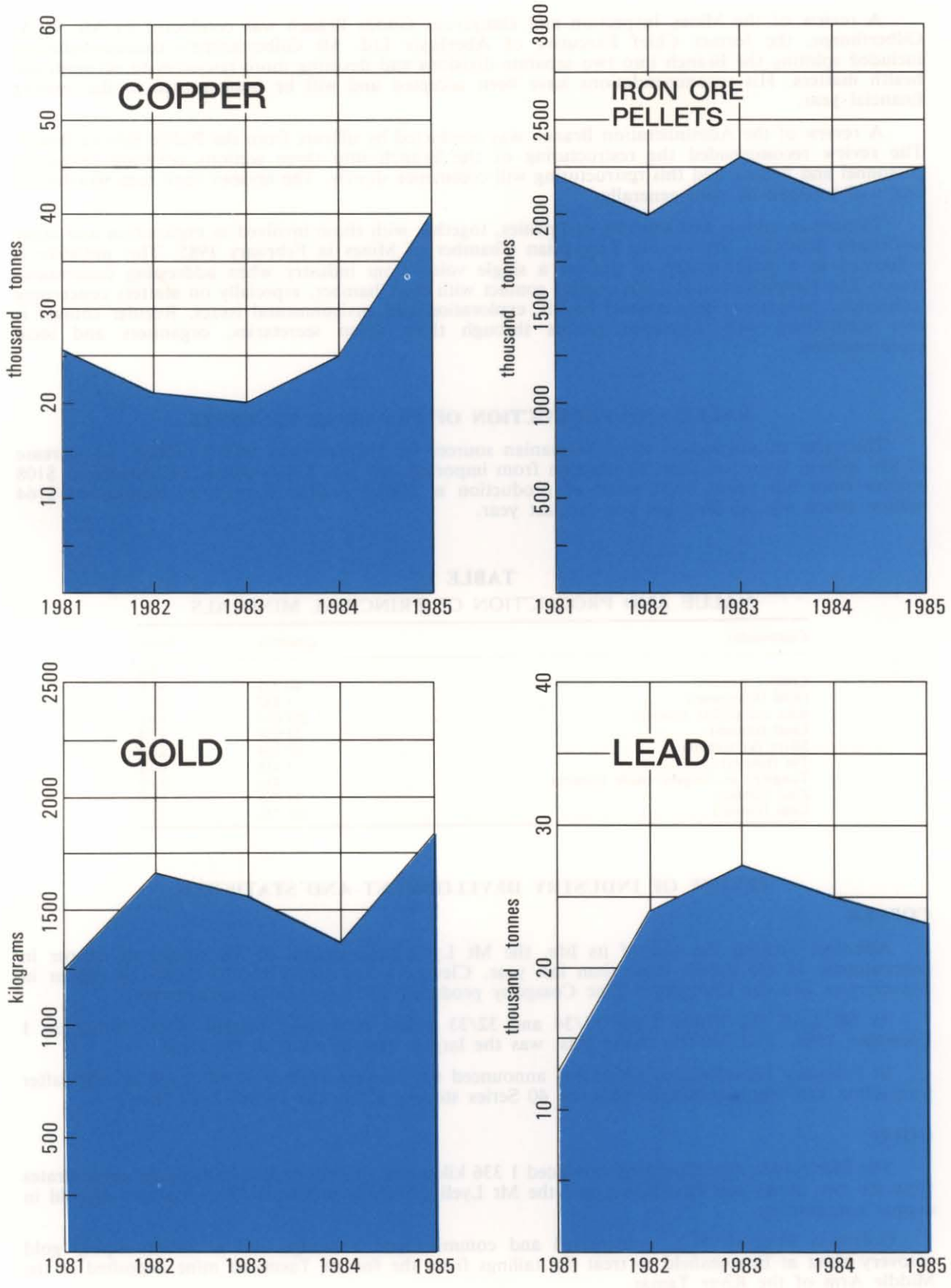
At Mt Lyell the Prince Lyell 33/34 and 32/33 pillars were mass blasted in one firing on 1 December 1984. This 750 000 tonne blast was the largest ever to occur at Mt Lyell.

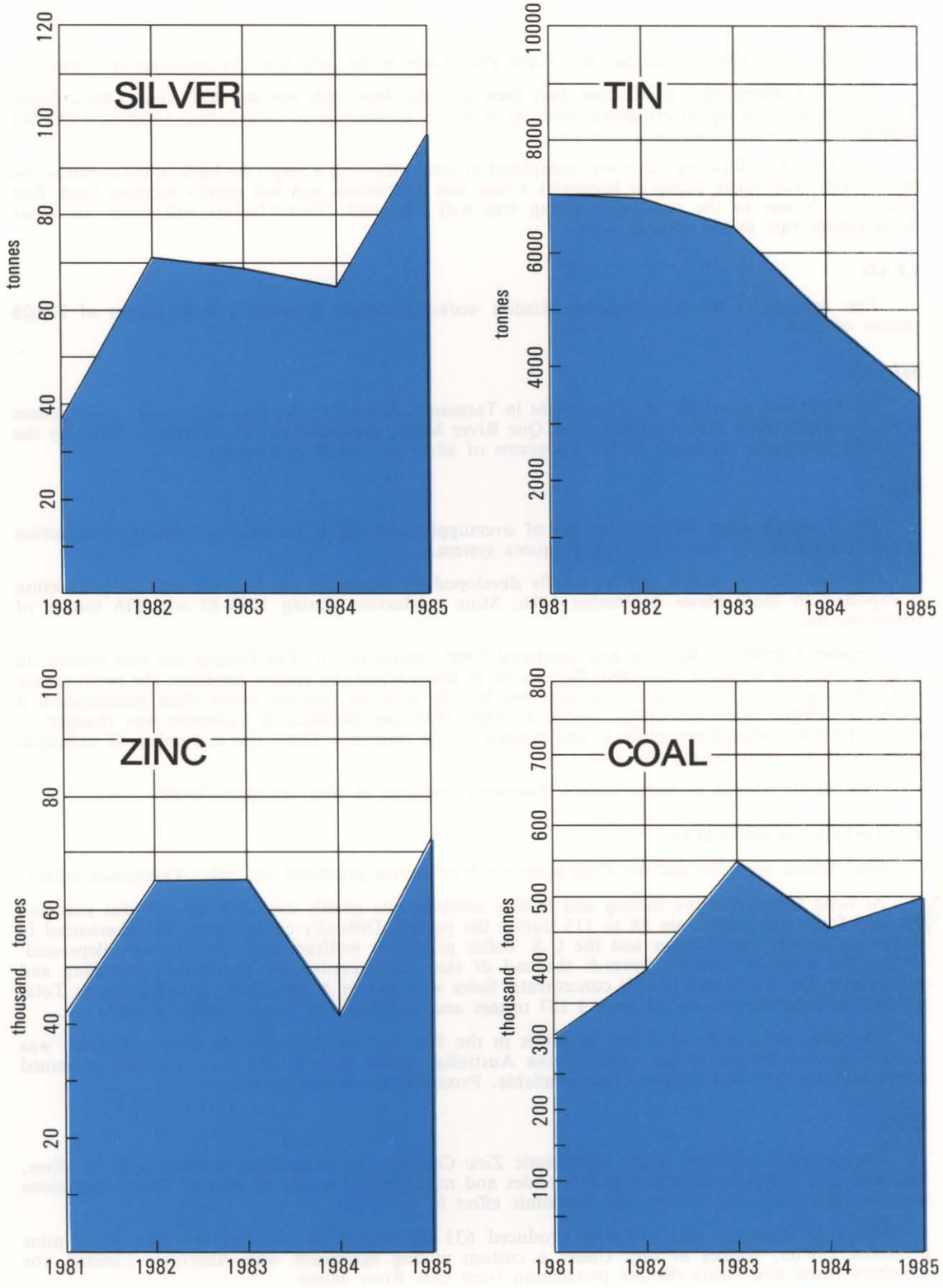
In February 1985 Renison Goldfields announced the planned closure of Mt Lyell in 1989 after production has been completed from the 40 Series stoping lift in the Prince Lyell mine.

GOLD

The Electrolytic Zinc Company produced 1 336 kilograms of gold in zinc-lead-copper concentrates from its own mines and Que River, and the Mt Lyell Company produced 505 kilograms of gold in copper concentrates.

Golconda Minerals N.L. constructed and commissioned a dredge and a carbon-in-pulp gold recovery plant at Beaconsfield to treat the tailings from the former Tasmania mine deposited in the Middle Arm of the River Tamar.


COPPER
thousand tonnes
10
20
30
40
50
60
1981
1982
1983
1984
1985
IRON ORE PELLETS
thousand tonnes
500
1000
1500
2000
2500
3000
1981
1982
1983
1984
1985
GOLD
kilograms
500
1000
1500
2000
2500
1981
1982
1983
1984
1985
LEAD
thousand tonnes
10
20
30
40
1981
1982
1983
1984
1985
5 cm


SILVER
tonnes
120
100
80
60
40
20
1981
1982
1983
1984
1985
TIN
tonnes
10000
8000
6000
4000
2000
1981
1982
1983
1984
1985
ZINC
thousand tonnes
100
80
60
40
20
1981
1982
1983
1984
1985
COAL
thousand tonnes
800
700
600
500
400
300
200
100
1981
1982
1983
1984
1985
5 cm

IRON ORE

Savage River Mines at Savage River and Port Latta is the only iron ore producer in Tasmania.

Despite working more production days than last year, less crude ore was delivered to the crusher. This was offset by a higher ore grade resulting in greater production of concentrates totalling 2 258 014 tonnes.

The Main Creek tailings dam was completed in June following a major set-back in the construction of the wall. The waste dump at Broderick Creek was established and will greatly increase truck fleet efficiency. Access to the south-west dump was well advanced. These factors will assist the waste development rate in the coming year.

LEAD

Zinc refining at the EZ Company Risdon works produced Tasmania's total output of 23 028 tonnes of lead.

SILVER

No silver was produced in its own right in Tasmania. However zinc, lead and copper concentrates from the Electrolytic Zinc Company and Que River Mines contained 83 023 kilograms. Similarly the Mt Lyell Company produced 14 761 kilograms of silver in copper concentrates.

TIN

Tin is experiencing severe problems of oversupply and excess production capacity. Production is constrained by the Australian export quota system.

Cleveland Tin at Luina has now fully developed all economic ore reserves and tin production is expected to cease about September 1986. Mine production during 1984–85 was 516 tonnes of contained tin.

Renison Limited at Renison Bell produced 2 892 tonnes of tin. The Federal ore was treated on its own over four weeks in July 1984. Because of its lower grade and greater hardness, the performance was not as good as the usual run-of-mine ore but the trial did indicate where plant modification is needed to obtain more successful results. In May 1985 the emphasis in treatment was changed to obtain a better concentrate grade at the expense of tin recovery. There was a number of industrial disputes at the mine during the year.

Alluvial tin mining in north-eastern Tasmania operated at very depressed levels.

TUNGSTEN (SCHEELITE)

King Island Scheelite and the Kara mine south of Burnie produced the entire Tasmanian output.

At King Island, the ore mining and milling achievements greatly exceeded the previous year and the workforce increased from 88 to 113 during the period. Difficulty continued to be experienced in marketing gravity concentrates and the U.S. dollar prices for wolfram and scheelite were depressed. Orders for artificial scheelite towards the end of the year exceeded the production capability and will greatly decrease stocks of this concentrate. Sales were mostly at the higher scheelite prices. Total scheelite concentrates produced were 1 127 tonnes and molybdenum concentrates 8 tonnes.

The Kara mine suffered a fall in prices in the first half of the year, the effect of which was lessened by the decline in the value of the Australian dollar later in the year. Demand remained poor, with no firm and regular order available. Production was 303 tonnes.

ZINC

The principle producer is the Electrolytic Zinc Company of Australasia Limited with its silver, lead and zinc mines at Rosebery and Hercules and metallurgical works at Risdon. These operations have an important employment and economic effect in the State.

Mines at Rosebery and Hercules produced 633 422 tonnes of ore and the Que River mine produced 229 657 tonnes of ore. Under a custom milling agreement with Aberfoyle Limited, the Rosebery plant also treats the ore production from Que River Mines.

The Risdon plant treats the company's own concentrates from Rosebery (some of which derive from the Que River mine), Elura, Broken Hill and Mt Isa. Total zinc production was 72 799 tonnes.

It was decided to phase out production at the Hercules mine and all underground development ceased. Broken and fully developed stope ore, together with the associated crown pillars, will be extracted prior to the closure of the mine early in 1986.

Development at Rosebery totalled 7 847 metres and was largely concentrated in headings required for longhole stoping. Surface drilling from two sites on Mt Black to explore possible down-dip extensions of the 'C' and 'F' lenses commenced.

Development of the Que River mine continued and advance was achieved on all levels from No. 3 to No. 7, mainly for the purpose of gaining access to new stope blocks. Some exploratory development was also carried out. Total advance for the year amounted to 1 509 metres. In addition, a total of 1 925 metres of 381 mm diameter hole was bored from the surface down to the stopes for use in fill placement.

COAL

The Cornwall Coal Company continued to be the only major coal producer in Tasmania and employed 147 persons. Production was 495 726 tonnes. The Duncan Colliery yielded 305 865 tonnes and the Blackwood Colliery 167 954 tonnes.

The Duncan washery at Fingal received capital investment of $1·7 million in new plant to coincide with the conversion of a Tasmanian industry to coal.

Avoca Transport Pty Ltd was granted a mining lease over the old Merrywood Colliery near Royal George and mined coal in the open pit.

PEAT

Collins Development Pty Ltd continued to produce peat from the Browns Marsh deposit for use in the horticultural industry. Operations were curtailed due to the above average rainfall during the summer harvesting season, with only 150 tonnes being produced.

NON-METALLIC AND CONSTRUCTION MATERIALS

Last year's buoyant production was not maintained, with notable falls in crushed and broken stone, sand and gravel. Other road materials increased but not sufficiently to reverve the overall decline.

There was a 12 per cent increase in brick clay production which, with a jump in building stone, reflected increased building activity in the State.

IMPORTED ORES

ALUMINIUM

Aluminium is smelted by Comalco at Bell Bay from alumina imported from the mainland. The capacity of the plant is some 170 000 tonnes of aluminium per year. About 1 300 people are employed at Bell Bay producing metal which is shipped in many forms to both domestic and overseas markets. Comalco is the largest user of electric power in Tasmania.

ILMENITE

The Heybridge plant of Tioxide Australia Pty Ltd imported 60 668 tonnes of ilmenite from Western Australia for the production of titanium dioxide.

LEAD-ZINC

The Electrolytic Zinc Company of Australasia Ltd at Risdon imported 164 432 tonnes of ore from mainland sources. From these the company also produced small quantities of cadmium and cobalt oxide.

MANGANESE

TEMCO imported 70 706 tonnes of manganese ore for the production of ferro-manganese and the further treatment of slag to produce silico-manganese.

Almost $47 million is to be spent over three years upgrading the plant at Bell Bay to boost capacity by 41 per cent. Silicate material quarried at Beaconsfield and iron and manganese ore from the mainland are alloyed in large electric arc furnaces which convert the feed into ferro-silicon and silico-manganese alloys.

AUSTRALIAN MINERALS AND ENERGY COUNCIL (AMEC)

AMEC is the body which provides a forum for discussion and policy co-ordination between the States and the Commonwealth on minerals and energy issues.

In March 1985 the Council met in New Zealand where the Director of Mines represented the Minister in his absence.

Offshore Petroleum Legislation, including the proposal to introduce cash bidding, and the division of revenues between the Commonwealth and States was discussed. It was agreed to set up a working party to 'examine the impact of the Australian Heritage Commission Act 1975 on minerals development exploration and mining in National Parks'. This agreement followed the presentation of a report on 'The Impact of the Australian Heritage Commission Act 1975 on Minerals Development and Exploration'. The paper was prepared due to pressure from Queensland and Tasmania to review the administration of the Act. The issue of allocation of tin quotas was also raised.

CONCLUSION

I wish to record my appreciation of the loyal and dedicated service given by all officers of the Department of Mines. It has been a year of many changes and they have risen to the challenge well and co-operated to achieve high standards. I know they are proud of the results they have achieved.

H. MURCHIE, *Director of Mines*

REPORTS BY DIVISIONS OF THE DEPARTMENT OF MINES

ADMINISTRATION DIVISION

The year under review has been one of very significant change for this Division. In the latter part of the year the Head of Division, who had many years service with this Department, decided to retire on 3 July 1985 and this was accompanied by the resignation of a senior accounting officer who was also a long serving officer.

These two events, together with other natural but significant staff turnover, prompted the Director of Mines to ask the Public Service Board to carry out a review of the Division. The main purpose of the review was to assess the suitability of the existing structure to the current functions and the new ones which would be required under the State Service legislation.

The review commenced on 16 April and the final report was received in May. A major restructuring was recommended together with a further review of the Accounts Section and the Registry. It was not possible to implement the major recommendations before the end of the year and this will be commented on in the next report.

The other major area of change was the proposed implementation of the State Service legislation from 1 January 1985. It became apparent that there would be a need for a full-time Personnel Section to be established to cope with the new requirements. It was therefore necessary to re-allocate duties between officers in order to free up appropriate officers and allow them to receive the required training. This was only possible with the assistance of the Resource Planning and Policy Development Division. The legislation will not be proclaimed until after 30 June 1985, but the preparation and training continued throughout the period.

Other areas of achievement included:—

(1) The processing of mineral statistics was computerised.

(2) The Division prepared material for the Department's display at the two main shows—Launceston and Hobart.

(3) A list of qualifications and training for each officer was prepared. It is proposed to computerise this at a later date, in the form of a staff training and development inventory system.

STAFF MOVEMENTS

Name	*Position*	*Remarks*	*Date*
H. Medwin	Inspector of Explosives	Retired	3.7.84
A. Moon	Geologist	Resigned	8.8.84
D. Green	Mineralogist/Petrologist	Resigned	17.8.84
D. Seymour	Geologist	Commenced	17.9.84
A. Brown	Senior Geologist	Promoted	11.10.84
B. Crosby	Senior Clerk	Resigned	2.1.85
R. McDonald	Driller	Resigned	22.2.85
B. Weldon	Geologist	Commenced	7.3.85
R. Sedgman	Technician	Commenced	29.4.85
B. Lovell	Driller	Commenced	29.4.85
R. Langridge	Senior Clerk	Commenced	2.5.85
J. Groves	Driller	Promoted	17.4.85
R. Bottrill	Geologist	Commenced	15.5.85
M. Whitmore	1st Runner	Promoted	2.5.85
S. Martinovich	2nd Runner	Commenced	27.5.85
M. Hill	Draftsman	Transferred	19.6.85

EXPLORATION LICENCES

The number of applications received for licences was thirty-one compared with sixty-five during 1983–84. Twenty-four of the applications were for all minerals, five for coal, oil and shale and the balance of two for stone.

Applications received during the past four years are as follows:—

1981–82: 45 1983–84: 65

1982–83: 64 1984–85: 31

As at 30 June 1984 there were 106 current Exploration Licences and one Special Prospector's Licence.

Expenditure for the year was $8 200 132 compared with $10 596 476 in 1983–84.

COURT OF MINES

Tasmania is divided into four mining districts. Each district has a Warden of Mines. The Wardens, who are magistrates, hear disputes arising under the Mining Act 1929, in the Court of Mines. The Wardens are:—

Mr J. Temple-Smith, North-Western Mining District;

Mr M. A. Hannon, Central Mining District and South-Western Mining District.

Mr K. N. Dockray, North-Eastern Mining District.

Cases heard during the year consisted of:—

C. J. Taylor v R. G. Crane and P. R. Chapman. Application for forfeiture of mineral lease 91M/77, 2 ha, Lisle. The application was withdrawn on 21 February 1985.

J. L. Davis v Conga Oil Pty Ltd. Objection to Exploration Licence 29/84, 61 km², Bruny Island. The objection was withdrawn on 15 August 1984.

D. & K. Thompson v Industrial & Mining Investigations Pty Ltd. Objection to Exploration Licence 40/84, 244 km², Deloraine. The objection was withdrawn on 14 March 1985.

Ranger Exploration Pty Ltd v Tasminex N. L. Application for forfeiture, mineral lease 32M/81, 18 ha, Mathinna. The application was withdrawn on 7 January 1985.

B. R. Hopkins v BHP Co. Ltd. Application for forfeiture, mineral lease 941P/M, 2 ha, Forthside. The lease was forfeited by Warden Temple-Smith on 31 May 1985.

Tasmanian Conservation Trust and Tasmanian Wilderness Society v CRA Exploration Pty Ltd. Objection to Exploration Licence 5/85, 135 km², Lake Margaret. The objection was dismissed on 30 August 1985.

Bellingham Progress Association v Pioneer Concrete (Tas.) Pty Ltd. Objection to Exploration Licence 16/85, 222 km², Lulworth. The objection was withdrawn on 1 August 1985.

C. E. Young v Austamax Operations Pty Ltd. Objection to Exploration Licence 17/85, 40 km², Andersons Creek. The objection was dismissed on 1 August 1985.

LEGISLATION

A revised schedule of fees applicable to the Dangerous Goods Act 1976 was approved.

The form for a mining lease under the Mining Regulations 1930 was amended.

OIL EXPLORATION

TABLE 2

OIL EXPLORATION PERMITS

Title	*Holder*	*Blocks*	*Expiry Date*
T/14P	Cue Minerals N.L.	42	9.1.86
T/15P	Weaver Oil and Gas Corp. Aust.	272	19.2.86
T/16P	Weaver Oil and Gas Corp. Aust.	32	19.7.86
T/17P	Van Diemen's Land Resources N.L. and Others	16	7.8.86
T/18P	Bass Strait Oil and Gas N.L. and Others	118	22.7.86
T/19P	Bridge Oil Ltd	243	27.3.87
T/20P	Van Diemen's Land Resources N.L. and Others	75	17.11.87
T/22P	Amoco Aust. Petroleum Co. and Others	52	3.9.90

RESOURCE PLANNING AND POLICY DEVELOPMENT DIVISION

This was the first full year of operation of this Division. New conditions for Exploration Licences, which came into effect on 1 July 1984, require holders to reduce the area held by 50 per cent after five years' tenure. As part of the introduction of the system, long established Exploration Licences were required to be reduced in 1984-85. The Exempt Tender Area system was introduced to avoid pegging conflicts and to allow the Department to consider various exploration proposals and choose the programme with the most technical merit.

Under the system, vacant areas are exempt from the Mining Act and no tenement application may be made on them. Interested parties may then put forward a tender for the area in the form of an exploration programme. A Departmental committee then considers the tenders and nominates the tenderer, who may then apply for an Exploration Licence in the normal manner.

During the report period, a number of tenements have been given up in areas with low prospectivity and these have not attracted tenders. However, on the prospective West Coast, some thirty-nine tenders have been received for seventeen areas, resulting in the granting of twenty-four Exploration Licences covering 1,622 km^2. The successful tenderers have proposed an expenditure of some $1 500 per km^2 in comparison with the minimum requirement, under the Act, of $100 per km^2.

This system has increased the exploration expenditure in the State, reduced delays to exploration expected from pegging conflicts, and ensures that the best technical programme is applied in each area.

The Division liaised with the Pioneer Group, which plans to re-open the Electrona Carbide Plant as a silicon smelter, in locating feed stock and has acted as an intermediary in negotiations with the Forestry Commission and the Department of Main Roads to acquire silica resources. Together with the Tasmanian Development Authority and the Forestry Commission, it facilitated the establishment of a sphagnum peat industry. Discussions were conducted with the Amoco Consortium regarding the latest round of drilling in the Bass Basin.

During the year several projects, initiated in the planning and policy field, have been implemented in the Department. As part of the devolvement of responsibility, recommended by the Cartland Report and embodied in the proposed State Service legislation, the Department will be responsible for internal personnel matters rather than the Public Service Board. Consequently, a programme of performance appraisal has been developed, approved by the Public Service Board and supported by the Tasmanian Public Service Association. The programme is designed to monitor staff performance and achievements and to plan work programmes for the following year in line with Departmental objectives. It will also form a logical basis for training and staff development. All staff have now attended training courses on the scheme and it will be implemented in 1985–86.

The Departmental Corporate Plan is now in the final stages of development and should be available in early 1985–86. The plan has been produced by the analysis of a series of external and internal questionnaires, aimed at establishing the Department's functions, attitudes, strengths and weaknesses.

A system of project budgeting has been introduced within the Department and in its initial stage will monitor staff usage on specific projects. In time, the system will be enlarged to monitor all Departmental expenditure on a project-by-project basis. Project budgeting will allow the Department to monitor and control the use of assets while being presented with a sensible record of how resources are being utilised and what the real costs of our services are.

Guidelines for mining leases in the South-West Conservation Area have been developed following discussions with the National Parks and Wildlife Service, the Forestry Commission, the Department of the Environment, and the Lands Department, and have been forwarded to the Government for approval. The guidelines are along similar lines to those approved for exploration and should lead to a better understanding of the strict controls required for development in this environmentally sensitive area.

The Division continues to act as the Department's land management section in liaison with other agencies throughout the State and within the working group which acts in an advisory role to the South-West Management Advisory Committee. This working group examines and approves all exploration programmes in the South-West Conservation Area, after suitable modification if required. Particular attention is paid to the minimisation of any environmental effect of such programmes, a concept which has been well supported by industry. The working group continues to consider exploration proposals and appears to be well accepted by industry as it deals with proposals expeditiously.

A comprehensive brochure 'The Mines and Mineral Resources of Tasmania' on the mining, mineral processing and mineral associated industries of the State is currently in proof form and should be published early next year.

Officers of the Division are responsible for the Departmental Energy Management Programme which has reduced power bills this year by $68 000. A study of Departmental vehicle use has been initiated to explore the possibility of fuel saving.

The Division was engaged in the production of last year's Annual Report with its new format. This new format has received a mixed reception. This year's report will be further modified to meet expressed requirements.

The Division has liaised between the other Divisions in order to co-ordinate the various Departmental activities.

MINES AND DANGEROUS GOODS INSPECTORATE DIVISION
MINES INSPECTION BRANCH

MINES INSPECTION ACT 1968

The Mines Inspection Branch is charged with the administration of the Mines Inspection Act 1968 and attendant Regulations and with the operation of the Drilling Section of the Department of Mines. Assistance is also supplied to administer the Dangerous Goods Act, the Mining Act, the Petroleum (Submerged Lands) Act and to the Department of the Environment as far as the Environment Protection Act is applied to mines and works.

By regulation, and routine and special inspections, the Branch ensures that safe and healthy working practices are maintained in mines, quarries, metallurgical works and offshore oil drilling rigs.

Plans and proposals for operation of mines and equipment used are examined and approvals issued as required.

Through the Board of Examiners, certificates of competency are issued to mine managers, crane drivers, winding engine drivers and stationary engine drivers.

The Drilling Section provides a comprehensive drilling service to the Geological Survey, the Department of Main Roads, and private enterprise.

Staffing consists of the State Mining Engineer, two senior mining engineers, four mining engineers, an electrical engineer, a mechanical engineer and a drilling superintendent. The engineers are located at Rosny Park, Burnie and Launceston.

During the year a total of 518 field day inspections and 44 special accident enquiries were carried out and 60 certificates of competency were issued.

MINING INDUSTRY

The mining industry continued to be plagued by low world metal prices and low demand. Of particular concern were the continued imposition of tin quotas and low metal prices.

No mines were closed during the year, although a short closure occurred at Renison. A programme for the closure of Mt Lyell within five years was announced.

Two small mines opened during the year. These were Golconda, operating a gold dredging operation at Beaconsfield, and Merrywood Colliery, a small open-cut coal mine near Royal George. Surface and portal works commenced for major exploration of Mackintosh Mining's Hellyer deposit.

EMPLOYMENT

The average number of persons employed in the industry was 7 946 during 1984–85 compared with 8 161 during 1983–84. Major retrenchments occurred at Mt Lyell and Cleveland Tin and minor retrenchments at King Island Scheelite.

ACCIDENTS

Accidents are reported and recorded in accordance with Australian Standard AS1885. All accidents involving loss of time of one shift or more are recorded.

There was a marginal increase in the number of persons employed in the industry for accident statistics purposes. Disappointingly the number of accidents increased from 1 369 to 1 623, the highest figure for 3 years. There were corresponding increases in the frequency and incidence rates.

While only 13·5 per cent of employees work underground in mines, accidents to these people accounted for 30·9 per cent of all accidents in the industry.

No fatalities occurred during the year.

Serious Accidents

D. Farrell, Comalco, fractured metatarsal, struck by crane bucket.

J. Volker, APPM, Tonganah, multiple injuries, fell from vertical ladder.

A. Wilson, Goliath, lacerations to head and wrist, struck when boom of mobile crane collapsed.

B. Nevil, Temco, fractured skull, struck by falling piece of metal.

R. Burns, Mt Lyell, fractured leg, fell down embankment.

T. Smith, Renison, fractured ribs, fell from scaffold.

M. Matthey, Renison, inhaled gas from flotation cell.

A. Wells, Renison, lacerated knee, fell in service loader bucket.

M. McDonald, Que River, lacerated leg, rock fall.

R. Holden, Renison, lacerations to body and arm, fell through roof.

J. Pfund, E.Z. Rosebery, fractured finger, rock fall.

W. Burgess, E.Z. Rosebery, multiple fractures of leg, struck by falling ventilation door.

S. Gilleece, E.Z. Rosebery, compound fracture of leg, fell into ore bin.

K. Thomson, E.Z. Rosebery, lacerations to face, compressed air blast.

W. Simms, E.Z. Rosebery, severe contusions to leg, struck by compressed air hose.

C. Broomhall, Savage River Mines, fractured rib, concussion, lube truck overturned.

W. Banham, Savage River Mines, severe concussion, haul truck overturned.

P. Barry, Savage River Mines, multiple scalds, sprayed by hot radiator water.

D. Riddle, Savage River Mines, severe crushing of hand, caught in moving machinery.

I. McMillan, Savage River Mines, Port Latta, fractured wrist, tripped and fell.

D. Cock, Savage River Mines, Port Latta, severe lacerations to hand, caught in components of stationary machinery.

G. Calvert, ACI sandpit, fractured wrists, fell from walkway structure.

A. Howlett, E.Z. Risdon, severe lacerations to arm, caught in conveyor pulley.

C. Taylor, E.Z. Risdon, fractured leg, fell when decking collapsed.

I. Raynor, E.Z. Risdon, fractured arm, fell from steel work.

DANGEROUS GOODS INSPECTORATE BRANCH

DANGEROUS GOODS ACT 1976

During the year the Hobart explosives magazines, located at Howden and operated since 1970, were closed, leaving the Launceston magazines as the only public utility magazines in the State. The vacant position of Inspector of Explosives for the Burnie area was not filled and the position is to be abolished.

The number of field inspections covering handling, storage, import, use and sale of dangerous goods was 2 934, compared with a programmed budget figure of 3 000. Premises licensed to keep dangerous goods totalled 2 457.

All imports of Class 1, 2·1, 3·1, 3·2 and 3·3 Dangerous Goods into the State were supervised by the Inspectors of the Branch.

There was increase in the number of licences to sell fireworks and safety cartridges, however it is anticipated that this trend will be reversed due to the forthcoming increase in licence fees. During the fireworks selling period, Inspectors concentrated on inspections of shop premises keeping and selling fireworks.

Dangerous Goods were destroyed by Inspectors on seven occasions.

The section was actively involved in the preparation of displays presented at both the Launceston and Hobart agricultural shows. Information pamphlets on various dangerous goods and a film on safety with fireworks were produced to promote the safe use of dangerous goods. A fireworks display was also organised by the section for the Clarendon Children's Home.

Members of the Branch served on many committees during the year, including ATAC's Advisory Committee for the Transport of Dangerous Goods by Road and Rail, ATAC's Competent Authorities Committee and Drafting Committee, SAA ME/15 Liquefied Petroleum Gas, ME/17 Flammable and Combustible Liquids, SAA CH/9 Safe Handling and Storage of Chemicals, Building Regulations Board, Southern Regional Disaster Planning Group, and the Hazardous Substances Working Group. A number of lectures were given to various organisations during the year.

Twenty-six incidents/accidents/complaints involving Dangerous Goods were investigated by the Section and are listed by Class.

Class 1

A request for assistance by a qualified shotfirer regarding an explosive misfire was followed up and the Inspector was able to determine the cause which was due to bellwire shorting out. The charge was subsequently fired.

A man lost his right hand at the wrist due to misuse of gelignite by using a short safety fuse. The safety fuse was ignited by the man, who then apparently thought it had gone out. When he attempted to re-light the fuse the gelignite exploded in his hand.

Investigation of an attempted entry into a magazine disclosed deteriorated explosives (AN60 55 mm) which were subsequently destroyed by the Inspector.

Misuse of explosives by a person not possessing a shotfirer's permit caused damage estimated at $1 000 to a car parked across the road from premises which were being demolished. House damage estimated at $400 also occurred. Prosecution was not proceeded with due to the shotfirer's advanced age and good background. All explosives were confiscated by the Department.

A blasting contractor, after firing a road cutting blast for the Department of Main Roads, was struck on the head by a rock from the blast. Although he was wearing a hard hat he suffered a fractured skull and lacerations to the face.

Class 2·1

A fire in a mobile space heater was caused by an initial leak of gas ignited by the heater panels. The fire was subsequently fueled by gas probably released from a collapsed component, and then by gas from the cylinder relief valve.

An LPG house fire was caused by a Rinnai space heater with two panel settings. A possible cause of the incident was the accidental knocking of the space heater ignition cam causing a continuous gas escape during room cleaning. When the space heater was next used the fire started.

An LPG cylinder fell from a truck transporting cylinders back to the terminal, and collided with the front passenger side of a car. No one was injured. The cylinder guard and side were dented but there was no release of gas. Damage to the car was reported to be $3 000. The truck had open metal-framed side supports and rails with access openings on the sides and rear. Frame apertures were too large to be able to restrain any loose cylinders if they fell from the upright position. Terminal staff have now taken general action to ensure load security.

Two complaints concerning reputed LP gas smells were investigated and found to be without substance.

A fire under the bonnet of an LPG-fuelled taxi was investigated, but no conclusions were reached.

A complaint concerning an illegal LP gas system was investigated, found to be true, and was rectified.

Illegal interference with a household gas system caused an LP gas leak, fortunately without fire or explosion occurring.

An LP gas tanker had just completed the filling of a 190 kg cylinder and while in the process of leaving the area the flap covering the engine exhaust fouled the domestic power supply lines and pulled them away from the building. The vehicle had not previously been used in the area and it required a greater overhead clearance than other vehicles previously used for the service.

Class 2·3

A leak with no ignition occurred during the loading of an anhydrous ammonia cylinder for transport. The dust cap on the valve was tightened and the leak stopped.

Class 3·1

A smell of petrol from cut pipes whilst a premises was being converted was investigated, and incorrectly abandoned underground storages were discovered. The system has now been correctly abandoned.

A twenty-seven kilolitre underground petrol tank installed approximately three and a half years ago become buoyant after particularly heavy rains, and floated out of the ground by half its circumference. The area was covered with foam and immediate action taken by the oil company to have the tank re-installed and securely anchored.

An explosion and fire occurred at a service station while a road tanker was discharging super-grade petrol into underground storages. Corrective measures taken at the site following the incident included vent outlet heights being increased due to the topography of the site and the mesh arrestor system changed to improve vapour dispersion. The investigation was unable to determine the cause of the explosion or identify the ignition source which could have initiated the explosion.

A fire on board a tug occurred while men were washing down steel plates below deck using a twenty litre drum of thinners. A boilermaker was welding above deck and sparks from the welding fell down the hatchway and ignited the thinners. Heat from the fire caused the drum to rupture and four men in the confined space below the decks were overcome by heat and smoke inhalation. The men were taken to the Launceston General Hospital where they were later discharged.

A tank rupture occurred during tankship discharge of product to an oil company terminal. The tank failed at the roof rim at two points on the north and north-west margins. The lower vent valve on the south side of the roof relieved the high pressure. The two valves at the peak of the dome likely relieved pressure. The dome distorted while adjusting to stress, causing rim ruptures. Thirty-five to forty thousand litres of product sprayed from these points into the bund surrounding the tank farm area. The incident is still being investigated.

Class 3·3 (Kerosene)

Kerosene spilt from a steam generator being used to steam clean an underground tank. Vapour was ignited and caused an explosion. There was no damage to persons or property.

Class 3·4 (heating oil)

A 400 000 litre leak occurred at an oil company terminal. The leak was traced to a valve which either failed or was opened by someone unknown. Seepage through sub-soil caused some river pollution and emulsified product was found in patches as far down as the Tasman Bridge. Pollution control procedures were carried out by the oil company in conjunction with environmental authorities.

Class 3·4 (Diesel fuel—road tanker)

The accident occurred after the vehicle had delivered its full load of diesel fuel and was returning to its depot. The unit veered into bushes at the side of the road and the prime mover jack-knifed. The tanker did not roll, but tank chassis damage was heavy. The road was not closed and the unit was eventually recovered and removed using a large crane.

Class 4

An incident occurred during the disposal by incineration of waste toner from a plain-paper copier (resin-coated ferrite). The incident appears to be an isolated case, and no evidence was collected to recommend strict care in disposal.

Class 4·3, 4·2

An explosion/fire was caused in the science laboratory of a high school due to the accidental dropping of sodium from a watchglass into a jar containing yellow phosphorous and water. The sodium and water reacted immediately evolving hydrogen that explosively ignited. The explosion burst the bottle, spattering pieces of yellow phosphorous throughout a section of room. On exposure to the air the pieces of yellow phosphorus ignited spontaneously causing spot fires. Twenty-eight students were evacuated and taken to the Royal Hobart Hospital for treatment/observation and one student, an asthmatic, was detained overnight.

DRILLING SECTION

Drilling was carried out by six crews. Major programmes were located near Devonport and on the West Coast.

A groundwater programme was carried out in the Devonport area centred on Moriarty and Northdown. Extensive reliance on groundwater for irrigation warrants monitoring of the rate of depletion of the resource. At one time three crews were used in drilling, pump testing and installing meters. Work also continued on the Midlands groundwater survey near Melton Mowbray.

A stratigraphic diamond drilling programme occupied four crews on the West Coast during the summer season. A notable deep hole was drilled to 1 063 metres intersecting the granite basement at Colebrook Hill near Rosebery. Copper mineralisation was also encountered. The Henty Fault was drilled at Bradshaws Road, and a stratigraphic programme completed at Stonehenge near Zeehan. Near Luina, an anomaly at the Arthur Dam was drilled to test for mineralisation.

Site investigation drilling continued at a high level for the Departments of Main Roads and Construction. Projects included: Strahan slipway; Henty River bridge foundations; Bass Highway overpass at Penguin; Midland Highway at Constitution Hill; Bass Highway at Don Hill, Devonport. Spillway investigation holes were drilled at the Craigbourne Dam site for the Rivers and Water Supply Commission. Site investigation drilling at the International Hotel, Hobart was conducted for Gutteridge, Haskins and Davey. Radio-telescope foundations were drilled for the University of Tasmania.

Drilling investigations were carried out at Tonganah in conjunction with the Bureau of Mineral Resources to investigate the genesis of the kaolin deposit.

The programme can be summarised as follows:—

	metres
Stratigraphic drilling	3 806
Groundwater investigation	3 697
Site investigation	1 017
Mineral investigation	721
Total	9 241

GEOLOGICAL SURVEY DIVISION

REGIONAL MAPPING

During the winter, mapping continued on the Interlaken, Snow Hill, St Helens and Ben Lomond 1:50 000 map sheets and mapping commenced in the Woolnorth Quadrangle. The summer mapping programme was directed toward the economically important west coast areas covered by the Corinna, Macquarie Harbour and Lyell Quadrangles.

The St Marys and Pedder map sheets were published while compilation was completed and drafting commenced on the St Valentines and Interlaken sheets. The Sheffield map sheet was laser-scanned in four colours preparatory to reprinting. Explanatory notes for the Oatlands and Sorell Quadrangles were printed while notes for Strahan and Kingborough were edited ready for printing at the end of the year. Printing of the latter publications was delayed by the failure of the Government Printer's phototypesetter. Work was almost completed on the preparation of a Geological Survey Bulletin on the Dundas-Mt Lindsay-Mt Ramsay area and on the explanatory notes for the St Marys and Eddystone Quadrangles. Geological training was provided for geologist Soetrisno of the Indonesian Geological Survey.

Preparatory work has been undertaken on contributions for a bicentennial volume on the geology and ore deposits of Tasmania, on a joint BMR/States tectonic map of eastern Australia, and on the BMR 1:1 000 000 series maps of Australia.

During the year the palaeontologist was transferred to the Regional Mapping Section for administrative purposes as part of a reorganisation of specialist positions.

Palaeontological activities during the year included:—

(1) Continued work on the systematic descriptions of Late Permian brachiopods.

(2) Provision of photographs for and proof-reading of the Kingborough Explanatory Report.

(3) The study of Siluro-Devonian faunas from the Lyell Quadrangle was completed.

(4) Further collection of the important trilobite *Dictyonema-Desmograptus* fauna at Smithton.

(5) Further collection of the well-preserved Middle Cambrian trilobite fauna at Native Track Tier, St Valentines Quadrangle.

(6) Provision of foraminiferal samples from Oonah.

(7) Completion of the manuscript of Late Palaeozoic palaeogeography of Tasmania for presentation at the 6th International Gondwana Symposium, Ohio, USA.

(8) Siting and commencement of a stratigraphic investigation hole at Porter Hill, Lower Sandy Bay.

(9) Commenced contribution on Lower Parmeener Super-Group of Tasmania for the Bicentennial Volume 'Geology of Tasmania'.

(10) Provision of Late Palaeozoic palaeogeographic maps of Tasmania for BMR.

ECONOMIC GEOLOGY

As part of the reorganisation of responsibilities of specialist officers within the Geological Survey, the geochemical activities and staff (the geochemist and a laboratory technician) have been transferred to the Economic Geology Section. The mineralogist/petrologist specialist position has been abolished and the incumbent appointed as a geologist in this section. The geologist specialising in petroleum geology has also been transferred to this section from the Regional Mapping Section. These moves will centralise most economic geology activities within the Economic Section and will make additional staff available to assist with the heavily increased administrative load placed on the section by the need to participate more in the granting and relinquishment of Exploration Licences and in the assessment and verification of geological reports from licence holders.

The tin/tungsten project continued with field examination at St Dizier, Storys Creek/Rossarden, Interview River, Razorback and Granville Harbour. An important project was the drilling of an exploratory diamond-drill hole 1 063 metres deep on Colebrook Hill to examine contact metamorphic and mineralisation effects of a projected granite body. The hole intersected granite at a depth of 1 034 metres after passing through thick sequences of skarn and hornfels with significant intersections of sulphides containing up to 1·7 per cent copper and a single sample assaying up to 1 per cent tungsten. The silver/lead/zinc project also progressed, with studies at Rosebery, Hellyer, Que River and Mt Lyell. Sulphur isotope studies were made on material from sulphides in the Gordon Limestone and samples from Leech Hill, Boco and Andrew River. Following the resignation of the mineralogist/petrologist, the geologist in charge of this project assumed that role for much of the year until a replacement was recruited.

The section continued to provide advice on the construction materials and non-metallic mineral resources of the State. Further progress was made with the Mt Read Volcanics mapping project. A major effort was made to plan, in some detail, projects for the expanded and accelerated programme of geological and geochemical exploration of the Mt Read Volcanics suite of rocks.

The geochemist devoted much of the year to the development of a new method of geochemical exploration by using the organic content of 'A' horizon soil samples. He was able to demonstrate that the method could duplicate the results of 'C' horizon soil sampling and it appears to offer a quicker method of carrying out geochemical soil sampling under western Tasmanian conditions. A new AAS system was commissioned late in the year. Work commenced on developing a technique to study the metallic content of organic matter in water.

Some progress has been made with a study of gold mineralisation in western Tasmania. The programme of assessing the coal resources of the State continued, with descriptions being compiled of the Preolenna, Saltwater River and York Plains coalfields, and work starting on the Mersey and Bagdad/Kempton coalfields. Following specialised studies, the coal geologist carried out petrographic work on the Duncan and Merrywood coal seams. The laboratory technician in charge of slide cutting was sent to ANU for a course of advanced rock and coal sectioning techniques, while another technician went to Adelaide to learn advanced and quantitative techniques in X-ray diffraction.

ENGINEERING GEOLOGY AND GROUNDWATER

A major survey was undertaken in the important groundwater district of the Sassafras-Port Sorell area to assess the long-term sustainable groundwater yield. Records of almost twelve months use of groundwater have now been collected. Further progress was made with the assessment of the groundwater resources of the Lower Midlands and a start made on a study of the Sheffield district.

Major foundation studies carried out include the Craigbourne dam, the Hobart International Hotel, and the proposed university radio telescope at Cambridge. Numerous assessments have been made of the slope stability of urban building blocks and the sites of eighteen proposed subdivisions have been examined. A special study of the morphology of Tasmanian landslips has progressed well and ten representative slips have been detailed to date. Work has been completed on the examination of a site at Dilston for the disposal of dangerous substances and consideration has been given to locating a suitable site for such purposes in southern Tasmania. The new Groundwater Bill is ready for submission to Parliament.

GEOPHYSICS

Data from the detailed BMR aeromagnetic survey of North-West Tasmania, flown in 1984, is still awaited by the Geophysics Branch and the indications are that the results of the 1985 survey of a large part of Tasmania will not be available for another two years. Gravity surveys have continued at Sorell/Copping, Tyndall, Boobyalla and Smithton and the entire Tasmanian gravity base has been revised and updated. A detailed gravity survey of the Hellyer deposit has demonstrated that the ore bodies can be detected by that method. Further work is planned.

Contact has been maintained with exploration companies searching for oil in Bass Strait and data has been received and released upon request.

Several computer programmes have been written for both geophysics and other sections of the Geological Survey and a strategic EDP plan for the Department was prepared. The borehole logger has been commissioned, user manuals prepared, and holes logged at Coles Bay, Bothwell and Forest. The vacant position of electronics technician has been filled.

A detailed plan has been drawn up for geophysical exploration of the Mt Read Volcanics rocks.

OIL EXPLORATION

Oil exploration activity in offshore waters around Tasmania remained high during the year. Eight permits remain in force although one, T/17P held by Van Diemens Land Resources in the Otway Basin, is subject to an application to surrender. During the year 3 764 line kilometres of new seismic data was shot in the Bass Basin. Two wells, Squid 1 (T/15P) and Tasmanian Devil 1 (T/16P), were completed by a consortium headed by Weaver Oil and Gas Corporation, but both were abandoned as dry holes without hydrocarbons. A third well, Yolla 1, was spudded in on 8 June 1985 in T/14P by a consortium headed by Amoco Australia Petroleum Company. At 30 June the well had reached a depth of 1 452 m of a planned total depth of 4 267 metres. Yolla 1 is the first of three drill holes planned by Amoco in the current programme.

The exploration philosophy in the Bass Basin has changed, largely as a result of stimulus provided by published results of the 1982 BMR seismic survey of the Bass Basin. The new philosophy is to test Palaeocene and Late Cretaceous sections of the sedimentary sequence rather than the stratigraphically higher 'Gippsland-type' plays.

GENERAL

During the year a very successful combined Geological Society of Australia—Department of Mines symposium was convened at Burnie on 'Mineral Exploration and Tectonic Processes in Tasmania'. Officers of the Department collaborated in the preparation of a paper entitled 'Metallogeny and tectonic development of the Tasman Fold Belt System in Tasmania' which was delivered at the 7th Australian Geological Convention in Sydney and subsequently accepted for publication by an international journal. Seminars were held within the Department to inform other Departmental divisions and interested parties from the mineral exploration industry on the work of the Geological Survey.

At the end of the year, the staff of the Survey comprised twenty-nine geoscientists, one surveyor, five technicians, seven drafting officers, two editorial staff and six field assistants.

CHEMICAL AND METALLURGICAL DIVISION

The 1 500 samples registered were at the same level as last year although the determinations made according to the same reporting format were less at 9 546. However, the reporting format has been revised to better reflect laboratory activity and with this revised method the number of determinations was 15 567. Both reporting formats are given to facilitate comparisons in future years.

The number of complete rock analyses, 199, is similar to last year. Although some samples were assayed for many elements, to be included a rock must be assayed so major constituents added up to 100 per cent.

No element predominated in the determinations made. Bismuth, potassium and sodium were done in record numbers according to the format used in recent years. Most notable was the decline in tin assays, which at 303 was the lowest number for this element for more than twenty years.

TYPE AND NUMBER OF TESTS

The following table shows the test work reported as in previous years so that a comparison can be drawn with past reports:—

Quantitative—	
Elements	7 767
Miscellaneous	474
Waters	618
Industrial Liquors	94
Total	8 953
Qualitative—	
Examination	29
Metallurgical	564
Total	9 546

The method of presentation of tests has been revised to more accurately reflect the work being done.

When water analyses were first reported only about twenty or thirty were being done each year but in recent years this has grown to several hundred. This represents a significant amount of analytical work better reported broken down into component parts than as a single test. Similarly the metallurgical unit operations in a project have never been previously reported, although the assays done for such projects have been. Using the revised method of reporting, the type and number of tests for the year were as follows:—

Quantitative—	
Elements	12 014
Miscellaneous	474
Waters	2 440
Industrial liquors	46
Total	14 974
Qualitative—	
Examination	29
Metallurgical	564
Total	15 567

Type of samples received:—

Industrial liquors	39
Metal or alloy	27
Metallurgical products	309
Rock or mineral	530
Waters	618
Total	1 523

Determinations made by the two main instrumental methods and for fire assaying:—

Atomic absorption (AAS)	3 461
X-ray fluorescence (XRF)	6 516
Fire assay	288

On the metallurgical side, the number of research projects was down but it should be noted that where kilograms of material were being submitted for testing in the past, it is now more common to receive tonnes of material. This reflects both on the type of material being sought (e.g. non-metallic) and also that with lower head values, more material must be treated initially to produce enough concentrate for evaluation. This in turn means increasing use of the pilot plant equipment which was used for sixteen test runs during the year.

Research Investigations—	
Garnet	1
Gold	1
Platinum	1
Tin/Tungsten	2
Tungsten	2
Water	1
Total	8

SUMMARY OF INVESTIGATIONS

GARNET

R848—Swan Resources Ltd, Victoria

A one tonne sample containing garnet was submitted for grinding and screening to produce sized abrasives. However, the impurities present precluded production of high-grade garnet products and the yields in those products made were low.

GOLD

R855—Lisle: A White

About 800 kilograms of material representing mill feed was screened, treated on a spiral, and the spiral concentrate further concentrated to show a recoverable gold yield of 0·16 g/t Au.

PLATINUM

R851—Department of Mines

A request for platinum assays at near our limit of detection led to modifications of the published methods for this determination. These modifications were summarised in this report.

TIN/TUNGSTEN

R833—Rossarden: Wheal Lutwyche Pty Ltd

Following R832, a large sample from No. 2 Tailings Dam was submitted for investigation. It assayed 0·5 per cent Sn and 0·4 per cent WO_3. Market grade tin and tungsten concentrates were made with respective metal recoveries of 40 per cent and 37 per cent.

R849—Rossarden: Wheal Lutwyche Pty Ltd

A sample of spiral tailing from R833 was submitted to Bartles (U.K.) for treatment on their cross-belt concentrator to compare results with table and vanner results obtained in R833. The cross-belt results were better than those from the other two machines.

TUNGSTEN

R847—Kara: Tasminex N.L.

These tests on mill products show serious over-grinding and avoidable losses are still occurring in the Kara Mill.

R850—Kara: Tasminex N.L.

Following the installation of more tables in the Kara Mill, test work was done to appraise this first step towards an improved circuit.

WATER

R8548—North-eastern Tasmania: River samples

This report summarised test work done on the Boobyalla, Ringarooma and Musselroe Rivers between 1967 and 1984 to appraise and reduce suspended matter in those streams.

DISPLAY STAND AT AGRICULTURAL SHOWS

For the first time since 1965 the Department of Mines this year mounted a display stand at the Launceston and Hobart Royal Agricultural Shows during October. The emphasis was on safe handling, storage and use of flammables, corrosives, oxidising agents and explosives in Tasmania. Companies and individuals working commercially with dangerous materials have strict obligations to public safety under the Tasmanian Dangerous Goods Act and are supervised by the Dangerous Goods Inspectors.

The 1984 show display went for enlightened self-interest. Information leaflets recently published by the Dangerous Goods Section were handed out. Video tapes, posters and photographs were used, along with an eye-catcher of a 200 litre fuel drum apparently leaking. Several types of gas detectors were demonstrated.

In recognition that dangerous goods supervision is only a small part of the activities of the Department of Mines, the stand included a large map showing mining and processing operations in Tasmania. A separate panel showed the economic contribution of the mining industry and activities and objectives of the Department of Mines. Booklets and pamphlets on the mining industry, gemstones, landslips and groundwater were available. Material used was selected with an eye to reuse at future shows and special events.

Many staff members readily gave up their spare time to give assistance to visitors to the display.

MINING CURRICULUM PROJECT

The Mining Curriculum Project for Secondary Schools was launched at the Department of Mines during April 1985.

During the 18 months preceding the launching, the Education Department produced materials for the Mining Curriculum Project. The financial support of Tasmanian mining companies, through the Tasmanian Chamber of Mines, achieved a highly professional result.

The teaching materials increase the awareness of mining and mineral processing in Tasmania. They inform teachers and provide activities on ore formation, finding and developing ore bodies, converting ores to metals and the history of mining. Other topics deal with the scale and economic importance of mining and mine product industries and the uses and properties of metals.

Teachers of science and social science, in grades nine and ten especially, can use the materials to provide practical activities when teaching theoretical aspects of a subject. Important applications exist in other years.

Schools could incorporate the materials into the curriculum in science and social science either as complementary units or extension topics for grades nine and ten. Teachers of grades seven and eight will find parts of the kit contain useful learning resources.

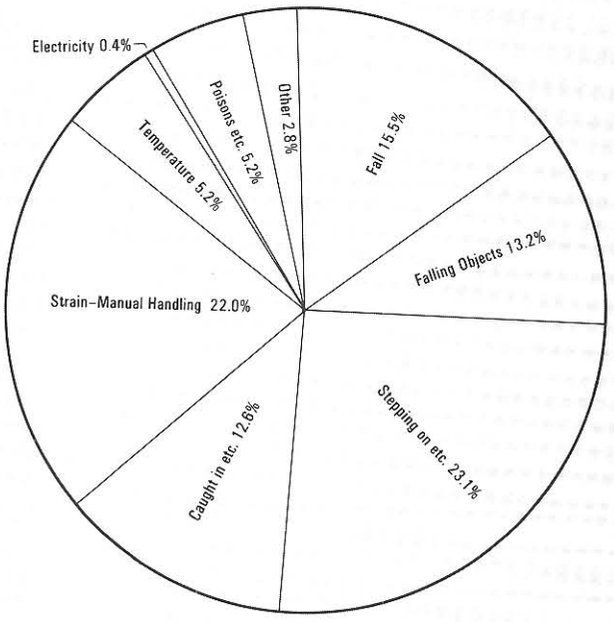
The materials can also be used as part of unitised H.S.C. courses in science and applied science and technology in grades eleven and twelve.

STATISTICAL TABLES

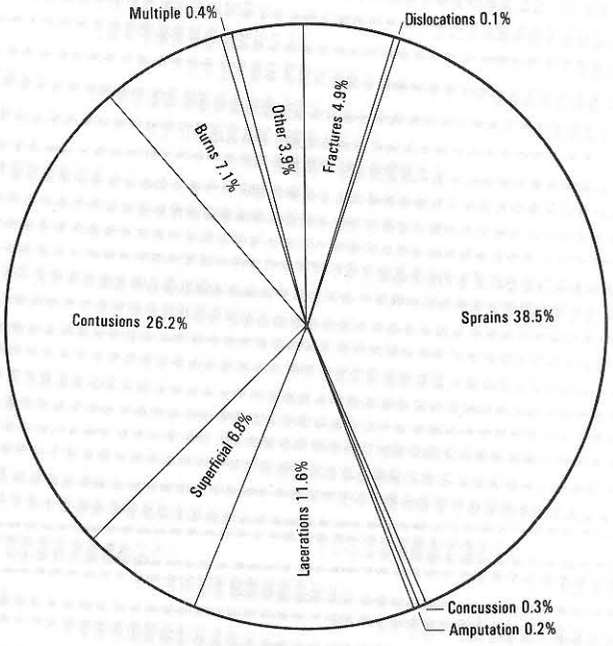
TABLE 3
EMPLOYMENT AND ACCIDENTS 1984–1985 (AS1885)

Employer	*Man Hours Exposure*	*No. of Injuries*	*Frequency Rates*	*Days Lost*	*Incid. Rate*	*Mean Dur.*	*No. of Employees*
					(%)	(days)	
APPM Tonganah	24 995	5	200	230	31·3	46·0	16
Cleveland Tin	142 589	7	49	67	11·5	9·6	61
EZ Rosebery	1 629 822	415	255	4 193	46·5	10·1	892
Golconda	840	....	....	....	....	....	15
King Island Scheelite	206 521	7	34	47	6·9	6·7	102
Mt Lyell	1 148 649	151	132	1 584	25·5	10·5	591
Que River	206 076	14	68	421	12·7	30·1	110
Renison	812 729	141	174	1 716	28·6	12·2	493
Savage River	844 491	93	110	1 186	22·1	12·8	420
Tasminex	46 652	6	129	21	26·0	3·5	23
All Mines	5 063 364	839	166	9 465	30·8	11·3	2 723
Comalco	2 438 281	252	103	3 193	19·6	12·7	1 289
EZ Risdon	3 116 594	285	91	3 477	16·0	12·2	1 778
Goliath Cement	521 731	20	38	153	7·7	7·7	261
Mole Creek	34 256	....	....	....	....	....	18
Port Latta	384 085	13	34	232	6·8	17·9	190
Temco	799 720	104	130	871	24·4	8·4	427
Tioxide Aust.	797 621	25	31	230	6·0	9·2	419
Ceramics	214 601	25	116	179	22·7	7·2	110
All works	8 306 889	724	87	8 335	16·1	11·5	4 993
Collieries	290 192	49	169	561	33·2	11·4	148
Quarries	209 409	8	38	250	7·5	31·3	106
Petroleum exploration	75 024	3	40	79	2·0	26·3	149
TOTALS	13 944 878	1 623	116	18 690	21·3	11·5	7 618

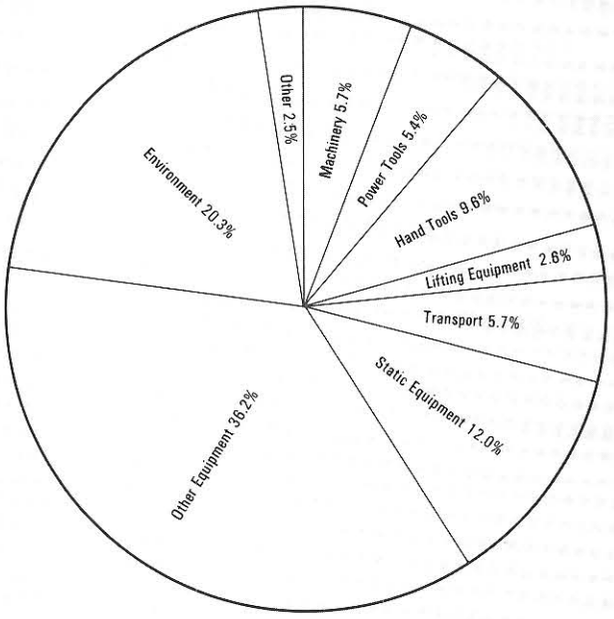
MINE ACCIDENT CLASSIFICATION, 1984–85
(Australian Standard AS1885–1976)



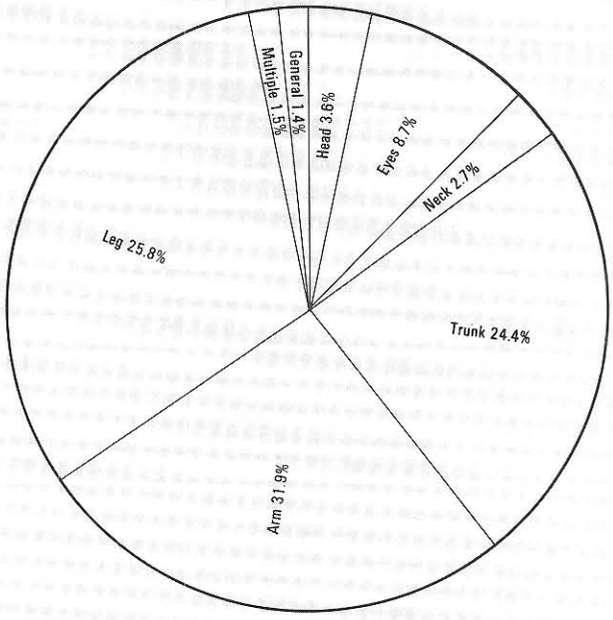
Type of Accident



Nature of Injury



Agency



Part of Body Injured

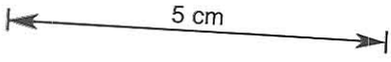


TABLE 4
CERTIFICATES OF COMPETENCY

The following Certificates of Competency were issued by the Board of Examiners in accordance with the Mines Inspection Act 1968:—

Metalliferous Mine Manager's Certificates

By examination *viva voce*

Certificate No.	*Name*	*Date*	*Mine*
296/84	Anthony Stewart Christianson	16.7.84	Department of Mines
297/84	Hayden James Tennent	18.9.84	Renison
298/85	Andrew John Bruce	28.5.85	Renison
299/85	Alan Burns Stanger	28.5.85	Renison
300/85	Richard Hugh Livingstone	28.5.85	Que River

In addition fifty-seven Crane Drivers, two Stationary Engine Drivers, and one Winding Engine Drivers Certificates of Competency were issued.

TABLE 5

MINERAL PRODUCTION FOR THE YEAR 1984–1985 FROM TASMANIAN SOURCES

	Cleveland Tin Ltd (1)	*Cornwall Coal Co.*	*E.Z. of Aust.*	*King Is. Scheelite*	*Mt Lyell (2)*	*Que River Mines (1) (3)*	*Renison Ltd (2)*	*Savage Rvr Mines*	*TEMCO*	*Tasminex*	*Small Producers*	*Totals*
Cadmium (tonnes)	....	....	173	....	....	....	....	....	....	....	....	173
Cobalt oxide (tonnes)	....	....	5	....	....	....	....	....	....	....	....	5
Copper (tonnes)	216	....	1 775	....	38 301	....	....	....	....	....	....	40 292
Crocoite	....	....	....	....	....	....	....	....	....	....	....Specimens only	....
Gold (kg)	....	....	1 336	....	505	....	....	....	....	....	1	1 842
Iron ore (tonnes)	....	....	....	....	....	....	....	2 258 014	....	....	....	2 258 014
Lead (tonnes)	....	....	23 028	....	....	....	....	....	....	....	....	23 028
Manganese dioxide (tonnes)	....	....	208	....	....	....	....	....	....	....	....	208
Molybdenum (tonnes)	....	....	....	8	....	....	....	....	....	....	....	8
Silica (tonnes)	....	....	....	....	....	....	....	....	....	....	26 305	26 305
Silicon compounds (tonnes)	....	....	....	....	....	....	....	....	39 106	....	....	39 106
Silver (kg)	....	....	83 023	....	14 761	....	....	....	....	....	....	97 784
Sulphuric acid (mono tonnes)	....	....	140 904	....	....	....	....	....	....	....	....	140 904
Tin (tonnes)	516	....	....	....	....	....	2 892	....	....	....	50	3 458
Tungsten (tonnes)	....	....	....	1 127	....	....	....	....	....	303	....	1 430
Zinc (tonnes)	....	....	72 799	....	....	....	....	....	....	....	....	72 799
Coal (tonnes)	....	495 726	....	....	....	....	....	....	....	....	....	495 726
Peat (tonnes)	....	....	....	....	....	....	....	....	....	....	150	150
TOTAL MINED (tonnes)	155 402	473 819	834 320	140 202	1 382 303	236 492	389 969	4 705 214	23 044	107 894	....	....

(1) Aberfoyle Ltd, (2) Renison Goldfields, (3) Production breakdown combined with E.Z. Company.
These figures take stockpile fluctuations into account.

TABLE 6
VALUE OF THE MINERAL INDUSTRY

Commodity	Unit	Year ended 30 June 1984		Year ended 30 June 1985	
		Total Quantity	Value	Total Quantity	Value
METALLIC MINERALS—			$		$
Cadmium	(tonne)	98	311 420	173	629 500
Cobalt oxide	(tonne)	2	24 978	5	122 913
Copper	(tonne)	25 070	41 645 107	40 292	45 058 648
Crocoite	(specimens only)	....	20 745	....	15 383
Gold	(kilogram)	1 364	19 088 780	1 842	25 288 568
Iron ore pellets	(tonne)	2 102 617	57 417 773	2 258 014	69 608 648
Iron oxide	(tonne)	1 300	13 500	7 645	82 120
Lead	(tonne)	24 882	13 415 775	23 028	12 385 351
Manganese dioxide	(tonne)	201	37 185	208	38 480
Molybdenum	(tonne)	20	76 066	8	30 099
Silica for silicon alloy	(tonne)	26 872	671 800	26 305	657 625
Silicon as silicon alloys	(tonne)	68 047	17 413 434	39 106	18 633 168
Silver	(kilogram)	64 969	23 151 306	97 785	27 819 220
Sulphur—Sulphuric acid from zinc concentrates	(mono tonne)	114 812	4 814 398	140 904	6 289 352
Tin	(tonne)	4 835	75 806 526	3 458	60 307 075
Tungsten as tungstic oxide	(tonne)	1 195	10 110 851	1 430	13 488 201
Zinc	(tonne)	41 098	45 977 146	72 799	92 081 824
Value of metallic minerals		....	309 996 790	....	372 536 175
NON-METALLIC MINERALS—					
Clay—					
Brick	(metre ^{3})	70 211	351 055	78 603	396 657
Other	(metre ^{3})	21 006	105 030	38 741	193 705
Dolomite	(tonne)	22 334	361 300	14 766	269 829
Kaolin	(tonne)	20 719	2 123 657	22 422	2 186 269
Limestone—					
Agricultural	(tonne)	101 578	954 423	75 162	694 596
Cement	(tonne)	372 399	1 117 197	585 093	1 755 279
Chemical and metallurgical	(tonne)	118 129	1 078 902	120 907	1 109 302
Other	(tonne)	14 865	56 601	21 250	82 239
Pebbles	(tonne)	1 717	76 520	1 305	81 235
Silica	(tonne)	15 047	84 490	11 183	64 460
Value of non-metallic minerals		....	6 309 175	....	6 833 571
FUEL MINERALS—					
Coal	(tonne)	453 288	11 356 503	495 726	12 293 809
Peat	(tonne)	620	115 733	150	36 947
Value of fuel minerals		....	11 472 236	....	12 330 756
CONSTRUCTION MATERIALS—					
Building stone—					
Freestone	(metre ^{3})	233	7 580	295	23 810
Granite	(metre ^{3})	....	....	6 768	41 340
Granite (red)	(metre ^{3})	504	3 240	....	....
Other	(metre ^{3})	54	25 550	63	40 560
Crushed and broken stone—					
Basalt	(metre ^{3})	430 474	5 416 498	380 238	4 162 414
Dolerite	(metre ^{3})	1 828 946	19 256 571	1 576 039	16 526 635
Limestone	(metre ^{3})	20 230	202 300	20 004	189 379
Sandstone	(metre ^{3})	13 262	133 272	17 784	177 840
Other	(metre ^{3})	192 830	1 928 300	172 888	1 736 490
Gravel	(metre ^{3})	1 504 078	9 099 374	909 468	5 330 880
Sand	(metre ^{3})	203 311	1 311 647	218 771	1 382 658
Other road materials	(metre ^{3})	107 347	536 383	295 159	1 513 585
Value of construction materials		....	37 920 715	....	31 125 591
TOTAL VALUE WITH AUSTRALIAN METAL PRICES		....	365 698 916	....	422 826 093
METALLURGICAL PRODUCTION FROM OTHER THAN TASMANIAN ORES—					
Aluminium Aluminium sulphate Cadmium Calcium carbide Cobalt oxide Ferro-manganese Titanium dioxide Zinc		....	431 921 499	....	540 029 258
VALUE OF MINING AND METALLURGICAL PRODUCTION		....	797 620 415	....	962 855 351
AVERAGE NUMBER OF EMPLOYEES		8 161	....	7 946	....

TABLE 7
PRODUCTION OF INDUSTRIAL MINERALS (tonnes)

Company	Kaolin	Limestone				Iron Oxide	Silica
		Agri-cultural	Cement	Chemical and Metall.	Other		
Ballarat Clay Co. (APPM)	22 422	....	....	....	....	....	....
A. R. Beams	....	26 946	....	25 928	....	....	....
Benders Spreading Services	....	7 136	....	45 340	....	....	....
Goliath Portland Cement	....	23 822	585 093	....	8 122	....	....
Mole Creek Limestone	....	5 307	....	49 595	13 128	....	....
Wright Stephenson and Company	....	11 951	....	....	....	....	....
F. R. Lazenby	....	....	....	....	....	....	10 524
Dalcoath Mining Company	....	....	....	....	....	7 645	....
Small Producers	....	....	....	44	....	....	659
Total	22 422	75 162	585 093	120 907	21 250	7 645	11 183

TABLE 8
IMPORTED ORES

Company	Product (tonnes)				
	Alumima	Lead-zinc ore	Ilmenite	Manganese ore	Phosphate rock
Comalco (Bell Bay)	233 974	....	....	....	....
E.Z. Company	....	164 432	....	....	Not reported
Tioxide Aust.	....	....	60 668	....	....
TEMCO	....	....	....	70 706	....

TABLE 9
PRODUCTION OF CONSTRUCTION MATERIALS 1984–85 (cubic metres)

	Building Stone			*Crushed and Broken Stone*					*Other Road Materials*			*Brick Clay*
Operator	*Freestone*	*Granite*	*Other*	*Basalt*	*Dolerite*	*Limestone*	*Sandstone*	*Other*		*Gravel*	*Sand*	
Assoc. Forest Holdings	....	....	....	9 564	....	....	....	....	....	65 676	....	....
Brambles Holdings	....	....	....	127 838	72 321	....	....	....	....	....	....	....
BMG Resources	....	....	....	176 870	61 302	6 580	....	....	....	98 139	7 963	....
Shaw Contracting	....	....	....	18 548	....	....	....	....	....	....	....	....
Forestry Commission	....	....	....	....	14 750	....	6 365	8 590	....	76 091	....	....
Hobart Blue Metal Industries	....	....	....	....	228 998	....	....	....	....	....	....	....
Hydro-Electric Commission	....	....	....	....	1 106 804	....	....	....	....	....	....	....
C. R. Johnson	....	....	....	....	19 349	....	....	....	....	7 643	....	....
Pioneer Quarries	....	....	....	....	67 845	....	....	....	....	....	....	....
Department of Main Roads	....	....	....	....	....	....	....	135 240	234 042	169 701	....	....
BHP	....	....	....	....	....	....	....	....	....	29 296	....	....
Ulverstone Quarries	....	....	....	....	....	....	....	....	....	6 200	21 100	....
Longford Municipal Council	....	....	....	....	....	....	....	....	....	7 620	....	....
Oatlands Municipal Council	....	....	....	....	....	....	....	....	....	24 153	....	....
Besser Tasmania	....	....	....	....	....	....	....	....	....	....	53 853	....
Small Producers	295	6 768	9 839	47 418	4 670	13 424	11 419	29 058	61 117	424 949	135 855	78 603
TOTAL	295	6 768	9 839	380 238	1 576 039	20 004	17 784	172 888	295 159	909 468	218 771	78 603

TABLE 10
CAPITAL EXPENDITURE

The following companies reported the value of Capital Expenditure at mines and weeks in 1984–85:—

Mines or Works	*Items*	*Value*
		$m A.
Mt Lyell	Plant items, mine development, mineral lease exploration	1·099
Savage River Mines—		
Savage River	Pit slope dewatering, stabilisation and drainage, diamond drill programme, power line relocation, Main Creek tailing disposal project, plant corrosion control and maintenance, concentrate pipeline maintenance, tailing dam and waste dump rehabilitation, townsite maintenance, process control in the concentrator, increased screening capacity in the concentrator, drainage installations for pit pumping, purchase of new D8L dozer, air conditioning of haul trucks, and completion of Community Recreation Centre	N/A
Port Latta	Furnace microprocessor control, corrosion rectification and structural steel replacement, heat recuperation project, and replace BC35 conveyor belt	N/A
Golconda Minerals	Dredge and gold recovery plant	3
Renison	Community projects, lease buildings and services, underground equipment, concentrator plant and equipment, instruments, office equipment, motor vehicles, mobile equipment, mine development	3·658
King Island Scheelite	Pump with line, sky-lights in concentrator roof, wet scrubber, spiral classifiers, plant modifications	0·396
Tasminex	Loader, buildings, pump	0·135
E.Z. Rosebery	Upgrading road between the Hercules mine and Murchison Highway, developing the Main and North Declines below 17 level, electric winches, fans and pumps for use underground, surface drilling programme, purchase and installation of the Larox pressure filters, replacement of light vehicles and erection of carports at Company houses	N/A
E.Z. Risdon	New granulation plant, automatic power control	N/A
Que River	Underground, surface and community capital works	2·043
Cornwall Coal	Washery upgradings, vehicle and mine development and exploration	3·096
Comalco	Air filtration and conditioning, potline, alumina store design, modifications to supply system, Capco safety upgrade, replacement No. 6 furnace, dross plant, Unimate ingot stacker, Brochot pot rammer, potline 2 and 3 automation and ML 1 potline technology	2·832
Temco	Loaders, drumming and packaging plant, ferro alloy storage plant, conveyor modification, screen, dryer, pilot casting line	1·751
Goliath	Bulldozer, garage extension, weighbridge and overhaul electrostatic precipitator	N/A
Tioxide	Coal fired boiler, automation and tailings dam	6

TABLE 11

NUMBER AND AREA OF LEASES AND LICENCES APPLIED FOR DURING THE YEAR TO 30 JUNE 1985

Leases and Licences	*Number*	*Area (ha)*	*Sluiceheads*
Coal	20	3 967	....
Clay	1	22	....
Gold	8	94	....
Minerals	15	674	....
Sand and gravel	30	677	....
Silver, lead and zinc	6	600	....
Stone	28	1 775	....
Tin	9	881	....
Easements	3	8	....
Water	2	....	....
	122	8 698	....

TABLE 12

NUMBER AND AREA OF NEW LEASES AND LICENCES ISSUED DURING THE YEAR TO 30 JUNE 1985

Leases and Licences	*Number*	*Area (ha)*	*Sluiceheads*
Easements	2	4	....
Coal (peat)	13	1 809	....
Gold	11	200	....
Minerals	5	501	....
Sand and Gravel	14	270	....
Stone	23	930	....
Tin	10	326	....
Water	4	....	415
Clay	1	9	....
	83	3 949	415

TABLE 13

TOTAL NUMBER OF LEASES AND LICENCES IN FORCE ON 30 JUNE 1985

Leases and Licences	*Number*	*Area (ha)*	*Sluiceheads*
Bauxite	5	183	....
Clay	17	327	....
Coal	20	5 122	....
Copper	6	1 294	....
Crocoite	1	4	....
Dolomite	4	126	....
Gemstones	4	67	....
Gold	55	2 714	....
Granite	4	12	....
Iron ore	12	3 528	....
Kaolin	1	340	....
Limestone	10	1 243	....
Marble	1	8	....
Minerals	33	5 829	....
Peat	2	172	....
Sand and Gravel	143	8 259	....
Silica	10	728	....
Slate	1	84	....
Stone	153	8 563	....
Silver, lead and zinc	16	895	....
Tin	296	13 983	....
Wolfram and tin	7	144	....
Water	79	....	1 192
Easements	89	1 922	....
	969	54 652	1 192

TABLE 14

TOTAL NUMBER OF ALL TYPES OF PROSPECTING RIGHTS HELD AS AT 30 JUNE 1985

Mining Tenement	*Number*	*Area*
Exploration Licences	106	15 370 km²
Special Prospectors Licence	1	24 km²
Miners Rights/Water Rights	8	11 ha
Prospectors Licences	25	498 ha
Permits to explore for Petroleum under Petroleum Act 1967	8	850 blocks
Owners Consent	1	3 ha

TABLE 15

LICENCES, PERMITS AND APPROVALS ISSUED FOR THE IMPORT, MANUFACTURE, STORAGE, USE AND SALE OF DANGEROUS GOODS

Licences to Keep Dangerous Goods	2 457
Licences to Sell Explosives and Safety Cartridges	200
Licences to Sell Fireworks	377
Magazine Licences	113
Import Licences	44
Licences to Convey	20
Licences to Manufacture Dangerous Goods	6
Exemptions Granted	1
Plans Approved	316
Licence to Manufacture Explosives	2
Gas Suppliers Licence	2
Shotfirer's Permits Issued	58

TABLE 16

IMPORTS OF FLAMMABLE LIQUIDS

Product (tonnes)	*Bell Bay*	*Burnie*	*Devonport*	*Hobart*	*Total*
Aviation Gasoline	2 486	....	....	13 752	16 238
L.P. Gas	5 713	....	10 275	4 856	20 844
Motor Spirit—					
Regular	8 266	681	1 665	6 906	17 518
Unleaded	400	1 361	1 799	3 313	6 873
Premium	62 900	25 370	53 226	125 111	266 607
Kerosene—					
Aviation	9 615	....	....	8 094	17 709
Lighting and Power	1 600	....	....	1 300	2 900
Bitumen Feed Stock	....	....	....	25 222	25 222
A.G.O. and Distillate	48 880	32 859	43 702	51 889	177 330
Heating and Fuel Oil	10 251	1 103	24 661	23 443	59 458
Total tonnes per Port	150 111	61 374	135 328	263 886	610 699
Number of Tanker Ships	24	9	24	26	83

TABLE 17

IMPORTS OF EXPLOSIVES

Product	*Queenstown*	*Burnie*	*Currie*	*Wynyard*	*Hobart*	*Total*
Ammonium nitrate for ANFO (t)	....	3 240	....	....	....	3 240
Blasting explosives Class 1.1.D (cartons)	....	36 350	408	....	...	36 758
Propellants Class 1.1.C (cartons)	....	....	....	88	....	88
Detonators Class 1.1.B (cartons)	19	1 524	107	39	39	1 728
Detonating fuses Class 1.1.D (cartons)	24	1 193	....	....	....	1 217

TABLE 18
ACTS ADMINISTERED BY DEPARTMENT OF MINES

Aid to Mining Act 1927
Coastal and Other Waters (Application of State Laws) Act 1982
Dangerous Goods Act 1976
Department of Mines (Investigations) Act 1972
Director of Mines Act 1951
Gas Franchises Act 1973
Hobart Town Gas Company's Act 1854 and 1857
Iron Ore (Savage River) Agreement Act 1965
Launceston Gas Company's Acts 1858, 1859 and 1885
Mineral Resources Act 1951
Mines Inspection Act 1968
Mining Acts 1929 and 1958
Mount Cameron Water-Race Act 1926
Mount Read and Rosebery Mines Limited Leases Act 1916
Petroleum (Submerged Lands) Acts 1967, 1982
Ringarooma and Cascade Water System (Agreement) Act 1947
Underground Water Act 1966

TABLE 19
STAFF ESTABLISHMENT AS AT 30 JUNE 1985

Administration	35
Mines and Explosives	21
Geological Survey	50
Chemical and Metallurgical	14
R.P. and P.D.	5
Diamond Drilling	13
Others (C.E.P. etc.)	4
Total	142

FINANCIAL STATEMENT

SUMMARY OF EXPENDITURE FOR THE YEAR ENDED 30 JUNE 1985

	1983–84	*1984–85*
	$'000	$'000
CONSOLIDATED REVENUE FUND—		
EXPENDITURE BY APPROPRIATION DIVISION 37—		
AGENCY RESOURCE SUMMARY—		
Administration—		
Salaries and payments related to salaries	725	762
Departmental expenses	232	280
Other expenditure	50	....
	1 007	1 042
Mines Inspection—		
Salaries and payments related to salaries	629	628
Departmental expenses	100	107
Other expenditure	710	674
	1 439	1 409
Geological Survey—		
Salaries and payments related to salaries	1 355	1 369
Departmental expenses	367	375
Other expenditure	8	8
	1 730	1 752
Chemistry and Metallurgy—		
Salaries and payments related to salaries	357	379
Departmental expenses	50	54
Other expenditure	....	....
	407	433
Resource Planning and Policy Development—		
Salaries and payments related to salaries	38	145
Departmental expenses	3	32
Other expenditure	....	....
	41	177
Total Consolidated Revenue Fund Expenditure	4 624	4 813
LOAN FUND—		
CAPITAL EXPENDITURE BY APPROPRIATION—		
Agency Resource Summary—		
Administration	27	24
Mines Inspection	126	83
Geological Survey	113	145
Chemistry and Metallurgical	29	45
Resource Planning and Policy Development	....	....
Total Loan Fund Expenditure	295	297
Trust Fund—		
In accordance with the provisions of the Public Account Act 1957—		
Special Employment Related Programme Act—		
Salaries and payments related to Salaries	35	....
Other expenditure	1	....
	36	....
Deposit Account—		
Deposits refunded	30	43
	30	43
Community Employment Programme—		
Salaries and payments related to salaries	5	32
	5	32
Australian Atomic Energy Commission Research Grant—		
Travelling expenses	1	....
Other expenditure	2	....
	3	....
Mining Trust Fund—		
Aid to Mining Loans	5	16
	5	16
Mt Cameron Water Race Suspense Account—		
Salaries and payments	32	19
Other Expenditure	1	....
	33	19
Ringarooma and Cascade Water Suspense Account—		
Interest on loan	2	2
	2	2
TOTAL TRUST FUND EXPENDITURE	114	112
TOTAL EXPENDITURE FROM ALL SOURCES	5 033	5 222

SUMMARY OF REVENUE FOR THE YEAR ENDED 30 JUNE 1985

	1983–84	*1984–85*
	$'000	$'000
CONSOLIDATED REVENUE FUND—		
Public Works and Services—		
Drill hire	123	116
Survey fees	3	3
Geological services	12	10
	138	129
Lease Rentals and Fees—		
Lease Rents under the Mining Act	157	164
Fees under Petroleum (Submerged Lands) Act	18	15
Sale of maps and publications	14	12
Other fees under the Mining Act	339	223
	528	414
Territorial Revenue—		
Royalty on iron ore pellets	312	318
Sale of Government property	2	4
Storage of explosives and flammable liquids	50	44
Mineral Royalties—		
Metallics	1 751	609
Sand and gravel	74	116
	2 189	1 091
Other Sources—		
Miscellaneous	3	5
	3	5
Total Revenue from Consolidated Revenue Fund	2 858	1 639
Loan Fund—		
Repayments	4	18
Total Revenue from Loan Fund	4	18
Trust Fund—		
Deposit Account	63	44
	63	44
Mining Trust Fund—		
Loan Repayments	22	32
	22	32
Mt Cameron Water Race Suspense Account—		
Sale of Water	8	1
	8	1
Forfeited deposits	10	....
	10	....
TOTAL REVENUE FROM TRUST FUNDS	103	95
TOTAL REVENUE FROM ALL SOURCES	2 965	1 734

OBJECTIVES OF THE DEPARTMENT AND THE DIVISIONS

DEPARTMENTAL OBJECTIVES

1. Provide Government and the private sector with all possible assistance and sound professional advice towards maintaining and increasing the value to the State of its resources.

2. Assure the State of the maximum utilisation and conservation of its resources by increasing the level of supervision over the activities of the mineral industry.

3. Seek positive participation in all discussions and decisions involving land use and status or changes to such with other State Departments, State and Federal Government, or their instrumentalities.

4. Actively pursue a policy of minimising any environmental impact by exploration, mining and mineral processing activities within the State.

5. Regularly review and update all internal and external administrative procedures and legislation to facilitate mineral development and to supply effective and efficient services to Government, industry and the public.

6. Continue to perform all necessary scientific research, relating to the earth sciences and the mineral resources of the State, and to publish the information obtained expeditiously for the benefit of mineral exploration and development, land use planning, environmental, groundwater resources and other purposes.

7. Create data bases containing all data available from private sector and departmental exploration along with other studies of mineral resources and geology in the State and make this available to the public.

8. Facilitate and oversee the exploration, development and production of the mineral, gas and petroleum resources within the State and in the offshore areas administered by it.

9. Carry out the Department's statutory responsibilities in a manner in keeping with sound professional practices and responsibility.

10. Bring all mining, quarrying and associated activities within the State under departmental control.

11. Maintain responsible and effective communication with all parties involved in the exploration and development of the State's mineral resources.

12. Actively pursue by education and inspection a real reduction in the incidence of accidents and health hazards in the exploration, mining and mineral processing industries.

13. Regularly review all rents, fees and charges associated with services and statutory requirements.

14. Improve departmental efficiency and effectiveness by continuing to operate a programme of staff development and training.

DIVISIONAL OBJECTIVES

RESOURCE PLANNING AND POLICY DEVELOPMENT DIVISION

1. Provide advice and initiatives to the Government and the Department through the Director of Mines on all aspects of resource development, planning and policy development.

2. Implement Government policies, as they exist or as they are developed in relation to the Department's functions and responsibilities.

3. Actively encourage and support the continuing viability and expansion of the State's mineral industry by private sector exploration and increased processing in co-operation with other Divisions.

4. Co-ordinate and monitor the effectiveness of all departmental activities which involve aspects of resource development.

5. Develop, monitor and modify the Department's corporate plan when required.

6. Introduce relevant management systems to the Department as required and approved by the Director.

7. Act as the Public Relations arm of the Department.

GEOLOGICAL SURVEY DIVISION

1. Continue the programme of systematic mapping of the State on scales of 1:50 000, 1:250 000, 1:500 000 and revise and republish existing maps as necessary. The mapping programme will be supported by laboratory studies and the work published promptly.

2. Continually update assessments of the State's mineral resources and complete studies on the genesis and distribution of those resources. Provide advice to the Director of Mines on all aspects of exploration and development of mineral resources, for the Minister, Government, industry and public. Develop and maintain data bases containing all geological information collected during mineral exploration and development.

3. Assist the exploration for and development of, the gas and petroleum resources of the State and surrounding continental shelves by the storage, retrieval and distribution of all data arising from previous oil exploration. Make up-to-date assessments of the coal and oil shale deposits of the State and advise explorers on all geological aspects of the solid fuel resources of the State.

4. Assess the quantity and quality of groundwater available in selected areas of the State. Monitor and regulate the production and pollution of groundwater. Maintain a register containing all geological, chemical and hydrological data concerning each water bore put down in the State.

5. Carry out zone planning in areas subject to landslips, provide advice on geological factors which may effect civil engineering structures, and undertake studies and provide advice on all geological hazards. Examine the geological aspects of environmental matters, disposal of dangerous substances, and soil erosion, and offer constructive advice on these matters.

6. Maintain and improve the current information service which involves the publication of geological maps and reports, library services for unpublished reports and the retrieval of geological information. Maintain reference rock, mineral, fossil, bore core and cuttings collections.

7. Maintain expertise in a wide range of geophysical methods in order to provide geophysical advice and services on petroleum and mineral exploration as well as geological problems, bore logging and engineering geology. Keep abreast of new geophysical techniques and instrumentation. Provide computer services to the Division.

8. Provide services such as geochemistry, palaeontology, palynology, mineralogy/petrology and lapidary to support other geological activities. Support the publication programme by means of editorial and cartographic services.

INSPECTION DIVISION

1. Maintain a high level of safety and occupational health in the mineral industry by the regular and thorough inspection of all mines and works.

2. Maintain a high level of safety in the import, handling, storage and manufacture of dangerous goods by the regular and thorough inspection of all licensed premises.

3. Advise on and monitor the successful reconditioning of land disturbed by mining operations.

4. Maintain an efficient drilling service for the Geological Division, other Government instrumentalities and, where required for the private sector.

5. Maintain a high level of safety and occupational health in offshore oil exploration drilling, which comes within our jurisdiction, by regular inspection.

6. Actively pursue the maintenance and where necessary upgrading the level of knowledge and expertise required by divisional staff in keeping abreast of developments in the fields of mineral development, safety and occupational health.

METALLURGICAL AND CHEMICAL DIVISION

1. Provide the Director of Mines with information and advice on matters of a metallurgical or chemical nature relating to the mining industry, and all matters concerning the operational administration of the laboratory.

2. Provide a metallurgical and analytical service, and information and advice on related matters to other Divisions of the Department, the mining industry and the general public.

3. Reduce the turn around time of departmental samples in the laboratory for routine analyses to a maximum of three months with an average of one and one half months by 30 June 1986.

4. Increase the value of work completed for industry and private individuals to $100 000 by 30 June 1987.

5. Reassess costs involved in producing results by the various methods employed and to develop a scale of fees to be charged to clients by 30 December 1985.

6. Actively pursue a programme of upgrading the level of knowledge and experience of laboratory staff by training and research.

ADMINISTRATION DIVISION

To provide an efficient and effective administrative service for the Director of Mines and the Department by:—

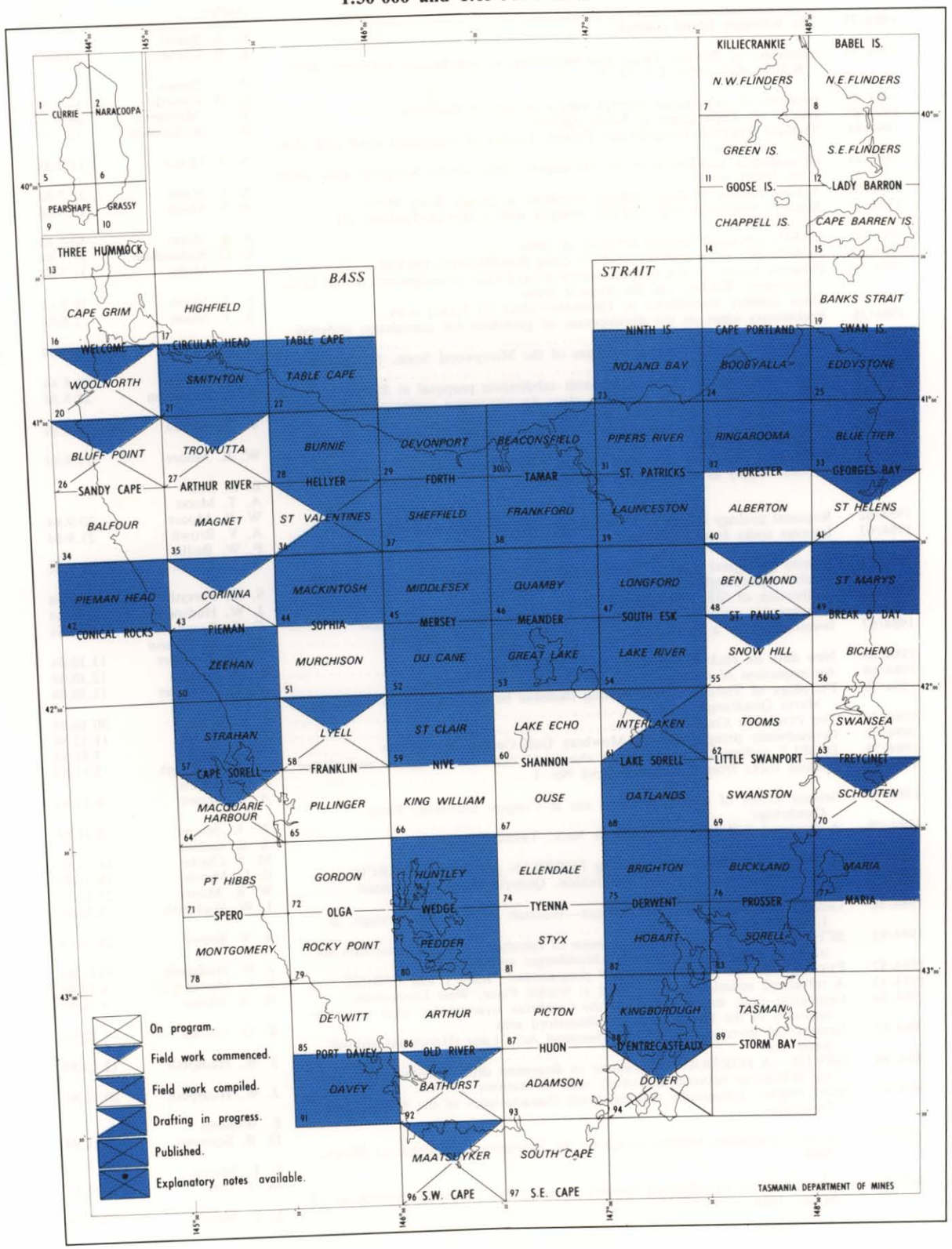
(a) Formulation of the budget including control of expenditure, recording of receipts, provision of management reports and ensuring compliance with Treasury requirements.

(b) Provision of a sound personnel management system, particularly with respect to staff development and training and the requirements of the State Service legislation.

(c) Administration of the legislation for the issue of mining tenements (including offshore), encompassing advice on necessary changes and ensuring prompt processing of all matters.

GEOLOGICAL ATLAS MAPPING PROGRAMME

1:50 000 and 1:63 360 Scales



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LIST OF UNPUBLISHED REPORTS 1984–85

No.	*Title*	*Author*	*Date*
1984/37	The Schouten Island coalfield	C. A. Bacon K. D. Corbett	10.8.84
1984/39	Chemistry of Tertiary basalt and palynology of interbedded sediments from B.H.P. drill holes, E.L.33/79	A. V. Brown S. M. Forsyth	10.7.84
1984/43	Analyses of commercial mineral waters on sale in Tasmania	W. L. Matthews	24.7.84
1984/47	Use of the Department of Mines digitiser	R. G. Richardson	11.7.84
1984/48	Sheffield Regional Groundwater Project: Review of completed work and ideas for the future	A. T. Moon	11.7.84
1984/49	Groundwater monitoring in the Devonport—Port Sorell—Sassafras area: Ideas for future work	A. T. Moon	12.7.84
1984/50	A brief outline of slope stability problems at Savage River Mines	A. T. Moon	13.7.84
1984/51	Bishop's simplified slope stability analysis with a Hewlett-Packard 41C calculator	A. T. Moon	30.7.84
1984/52	CARP—computer assisted retrieval of plans	R. G. Richardson	23.7.84
1984/53	Probabilistic slope stability analysis using Rosenbleuth's method	A. T. Moon	31.7.84
1984/54	Progress report on the reconnaissance groundwater investigations in the Little Swanport, Rheban and Runnymede areas	A. T. Moon	30.7.84
1984/55	Slope stability assessments in Tasmania—ideas for future work	A. T. Moon	2.8.84
1984/56	Preliminary ideas on the development of guidelines for consultants undertaking slope stability assessments	A. T. Moon	3.8.84
1984/57	Petrographic and proximate analyses of the Merrywood Seam, Merrywood Colliery, North-East Tasmania	C. A. Bacon	21.8.84
1984/58	Stability assessment of the Leichhardt subdivision proposal at Relbia	P. C. Stevenson	28.8.84
1984/59	Subsurface movement in expansive clay: An alternative explanation for house cracking at Sandown Road, Launceston	W. R. Moore	30.8.84
1984/60	A preliminary seismic refraction survey at a proposed dam site at Grindelwald, West Tamar	W. R. Moore	14.9.84
1984/61	Preliminary report on the feasibility of using groundwater as a supplementary water supply at the Kingston Golf Club	B. E. Cox A. T. Moon W. R. Moore	20.9.84
1984/62	Regional geology of the Mt Youngbuck—Magnet area—1:25 000 map	A. V. Brown	21.9.84
1984/63	Igneous rocks from Squid No. 1	P. W. Baillie A. V. Brown	21.9.84
1984/64	Interim geological map of the Ross—Woodbury—Western Tiers area, Interlaken Quadrangle	S. M. Forsyth	27.9.84
1984/65	Calibration of SIE well logger probes	J. W. Hudspeth	18.10.84
1984/66	Petrographic analysis of the Duncan Seam, Duncan Colliery, Fingal	C. A. Bacon	5.10.84
1984/67	Investigation of a basalt quarry, West Mooreville Road, Burnie	R. C. Donaldson V. M. Threader	11.10.84
1984/68	New data on rock distribution, York Plains area	S. M. Forsyth	12.10.84
1984/69	An inspection of Grierson's clay pit (762P/M) near Forcett	V. M. Threader	11.10.84
1984/70	Petrology of Tertiary olivine-bearing tholeiitic basalt from Barnes Road, St Marys Quadrangle	J. L. Everard	30.10.84
1984/71	The Preolenna Coalfield	C. A. Bacon	11.12.84
1984/72	Groundwater prospects at the Mowbray Golf Course, Launceston	W. R. Moore	7.11.84
1984/73	DIGPLT preliminary report. Scale change of maps using digitiser and plotter	J. W. Hudspeth	2.11.84
1984/74	Igneous rocks from Tasmanian Devil No. 1	P. W. Baillie A. V. Brown	6.11.84
1984/75	Seismic survey of a proposed dam site at Craigow University Farm, Cambridge	W. R. Moore	9.11.84
1984/76	A diamond drill hole at Eaglehawk Neck, Tasman Peninsula	A. B. Gulline M. J. Clarke	16.11.84
1984/77	Retrieval of records and data using FORTRAN programme SEARCH	E. L. Martin	16.11.84
1984/78	Slope stability of a proposed subdivision, Queechy Road, Launceston	W. R. Moore	27.11.84
1984/79	VLF-EM trial investigations	J. W. Hudspeth	5.12.84
1984/80	Geological compilation of the Zeehan—Waratah area, Dundas Trough, at 1:100 000 scale	A. V. Brown	29.11.84
1984/81	SCHTRAV—A FORTRAN programme to calculate apparent resistivities for traverses using the generalised Schlumberger array (Revision 1)	J. W. Hudspeth	30.11.84
1984/82	Printing text files using FORTRAN programmes PRINTT and CPRINT	E. L. Martin	4.12.84
1984/83	A refraction seismic survey of land at Sophie Place, West Launceston	W. R. Moore	4.12.84
1984/84	Geological maps and summary of the Cambrian stratigraphic units and relationships in the Henty River—Williamsford area	K. D. Corbett	7.12.84
1984/85	Geophysical investigations of the Thousand Acre Lane (Hamilton) groundwater site	J. W. Hudspeth	12.12.84
1984/86	GRVTIE—A FORTRAN programme to determine drift corrected meter reading differences between alternately read tie stations	J. W. Hudspeth	20.12.84
1984/87	Short course: stratigraphy and structural characteristics of the North Coast, Tasmania	E. Williams D. B. Seymour	7.11.84
1985/01	List of Unpublished Reports issued by the Tasmania Department of Mines, 1984	E. L. Martin M. J. Dix	4.1.85
1985/02	Author index to Unpublished Reports issued by the Tasmania Department of Mines, 1984	E. L. Martin	4.1.85

LIST OF UNPUBLISHED REPORTS 1984–85—*(continued)*

No.	*Title*	*Author*	*Date*
1985/03	Author index to Unpublished Reports issued by the Tasmania Department of Mines, 1971–1984	E. L. Martin	14.1.85
1985/04	GRIDCON: A FORTRAN programme for converting one set of grid co-ordinates to another	J. W. Hudspeth	23.1.85
1985/05	Foundation conditions at the proposed radio telescope site, Cambridge	W. L. Matthews	15.2.85
1985/06	Groundwater investigation for town supply, Gladstone, north-eastern Tasmania	W. R. Moore	28.2.85
1985/07	Field logging handbook for the SIE logger	J. W. Hudspeth	14.3.85
1985/08	CARS—A computer assisted records system (Revision 3)	R. G. Richardson	28.2.85
1985/09	Petrographic and proximate analyses of coal from the York Plains coalfield	C. A. Bacon	18.3.85
1985/10	TASROCK—a computer based catalogue for Tasmanian rocks	R. G. Richardson	18.3.85
1985/11	Geological compilation map of the Mount Read Volcanics, Que River to Mt Darwin	K. D. Corbett	6.3.85
1985/12	CHEMFORM: A FORTRAN programme for calculating the chemical formula of a mineral from its analysis	J. W. Hudspeth	21.3.85
1985/13	Offshore well data held by the Tasmania Department of Mines (Revision 1)	P. W. Baillie J. W. Hudspeth	21.3.85
1985/15	A new Cambrian fossil locality from Native Track Tier, north-west Tasmania	P. W. Baillie J. B. Jago	25.3.85
1985/16	ELSORT—A programme for sorting exploration licence report numbers	R. G. Richardson	25.3.85
1985/17	A brief outline of computer programme specifications	P. C. Stevenson	4.4.85
1985/18	Caliper tool supplement to the field logging handbook for the SIE logger	J. W. Hudspeth	10.4.85
1985/19	Source rocks from Squid No. 1, Bass Basin	P. W. Baillie	11.4.85
1985/20	Contouring using the Department of Mines Perkin-Elmer mini-computer. Part A: Small quantities of raw data	R. G. Richardson	1.5.85
1985/21	Contouring using the Department of Mines Perkin-Elmer mini-computer. Part B: Gridded data	R. G. Richardson	1.5.85
1985/22	LIBLST: The Library Exchange List programme	J. W. Hudspeth	24.4.85
1985/23	CONCOORD—a programme for conversions between the Australian Map grid and geographic co-ordinates	R. G. Richardson	2.5.85
1985/25	A preliminary gravity survey of the Hellyer prospect	J. W. Hudspeth R. G. Richardson	23.5.85
1985/26	Geophysical surveys over the Ocean Beach magnetic anomaly, western Tasmania	R. G. Richardson	23.5.85
1985/27	The Saltwater River coalfield	C. A. Bacon	24.5.85
1985/28	Pump test at the Tasmania Golf Club, Barilla Bay	W. L. Matthews	27.5.85
1985/32	DIGPLT preliminary report. Scale change of maps using the digitiser and plotter (Revision 1)	J. W. Hudspeth	19.6.85
1985/33	DORIS—A drill log record information system	R. G. Richardson	19.6.85

REPORT OF THE MOUNT CAMERON WATER RACE BOARD
FOR THE YEAR ENDED 30 JUNE 1985

The Minister for Mines,

We submit the report of the Mount Cameron Water Race Board for the year ended 30 June 1985.

With the collapse of the local tin industry and no likelihood of recovery there were negligible sales of water. Consequently the Board was wound up in November 1984 after operating for over 100 years and the Manager, Mr N. Petrie, ceased duty.

Regrettably wide canvassing failed to find any useful purpose for the Old Chum Dam. As the spillway is rapidly eroding the valves in the dam should be removed so that water cannot be stored, thus preventing further damage to the spillway. The assets of the Board are to be disposed of.

Mr N. Petrie was kind enough to return for several weeks after officially ceasing duty to repair the race, following damage which occurred subsequent to his leaving the employment of the Board.

H. MURCHIE, *Chairman*

V. WOOD, *Member*

K. R. DAVEY, *Member*

MOUNT CAMERON WATER RACE SUSPENSE ACCOUNT T753
STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 30 JUNE 1985

	1984	*1985*
Receipts—	$	$
Appropriation Act 1983-84 (Loss 1982-83)	27 607	....
Appropriation Act 1984-85 (Loss 1983-84)	....	25 277
Sale of Water—		
Fixed scale	6 552	350
Royalty scale	....	....
Domestic	992	496
Balance to next account	25 277	18 073
	60 428	44 196
Payments—		
Balance from last account	27 607	25 277
Salaries wages and pay-roll tax	31 946	18 838
Car allowance	500	....
Travelling allowance	305	81
Maintenance	70	....
	60 428	44 196

REPORT OF THE RINGAROOMA AND CASCADE WATER RACE BOARD FOR THE YEAR ENDED 30 JUNE 1985

The Minister for Mines,

During the year the Rivers and Water Supply Commission took over the assets and debts of the Board and the Act is to be repealed. The Commission has an engineer on site. The legal formalities are not yet complete.

The Board's debt repayments to the Treasury are to be made by the Rivers and Water Supply Commission and there will be no continuing financial commitment to the Board in the coming financial year.

It is recommended to the Minister that he move to wind up the Board.

H. MURCHIE, *Chairman*

N. P. EDWARDS, *Member*

K. R. DAVEY, *Member*

RINGAROOMA AND CASCADE (WATER) SUSPENSE ACCOUNT T754

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 30 JUNE 1985

	1984	*1985*
Receipts—	$	$
Appropriation Act 1983-1984 (Loss 1982-1983)	1 988	....
Appropriation Act 1984-1985 (Loss 1983-1984)	....	2 132
Balance to next account	2 132	2 014
	4 120	4 146
Payments—		
Balance from last account	1 988	2 132
Allowances	179	....
Interest on Capital Cost	1 953	2 014
	4 120	4 146

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Electrolytic Zinc Company's Risdon Works (Photo: Tasmanian Government Stills Photographic Section)