

#### The Department of Mines

Head Office
Gordons Hill Road,
ROSNY PARK 7018
P.O. Box 56,
ROSNY PARK 7018
Telephone (002) 30 8011
Telex AA 58276
Fax (002) 44 2117

Burnie Office

Reece House, Cnr. Mount & Cattley Streets, BURNIE 7320

> Telephone (004) 30 2202 Telex AA 59007 Fax (004) 31 8395

Launceston Office

Chemical & Metallurgical Laboratory, 287 Wellington Street, LAUNCESTON 7249

Telephone (003) 44 2431 Telex AA 58764

#### **Minister for Mines**

The Hon. Ray Groom, Executive Building, Franklin Square, HOBART 7000

> Telephone (002) 30 8011 Telex AA 57238 Fax (002) 34 4467



# **DIRECTOR OF MINES**

REPORT FOR THE YEAR ENDED 30 JUNE 1987

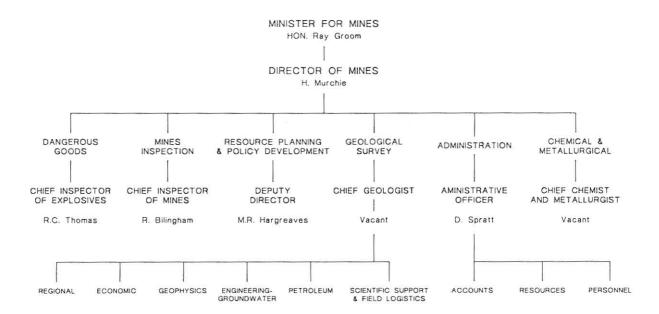
### TABLE OF CONTENTS

DEDODA OF THE DIDECTOR OF MINDS	Page
OVERVIOUS	5
Overview	5
Review of Departmental Activities	6
Mineral Production Graphs	8
Value and Production of Principal Minerals	10
Table 1—Value and Production of Principal	10
Minerals	10
Australian Minerals and Energy Council	10
REPORTS BY DIVISIONS OF THE DEPARTMENT	11
Administration	11
Resource Planning and Policy Development	12
Mines Inspection Division	14 14
Mines Inspection Branch	17
Mines	17
Works	19
Dangerous Goods Division	21
Geological Survey Division	$\frac{1}{23}$
Regional Mapping Branch	23
Economic Geology Branch	24
Engineering Geology Branch	26
Petroleum Exploration and Marine Geology Section.	26
Table 2—Oil Exploration Permits	27
Geophysics	27
Geological Support Services	28
Chemical and Metallurgical Division	30
STATISTICAL TABLES	33
Table 3—Employment and Accidents	34
Table 4—Certificates of Competency	36
Table 5—Mineral Production—Tasmanian sources	37
Table 6—Value of the Mineral Industry	38
Table 7—Production of Industrial Minerals	39
Table 8—Imported Ores	39 40
Table 10—Mineral Production Since 1880	41
Table 11—Number and Area of Leases and Licences	41
Applied for	42
Table 12—Leases and Licences Issued	$\frac{1}{42}$
Table 13-Total Number of Leases and Licences	42
Table 14-Total Number of all Types of Rights	43
Table 15—Dangerous Goods Approvals Issued	43
Table 16—Imports of Flammable Liquids  Table 17—Imports of Explosives	43
Table 17—Imports of Explosives	44
Table 18—Acts Administered by the Department	44
Table 19—Staff as at 30 June 1987	44
Table 20—Drilling Details 1986–87  Table 21—Type and Number of Tests	45 46
	40
FINANCIAL STATEMENT	48
OBJECTIVES OF THE DEPARTMENT AND	
DIVISIONS	50
GEOLOGICAL ATLAS MAPPING PROGRAM	52
LIST OF UNPUBLISHED REPORTS 1986-87	53
REPORT OF THE MT CAMERON WATER RACE	
BOARD	55
REPORT OF THE RINGAROOMA AND CASCADE	
WATED DOADD	56

#### DEPARTMENTAL 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 1987**



#### REPORT OF THE DIRECTOR OF MINES, 1986-87

To the Minister for Mines,

Annual Report of the Department of Mines for the year 1986–87 submitted by the Director of Mines, Mr Hugh Murchie.

#### **OVERVIEW**

The year showed a marked upturn in the overall health of the mining and metallurgical industry. After several years of lean, hungry times, where survival was the major objective, it is heartening to be able to report renewed optimism and confidence in the future.

This confidence is graphically illustrated by commitments to invest more than \$450 million during the next four years on new mines and processing plants, and on improvements to existing facilities. A further \$20 million per year will be invested in research and development, and in mineral exploration programmes. This is good news, as the industry provides more than 40 per cent of the State's foreign export earnings and employs 10 per cent of Tasmania's workforce directly and indirectly. Hard times have encouraged rapid application of new ideas and technology, and this has helped to ensure that mining is here to stay.

As I predicted last year there was no activity in oil exploration this year. However two areas in the Sorell and Otway Basins were released for tender in January 1987 and the response was most encouraging. The tenders are now being evaluated and the successful bidders will be announced shortly.

#### REVIEW OF THE YEAR

Tioxide Australia Ltd, at Heybridge near Burnie, is spending \$23 million on expansion of its plant to increase capacity from 35 000 tonnes per year to 52 500 tonnes per year. This will enable the company to capture a larger share of the world pigment market, especially in the lucrative Western Pacific Basin. This is the second stage of expansion initially started in 1985–86.

M. K. Silica, the joint venture between Monier Ltd and Japanese interests, altered their proposals to build a processing plant for their silica flour project. They will now site the upgrading process at Heybridge rather than Cooee to satisfy local environmental concern. The initial production rate will be 20 000 tonnes of high quality product per year.

The haul road to the Duncan Colliery was re-surfaced with rolled concrete during the Christmas shut down. This was the first such road to be laid in Australia, and it is hoped that this will open up new markets and technology for cement.

Following a leak at the Golconda tailings dams, detailed stability work was undertaken and the situation made safe. A cyanide recovery unit has been installed and results evaluated.

Beaconsfield Gold Mining Company Ltd is spending \$8.5 million rehabilitating the mine and conducting a detailed assessment of ore reserves in expectation of spending \$30 million on a full-scale mining operation.

In June the Minister for Mines presented the Beaconsfield Mine Museum with a reconditioned Joy 30HD diamond drill which had been used by the Department of Mines in the initial prospecting work at Beaconsfield in March 1963. This work encouraged further exploration at Beaconsfield which will hopefully result in the reopening of the Tasmania Mine.

The Temco ferro alloy plant at Bell Bay has been upgraded at a cost of \$57 million by utilising waste heat to generate more electrical energy, which will boost plant capacity by up to 40% and make the company more competitive on world markets. A new crushing plant was commissioned and casting machines provided for Number 1 and 2 furnaces, ensuring safer and cleaner operations.

A further agreement has been reached between Mt Lyell and the Government which has resulted in an extension of the mine life to 1994, with the company committed to developing the mine to deeper levels.

The Electrolytic Zinc Company will invest \$100 million replacing the leaching and purification plant at the Risdon zinc refinery. When this work is completed E.Z. will be the largest zinc smelter in the world and a most efficient zinc producer. The company also has plans to conduct a feasibility study to expand capacity of the Risdon works by some 40%.

Comalco has established a rehabilitation centre for injured workers. The facility includes offices, exercise area, and work benches to assist psychological and physical recovery. The company is pioneering the latest trends in rehabilitation and is to be congratulated for its initiative.

Goliath Cement commissioned a new clinker storage complex at Railton during the year. This will improve environmental and quality control and reduce costs. At a cost of \$7 million, it has capacity to store and blend up to 80 000 tonnes of clinker. A feature is the unique conveyor recovery system for the stored material.

Renison achieved the target milled tonnage of 850 000 tonnes for the year. Recovery and grade were as budgeted. The mine has produced well to survive following the collapse of the International Tin Council.

Pioneer Silicon Industries, a joint venture of Pioneer Concrete Services Ltd and Pechiney Australia Pty Ltd, made good progress in constructing a silicon smelter at Electrona. Work is substantially complete and start up will be early in the new financial year. Work was monitored by a Silicon Development Advisory Committee, representing the Departments of the Environment, Construction, and Mines, the Kingborough Council, the Company, and other Authorities when required. The project proceeded smoothly due to the co-operation of all involved.

The highlight of the year was the continued development of the Hellyer Mine. Aberfoyle succeeded in completing the adit access to the orebody, developing stoping blocks, and raise-boring two ventilation shafts, in record time. In recognition of this mining engineering feat the Premier, the Hon. Robin Gray, M.H.A., presented Achievement Awards in the form of framed certificates to the company and employees involved.

The tin concentrator at the Cleveland Mine was converted to treat Hellyer ore on a pilot scale at seven tonnes per hour. Feasibility studies are well advanced to market, mine and process the Hellyer ore. Negotiations commenced with Aberfoyle to draft a Hellyer Heads of Agreement between the company and the State Government. The Agreement will cover all aspects of the project. The Department of Mines coordinated the requirements of all involved Authorities. The Agreement is in the final stages of preparation and should be presented to Parliament in the coming Budget Session. I expect it to be a landmark agreement for Tasmania.

### REVIEW OF DEPARTMENTAL ACTIVITIES

The Mt Read Volcanics Symposium, jointly organised by the Department and the Geological Society, was held in Burnie in November. The symposium was well attended and most successful. Steady progress has been made with our Mt Read Project and a sound data base established for explorers.

The Commonwealth scheme for financial aid to small tin miners has been implemented and is being administered by the Department. It has been well received and is relieving hardship and encouraging small miners to prospect for other minerals.

Following flash floods in the Fingal Valley, the Department repaired breaches in the Storys Creek and Rossarden tailings dams. Effluent monitoring continues through the Department's laboratory at Launceston.

The Engineering Geology Section has been active in providing many sectors of our community with assistance and advice on landslips, groundwater, foundation studies and subdivision developments. Special projects were undertaken for the International Hotel, Comalco, Transport Tasmania, Hobart City Council, Rivers and Water Supply Commission, Southern Tasmanian Geodata Mapping Project, and the Meander Irrigation Channel.

The Department of Public Administration conducted a review of our personnel practices and their recommendations are now being implemented. They were impressed with our performance appraisal scheme, staff development programme, staff consultative committee, and the corporate plan for the Department.

The publication 'Mines and Mineral Resources of Tasmania' has been amended to bring it up to date, and is being printed. Pamphlets on retention licences, reporting guidelines, advice to landholders regarding exploration licences, and the Mt Read Volcanics Project have been printed and have been well received by the public and industry.

The Mines Inspection Act and Regulations was amended to provide for employees safety representatives. This legislation, together with works safety committees, will encourage self regulation and ensure that safety is applied where it should be—at the work-place, and as it should be—by the work-force.

The Occupational Health and Hygiene Group in the Mines Inspection Branch has been set up, and equipment obtained, for monitoring dust and gases. It is pleasing to be able to report that progress is being made and this initiative will be a valuable step in improving safety and health in mines and works.

Central core-storage facilities are urgently required to provide a much needed data base for mineral explorers. A study is being done to determine how best to provide and site this complex.

Waste disposal problems continue to confront us. Other Statutory Authorities look to the Dangerous Goods Branch to solve the problem when it becomes a question of making a firm decision. We have managed to help out and provide practical, positive action on disposal, but a policy, and strategy, on State waste disposal facilities is long overdue.

It is pleasing to note that the Department's laboratory has greatly increased the volume of analytical and research work undertaken for industry and the public.

The drilling section has had an active year and has successfully completed jobs at:

- The Arthur Dam where mineralisation has confirmed our Huminex process;
- Sub-basalt drilling in the Waratah area, proving the extension of the Mt Read Volcanic series to depth;
- King River bridge site for the HEC at Crotty;
- Huon Forest Products wharf site on the Huon River;
- Groundwater drilling for Municipalities, Agricultural Shows, Salvation Army, farmers and East Coast groundwater survey.

The section provides a valuable service for Government, and the public, with their work being well recognised for its unique value.

Our newsletter 'Mines News' was published in October but, due to lack of voluntary contributions, it may not be possible to continue its production on a regular basis. This would be unfortunate and I hope my staff can produce a few enthusiasts, as we cannot afford a Public Relations Officer. I still believe we have a more genuine impact when we do it ourselves rather than letting others do it for us.

The Geological Survey conducted their annual public seminar in October. This was again a successful forum, being well attended by interstate and local delegates.

An open day for the families and friends of staff was conducted in September. Visitors were shown through the Rosny Park building and viewed working areas such as drafting, laboratories and computer rooms.

Although special displays and films were arranged it was generally work as usual in the Department. Two hundred people attended and the staff tea fund provided refreshments.

The value of the open day was in giving people at home a better idea of where and how their family member works. The occasion heightened the skills of the staff in explaining their work to visitors, and was a dress rehearsal for a full scale public open day planned for September 1987.

As a result of the downturn in oil exploration activity, the State Petroleum Engineer resigned in December 1986. He has joined the Bureau of Mineral Resources in



Drafting Officer Ken Bird explains the work of the Mines Drafting Office to visitors on the staff open day.

Canberra, and BMR have kindly agreed to make him available whenever we need technical assistance in our area of joint authority.

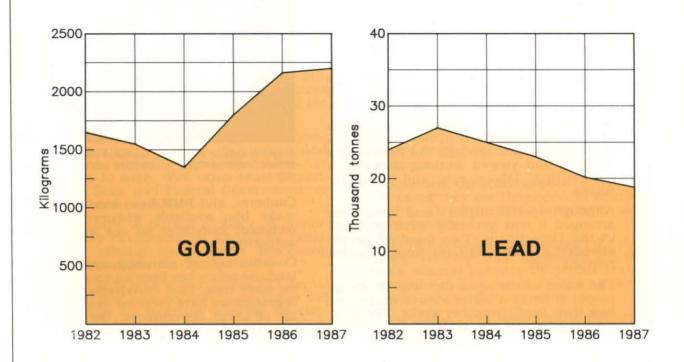
Co-ordination of planning approvals and land use policy has been an area of concern for some time. I am encouraged by the co-operation we have received from the Director of Local Government, the Town and Country Planning Commission, and local councils. I believe with better consultation and communication we can ensure development goes ahead in a sensible and sensitive manner.

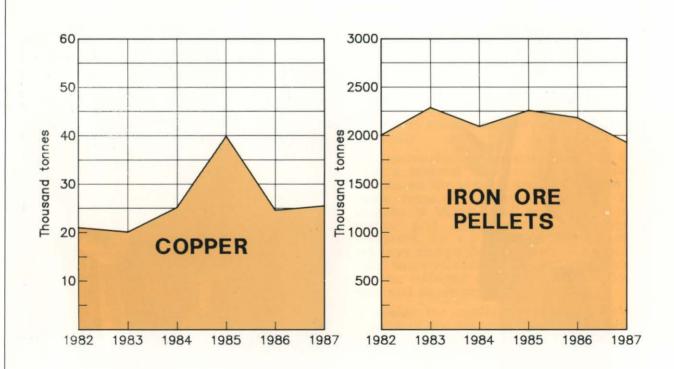
Recognition of local community views and requirements is fundamental to successful project development.



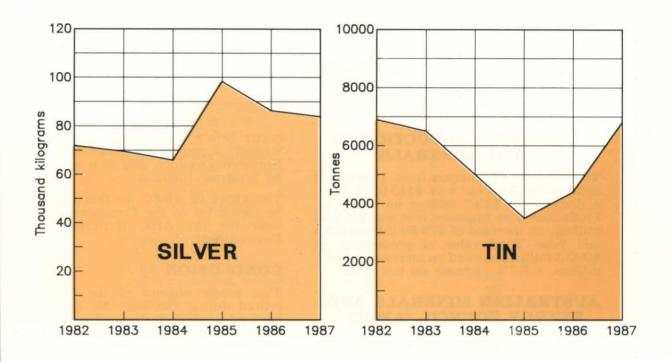
The Department jointly organised a symposium on the Mt Read Volcanics during the year. The symposium was opened by the Minister for Mines, the Hon. Ray Groom (second from left), who is pictured with Departmental geologists Keith Corbett (left), Peter Collins and Carol Bacon. (Photo—Advocate)

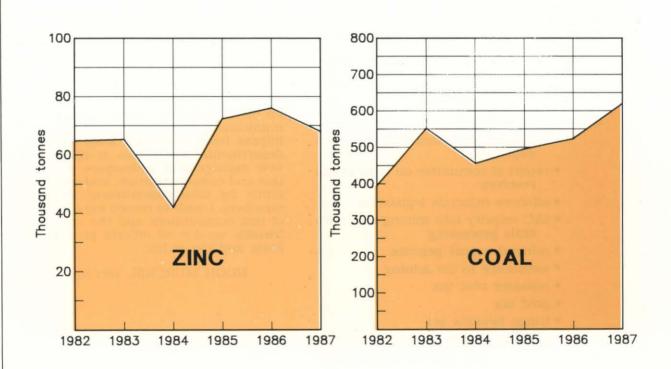
#### PRODUCTION OF PRINCIPAL MINERALS











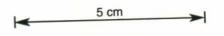


Table 1

VALUE AND PRODUCTION OF PRINCIPAL MINERALS

Commodity	Quantity	Value
Copper (tonnes)	25 112	53.9
Copper (tonnes)	2 079	40.3
Iron ore pellets (tonnes)	1 840 200	62.7
Lead (tonnes)	19 306	14.3
Silver (kilograms)	83 109	24.1
Tin (tonnes)	6 864	47.7
Tungsten as tungstic oxide (tonnes)	1 190	8.1
Zinc (tonnes)	68 077	91.3
Coal (tonnes)	622 635	18.3

### VALUE AND PRODUCTION OF PRINCIPAL MINERALS

The value of production from Tasmanian sources for the year was \$415.02 million, a decrease of \$13.7 million on last year. Production from imported ores was \$575.32 million, an increase of \$79.86 million from last year. Total value of production, at \$990.3 million, showed an increase of \$66.1 million, a 6.7% increase on last year.

## AUSTRALIAN MINERALS AND ENERGY COUNCIL (AMEC)

In November 1986 the Council met in Canberra, where the Minister for Mines, the Hon. Ray Groom, M.H.A., represented Tasmania.

Ministers discussed the issues arising from the Energy 2000 conference held in September 1986. The Commonwealth will conduct reviews of petroleum taxation regime and the petroleum allocation system. A Commonwealth Energy Policy Paper will be issued prior to the next AMEC meeting. Formalised consultative mechanisms between the Commonwealth and the States in relation to the electricity supply industry, energy research and development, energy conservation, transport and alternative fuels were discussed.

Other items included:

- support for onshore oil and gas exploration
- report of committee on natural gas reserves
- offshore minerals legislation
- IAC enquiry into mining and minerals processing
- mineral export permits
- · assistance to tin mining
- resource rent tax
- gold tax
- fringe benefits tax
- capital gains tax

Mr Groom expressed concern that the listing of a large proportion of Tasmania in the National Estate was stifling development in mining and forestry, and suggested that the Australian Heritage Commission Act 1975 be amended so that effective consultation with the States could

occur before listing took place. He was strongly supported by Queensland and the Northern Territory, and to a lesser extent by Western Australia.

The views of AMEC on this issue would be forwarded to the Commonwealth Minister for the Arts, Heritage and the Environment.

#### CONCLUSION

Two senior officers of the Department retired during the year. Mr E.C. (Chuck) Leyland retired in November 1986 after twenty years service as a mines inspector and senior mining engineer in the Burnie office. Vic Threader retired in March 1987 after twenty-six years service as senior geologist, specialising in non-metallic minerals. I record my appreciation of the loyal service they have given to the State and the Department. I wish them a long and happy retirement.

In February 1987 Bruce Gulline, a senior geologist in the Regional Mapping section, died following a short illness. Bruce gave over thirty years of service and will be sadly missed by all his colleagues. His publications and maps record the contribution he has made to Tasmanian geology.

1986–87 has again been a very busy year for the Department. Modern trends in communication, consultation and conciliation impose much increased work loads on all departmental staff. This is countered by new management techniques, mechanisation and computerisation, and more importantly by total commitment by all staff members. I wish to record my appreciation of this commitment and the cheerful and friendly service all officers provide to the State and the public.

HUGH MURCHIE, Director of Mines.

# REPORTS BY DIVISIONS OF THE DEPARTMENT OF MINES

#### ADMINISTRATION DIVISION

#### PERSONNEL AND MANAGE-MENT SERVICES

During the year further development took place in utilising new technology to overcome the problem of coping with increasing demand with static or reducing staffing Electronic typewriters upgraded to stand-alone word-processors for day-to-day correspondence, and officers received training on the word-processing package acquired for the Department's mini-computer. This package is used mainly for preparation of scientific and specialist reports prepared by Departmental geologists and engineers. Further use was made of the State Service Personnel System on the State Computer Centre's Sperry main-frame, and our officer has received training which is increasing the management information value of the system.

Records Section staff have also shown great enthusiasm in converting manual mail recording systems to a computerised document tracking system. The Senior Records Clerk, in association with the Departmental programmer, has developed further enhancements enabling closer control and quicker recovery of outgoing mail information.

The Department's personnel section was involved in a joint exercise with officers from the Department of Public Administration aimed at trialling a personnel management evaluation package developed by the DPA. An appraisal of the Department's operations in this area was a valuable side benefit, and joint recommendations are being implemented.

Staff development is being actively encouraged, with an increasing number of staff participating in DPA-sponsored courses. The Executive Officer (Personnel and Management Services) participated in a trainer-training scheme which has increased the availability of appropriate courses to Departmental staff.

#### FINANCE

The Department finished the year within its budget allocation and Treasury changes have resulted in some increased flexibility in financial management.

Treasury also advised that the Department would be converting to full on-line use of the developing Central Finance System. This will need further analysis of financial management reporting requirements.

A Federally-funded assistance scheme for small tin miners was introduced during the year. The scheme is aimed at assisting small tin miners to diversify into other mining activities, following the collapse of world tin prices. Miners have been assessed as eligible and are receiving assistance.

#### RESOURCE ADMINISTRATION

Action is continuing within the Section to facilitate administration of legislative requirements relating to leases, licences, exempt tender areas (ETA), etc. Arrangements were finalised with the Australian Bureau of Statistics for the provision of a project officer to rationalise and co-ordinate the provision of mining industry statistics. The review is to cover the whole management system of mining leases and will be a significant step in upgrading the system.

Changes in the Mining Act, effective from 1 January 1987, have introduced retention licences, eliminated the requirement for applicants to mark out exploration licence areas, and dispensed with many of the administrative requirements of ETA processing.

#### STAFF MOVEMENTS

Name	Position	Remarks	Date
K.D. Corbett	Senior Geologist	Promoted	2.10.86
E.C. Leyland	Senior Mining Engineer	Retired	14.11.86
J.M. Richardson	Records Clerk	Commenced	10.12.86
K.G. Bird	Drafting Officer	Promoted	13.12.86
P.H. Winchester	State Petroleum Engineer	Resigned	30.12.86
D.R. Burgess	Drafting Officer	Resigned	23. 1.87
P.L.F. Collins	Geologist	Resigned	23. 1.87
A.B. Gulline	Senior Geologist	Retired	18. 2.87
R.P. Lohrey	Driller	Resigned	27. 2.87
V.M. Threader	Senior Geologist	Retired	3. 3.87
P.R. Murzecki	Registrar of Mines	Resigned	27. 3.87
R. Billingham	Chief Mining Engineer	Promoted	2. 4.87
T.E. Evans	Senior Mining Engineer	Promoted	2. 4.87
J.L. Everard	Geologist	Reclassified	3. 4.87
J.W. Hudspeth	Assistant Geophysicist	Reclassified	3. 4.87
J.W. Hudspeth	Assistant Geophysicist	Transferred	25. 6.87
V.M. Smith	Typist	Resigned	29. 6.87

#### 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 R. B. Chen, 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: Municipality of King Island v Sanadine NL. Objection to Exploration Licence 28/85. Objection withdrawn 29 October 1986.

Fox v Philpott. Application for forfeiture Lease 1018P/M. Objection withdrawn 16 February 1987.

McDonald v Johnson. Application for forfeiture Lease 63M/79. Hearing 18 August 1987.

Burnie Field Naturalist Club v Aureole Resources. Objection to Exploration Licence 41/86. Objection withdrawn. Various objectors v Conga Oil. Objections to Exploration Licences 52/86 and 53/86. Objections dismissed by Warden 18 March 1987.

Various objectors v Conga Oil. Objections to Exploration Licences 8, 10, 11 and 12/87. Objections dismissed by Warden.

P. A. Taylor v Mineral Holdings Pty Ltd. Application for forfeiture Lease 51M/72. Hearing date to be set.

Pirzl and Griffin v Graham, Reicher and Griffin. Application for forfeiture of Leases 16M/83 and 26M/83. Hearing date to be set.

#### COMPUTING

More use is now being made of the MAP-PER system and the Department's programmer has been able to develop information systems for Personnel, Records and Dangerous Goods. It is anticipated that, with increased use of MAPPER and the commercial packages now available, the rate of system development will increase substantially.

# RESOURCE, PLANNING AND POLICY DEVELOPMENT DIVISION

During the year the Division continued to operate in its now established role across the Department's areas of responsibility by handling specific areas of interest.

One of these areas covers matters of environmental concern, and the early part of the year saw completion of the remedial measures necessitated by storm damage at Storys Creek and Rossarden. Other environmental matters included assistance to Greening Australia in the rehabilitation of disused mining areas in the north-east, participation in the World Heritage Area Consultative Committee, and the introduction of a new model Environmental Impact Statement for exploration programmes. All exploration programmes within Conservation Areas are approved and monitored by a working group, chaired by the Division, with representatives from the Departments of Mines, Environment, and Lands and National Parks.

The Division continued to represent Tasmanian interests on the Australian Minerals and Energy Council working group on Natural Gas and Pipelines, and is cooperating with the Commonwealth Department of Industry, Technology and Commerce in the Basic Metals Industry Council review study of raw materials processing. Similar co-operation is proceeding on the same subject with the Department of Primary Industries and Energy, in line with its involvement with AMEC.

Legislative matters dealt with have included:

Amendments to the Mining Act, 1929 which have substantially changed the provisions in relation to Exploration Licences and introduced a formal mechanism for competitive application for land released from an existing exploration licence.

To provide security for a mineral discovery which cannot be developed immediately because of economic or other acceptable reasons, a new form of title, the Retention Licence, has been established. The continuance of this title is dependent on a constant reappraisal of the situation, and where the circumstances become favourable the resource is required to be developed or surrendered.

Also under the revised legislation, dealings in exploration or retention licences must be approved by the Minister. For this purpose a register has been established to record all changes to and dealings in licences

Amendments to the Mining Regulations 1930 also took effect late in 1986. Mining royalties are now assessable on construction materials and non-metallic minerals mined on Crown land.

Other amendments to the Regulations which were necessary to give effect to Mining Amendment Act 1986, included

changes to forms and procedures while removing unnecessary detail and simplifying the means of applying for licences.

Amendments to the Tasmania Petroleum (Submerged Lands) Act 1973 were passed in 1986 to incorporate changes previously made to the Commonwealth Act.

The corresponding legislation of the State and Commonwealth is, by agreement, kept uniform so far as possible, with the State having jurisdiction over the exploration and development of off-shore petroleum resources within the three-mile limit of the territorial sea.

The Tasmanian Act now includes provision for retention leases for uneconomic discoveries, clarifies the requirements for the registration of dealings, revises the provisions relating to the giving of Directions, and includes a large number of minor and technical amendments to clarify the intent of the legislation.

The Division was principally responsible for drawing up the Hellyer Agreement between the State Government and Aberfoyle Ltd covering the infrastructure and royalty system under which the Hellyer development will proceed.

Discussions with the Local Government Office and Town and Country Planning resulted in useful input to the revision of the Local Government Act.

The Division was also responsible for introducing the operation of the Small Tin Miners' Compensation Agreement, by which Commonwealth funds were made available to support small tin miners affected by the collapse of the world tin market.

Within the Department the staff were invited to become more involved in resource development by holding brain-storming sessions for the suggestion of initiatives. One of the sessions was attended by the Minister for Mines who found it profitable and informative.

A new lease of life has been established for the Mt Cameron Water Race which has existed for more than one hundred years as the water source for a large part of the north-east tin area. The race is being put into original condition, although much reduced in extent, as an aid to irrigation, while being retained for any possible future re-awakening of alluvial tin mining.

A display was mounted with information concerning the Mt Read project and, after travelling the State, has been placed permanently in the Zeehan Mining Museum.

Another museum, this time at Beaconsfield, has had its display augmented by the now replaced Department diamond drill which was used to explore the extension to the old Tasmania Mine orebody. A wooden bowl in pitch-pine worked from one of the old spear rods recovered from the waterlogged shaft is now on display in the Department.

The 1986–87 Departmental Corporate Plan was produced and the publication 'Mines and Mineral Resources of Tasmania' has been updated and is awaiting printing.



Minister for Mines Ray Groom (left) with the Chairman of the West Tamar Historical Committee Dick Hooper (centre) and Warden of Beaconsfield Trevor Roach at the presentation of the former Department of Mines diamond drill to the Grubb Shaft Museum at Beaconsfield. (Photo—Examiner)

#### MINES INSPECTION DIVISION

During the year the Division consolidated its activities following the implementation of the Gilberthorpe Report into Mines Inspection and Dangerous Goods, and the Minister's consideration of the Kremmer Report into the Drilling Section. A further review of Government health, safety and environmental inspection agencies was started by the Department of Public Administration, but no recommendations were available by the end of the year.

The Division was staffed by five mining engineers, mechanical and electrical engineers, two industrial chemists, a drilling superintendent and eleven drilling crew. Mr E.C. Leyland, Senior Mining Engineer, Burnie, retired during the year and Mr T.E. Evans was appointed to the position.

## MINES INSPECTION BRANCH GENERAL

The Inspection Branch is charged with administration of the Mines Inspection Act 1968 and attendant regulations. Assistance is supplied to administer the Dangerous Goods Act, the Mining Act, and the Petroleum (Submerged Lands) Act. Some officers of the Branch are appointed authorised officers under the Environment Protection Act and the Industrial Safety Health and Welfare Act to assist the Departments of the Environment and Labour and Industry respectively in administering those Acts as they apply to mines, works and underground operations of the Hydro-Electric Commission.

By regulation, and routine and special inspections, the Branch ensures that safe and healthy working practices are established and maintained in mines, quarries and works. Plans and proposals for operation of mines and equipment are examined and approvals issued as appropriate. During the year a total of 602 field day inspections were carried out and 40 certificates of competency were issued.

The Branch was represented on the Silicon Development Advisory Committee which, through the Silicon Development Act, supervised the establishment of a silicon smelter at Electrona; the Tasmanian Dams Safety Committee; the Interdepartmental Occupational Health committee; and the Chamber of Mines Occupational Health Committee.

The Mines Inspection Amendment Act 1986 was passed in November 1986. This Act, together with the Mines Inspection (Employees' Safety Representatives) Regulations, 1987, allows for the election of safety representatives on mines or works, or the establishment of approved safety committees. Elected representatives and committee members are required to attend formal training courses in health and safety matters. By the end of the year no representatives had been elected, but all major mines and works had established some form of safety committee.

The Silicon Development Act 1986 was the first development act of its kind in Tasmania for a mineral development, and ensured the co-ordination of all approvals for Pioneer Silicon Industries' Electrona smelter by a central body. Considerable additional work was required by the Branch to oversee construction, but the exercise was seen as successful and enabled the project to be almost completed by the end of the year.

The Chief Inspector of Mines and the Director of Environmental Control conducted a joint inspection of the Mt Lyell mine to observe rehabilitation works carried out in accordance with the Mount Lyell Mining and Railway Company (Continuation of Operations) Act, 1985. Considerable cleanup and demolition had been carried out to minimise the rehabilitation required when the mine does eventually close. It was announced during the year that the life of the mine would be extended beyond the original planned closure date of 1989 because of the improved economic situation.

Officers attended and lectured at Trade Union Training Authority and Tasmanian Trades and Labour Council safety courses for union members on legislation and occupational health and safety matters. Various mine safety committee meetings were attended and addressed.

Occupational health and safety surveys were commenced at all major mines and works, and most major employers have established adequate occupational health and safety programmes. These programmes include biological and environmental monitoring. Increased sampling of atmospheres for dust, gases and general ventilation was carried out by the Branch using recently purchased equipment. Delays were experienced in obtaining quantitative and qualitative results from dust sampling because of slowness in the upgrading of the Geological Survey's X-ray diffractometer. Following attendance at a workshop on environmental monitoring in Perth, an officer has established a computer data bank for storage and retrieval of sampling results which will be operational in 1987–88.

Work continued on the revision of the Mines Inspection Regulations, but the required consultation with all parties involved ensures that this is a slow process. Greater involvement in town planning matters took place and the Branch held joint meetings with Beaconsfield and Esperance Municipal Councils, the Department of the Environment, and developers to assist in obtaining approvals for mining ventures. The Chief Inspector gave evidence before the Planning Appeals Board hearing into the refusal of the Devonport Council to grant a planning permit for operation of a mining lease. Involvement in planning matters will increase as planning schemes are extended throughout the State.

An ex-employee of Renison Ltd was successfully prosecuted following an incident where an explosion took place whilst a petrol tank was being heated. A case against a second employee, following a separate incident, was dismissed by the courts.

Officers of the Branch attended various workshops, meetings and seminars on mining and environmental practices, including those conducted by the Australian Minerals Industry Council, the Standards Association, Australian Counter Disaster College, and the Western Australian Department of Mines. Several officers took part in short management programmes conducted by the Department of Public Administration.

#### SAFETY AND ACCIDENT STATISTICS

The 1986-87 accident statistics for the mining industry are presented in Table 3.

The number of lost-time accidents decreased by 100, from 1622 in 1985–86 to 1522 in 1986–87, directly reflecting the decrease which occurred in the number of persons employed in the industry. The number of days lost due to accident also decreased, but this time a little more than proportionately from 23 056 in 1985–86 to 19 781 in 1986–87.

No feeling of achievement by the Inspectorate is derived from these improved figures. It is, however, hoped that they signal the beginning of a trend which will continue for a long time into the future.

Accidents of one to three working days lost accounted for 39% of total accidents, those of four to ten days a further 39%, and those over ten days 22%.

Gratifyingly, no fatal accidents occurred. The declining trend in fatalities over the past sixteen years is shown in the graph. The following provides a brief description of the more serious accidents which occurred.

Falling objects—a rigger suffered severe shoulder injury when struck by a falling pipe during a rigging operation; an LHD operator was struck on the arm and leg by rocks falling from his machine's bucket whilst loading a truck; a miner suffered head and face lacerations when struck by a rock falling from the face which he was wiring for blasting; a development miner suffered multiple fractures when he was struck by a rock falling from the face while he was changing a drilling bit.

Falls—a contractor's apprentice tradesman suffered multiple fractures when he fell twelve metres from a building roof; a quarry manager fractured his shin when he fell down some steps; a rise miner fractured an ankle when he fell from an Alimak platform whilst it was travelling down the rise.

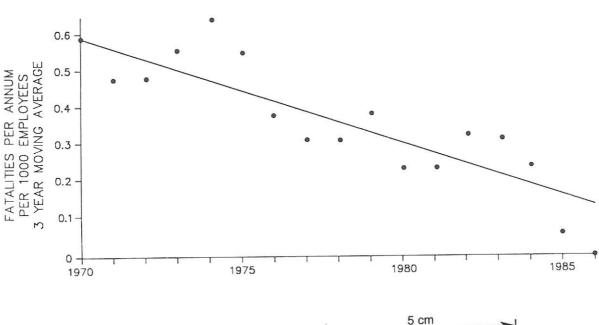
Collisions—a shifthand suffered multiple fractures when he was thrown from the forklift truck he was operating following its collision with a pillar; a shift boss received a head fracture when he was knocked down by a rail truck derailing.

Machinery—a labourer lost a finger when it became lodged between loader bucket and linkage arm; a machine operator lost a big toe in a brick-setting head; an operator suffered a fractured wrist when he became lodged in a conveyor idler; a downhole drilling rig operator was severely burned when he became trapped by his rig against the sidewall of the underground working place.

Electrical—a furnace operator suffered an electric shock.

#### FATAL ACCIDENTS 1970 TO 1986

TOTAL = 49 AVERAGE EMPLOYMENT = 9 234





A mine rescue team at the Cornwall Coal Company engaged in a training exercise at the Duncan Colliery. (Photo—Examiner)

#### DRILLING SECTION

Drilling was undertaken by five crews, operating throughout the State. Performance was maintained at the satisfactory level of 1985–86.

More stratigraphic holes were drilled on the West Coast as part of the Mt Read Volcanics programme. Seven holes were drilled near Waratah, testing formations beneath the basalt cover. Four holes were drilled at Mt Charter, near Que River, investigating the Hellyer ore horizon and the Mt Charter fault.

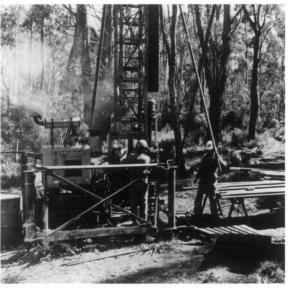
Other stratigraphic holes were drilled at Windermere and Lenah Valley in connection with landslip investigations.

As in 1985–86 a considerable amount of site-investigation drilling was undertaken. Work for the Materials Research Division of the Department of Main Roads continued, chiefly in connection with the Bass Highway and Hobart Southern Outlet projects, but also at Akaroa (near St Helens) and at Corinna. Significant metreage was also achieved near Crotty, in connection with King River Power Development bridgeworks, and near Geeveston, in connection with proposed wharf construction by Associated Forest Holdings. In addition, drilling was conducted in conjunction with the Hobart Marine Board, who provided the barge 'Kulanda' for the purpose.

Work continued on the Sheffield groundwater programme. Twenty-two boreholes were drilled for this project. Several water boreholes were also put down in the southeastern part of the State. Drilling programmes for the year are summarised as:

	metres
Site investigation	1 953
Sub-basalt programme	2 685
Stratigraphic drilling	1 540
Water boring	2 607
Mineral investigation	151
Total	8 936

A full drilling summary is given in Table 20.



Diamond drilling for the Mt Read Volcanics Project near Guildford, western Tasmania.

#### MINING INDUSTRY-MAJOR OPERATIONS

#### MINES

### Aberfoyle Resources Limited, Hellyer Division

Underground development continued at the Hellyer mine. Ore amounting to 116 551 tonnes was produced and trucked away. All of this ore came from the development undertaken, which totalled 946 metres.

The ore produced from Hellyer is first trucked by road to Que River, where it is placed on stockpile. A second road trucking then takes place between Que River and Luina, where the ore undergoes treatment in the Cleveland mill. No mixing with Que River ore occurs.

At the Cleveland mill, treatment capacity was increased over the period from January to March at a cost of \$4 610 000. Milling at the new rate of 250 000 tonnes of ore per annum started immediately upon completion of the upgrading and at the end of June 69 019 tonnes of ore had been treated for the production of 19 880 tonnes of bulk lead-zinc concentrate. Over the six months immediately prior to the commencement of the upgrading, the mill treated 16 767 tonnes of Hellyer ore on a trial basis to produce 3100 tonnes of concentrates of various types.

At year end, a feasibility study was being conducted in connection with the construction and operation of a one million tonnes per annum concentrator at Hellyer.

#### Cornwall Coal Company N.L., Fingal

Production at the Duncan Colliery was 371 000 tonnes, an increase of 83 500 tonnes over the previous year. Output per man shift increased to 18.2 tonnes from 15 tonnes. The improvement was largely due to organisational changes and pillar extraction towards the end of the year. The northern area of the mine was re-entered after extensive floor brushing and pillar extraction continued in good coal. In the south, a new twin heading connection improved efficiency of transport of men, materials and coal. The southern panel was developed next to dolerite intrusions in difficult mining conditions, and pillars were successfully extracted in good quality coal. This extraction was monitored for strata pressures and movement by the Australian Research Laboratories Industry assisted by the Department of Mines. The south-eastern panel was stopped in poor quality coal and very difficult mining conditions. At the end of the year manning was reduced from a peak of 86 to 65 by transfer of men to other areas of the company.



Concentrate storage and loading shed under construction at Hatfield Siding as part of the expansion of production at the Hellyer mine.

Blackwood Colliery's record production of 215 000 tonnes was achieved with a slightly reduced output per manshift of 28.7 tonnes. Development of short panels east and west of the main headings continued at the northern extremity of the colliery, and pillars were subsequently extracted. A small open cut was established to remove coal from the Blue Upper and Blue Lower seams and to ultimately provide a new entry to the west of the present portals. Forty-two men were employed at the end of the year and three-shift operations started.

Coal washed was 600 000 tonnes, including some 33 000 tonnes purchased from Merrywood. Cleaning operations were further improved with a desliming circuit added to the spiral concentrator circuit.

Capital expenditure of \$1 000 000 included new road works, conveyor extensions, and an excavator. The new rolled-compacted concrete paving of the Duncan haul road and washery surrounds was a first for Tasmania and greatly improved haulage and cleanliness.

### Electrolytic Zinc Company, West Coast Mines

Mill throughput, at 819 901 tonnes of ore, was nearly 90 000 tonnes less than for 1985–86. Of this tonnage 304 932 tonnes were purchased from the Que River mine.

Concentrate production was:

Mining operations at the Hercules mine ceased early in the year. Environmental rehabilitation of the mine area is currently in hand.

Diamond drilling of the South Hercules resource was complete at year end. Metallurgical testing of core samples has commenced.

	Concentrate	Zinc	Lead	Copper	Silver	Gold
-	tonnes	tonnes	tonnes	tonnes	kg	kg
Copper concentrate	29 119	3 669	9 435	3 261	66 362	kg 1 331
Lead concentrate	33 368	4 204	20 655	133	20 588	90
Zinc concentrate	155 360	81 409	5 593	435	****	
Total	217 847	89 282	35 683	3 829	86 950	1 421

#### Golconda Management Limited, Beaconsfield

Tailings from the old Tasmania mine continued to be dredged from the River Tamar for cyanide treatment to recover the gold content. A new state-of-the-art cyanide recovery plant was constructed and commissioned to improve gold recovery and regenerate cyanide from the treatment water. Problems were experienced during times of heavy rainfall with the stability of the tailings storage dam, and emergency action was required to avoid major pollution of the River Tamar.

Tailings treated totalled 266 000 tonnes and 272.5 kg of gold were recovered. Capital expenditure amounted to \$391 300, chiefly on account of the cyanide recovery plant.

#### King Island Scheelite, Grassy

As a result of the continuance of depressed markets and a low scheelite price, King Island Scheelite again lowered its production target.

By keeping the mining concentrated in the higher grade portions of the orebody, the target was met by producing far less ore than was produced in 1985–86. Concentrate production for the year amounted to 1205 tonnes, 23 tonnes more than the target, and this was achieved by mining and milling 85 535 tonnes of ore at a grade of 1.30% WO<sub>3</sub>.

Due to a swing in the market, the treatment process, which was modified in 1985–86 to increase the production of artificial scheelite, was modified back to its earlier form before the close of 1986–87. At year end, the treatment plant was thus producing more gravity scheelite than artificial scheelite.

### The Mount Lyell Mining and Railway Co. Ltd, Queenstown

The wheel of fortune again turned for Mt Lyell. On 16 March 1987 the company announced its intention to extend mining operations into the 50 Series of stopes and probably into the 60 Series as well. Before

that date, the mine operated under the premise that it would close in 1989 following the exhaustion of the 40 Series.

Up to the time of this announcement, no major development was carried out. In April, development for access to the 50 Series began in earnest.

Production and treatment of ore, at 1.58 million tonnes, fell well below the achievement of 1985–86. Extraction limitations brought about by ground deterioration following the 42/43 pillar blast were the principal cause of this. Industrial action also resulted in the loss of 12.5 shifts of production.

On 27 February 1987 production from Cape Horn terminated and the mine closed.

Capital expenditure for the year was:

	\$
Mining equipment	290 000
Vehicle replacements	
Machine shop equipment	183 000
Mine development	177 000
Miscellaneous items	64 000
Total	1 090 000

#### Que River Mining Pty Ltd, Que River

In line with the latest target rate, 290 000 tonnes of ore were hoisted from the mine and 304 760 tonnes of ore were road-hauled to the Rosebery concentrator of the Electrolytic Zinc Company. The grade of the ore hauled was given as being 0.4% Cu, 7.7% Pb, 13.5% Zn, 224 g/t Ag and 4.1 g/t Au.

Stoping operations continued to be undertaken successfully. Underground development also continued and a total of 996 metres was achieved. A new P North ventilation system was commissioned and this has given better control over air flow in northern parts of the mine.

Industrial disputation caused the loss of fourteen production days.

Capital expenditure over the year amounted to \$436 362. Surface building extensions accounted for the bulk of this.

#### Renison Limited, Renison Bell

Many new operating records were established. For the first time since treatment plant expansion was undertaken in 1980–81, the tonnage of ore treated, at 854 435 tonnes, exceeded nominal plant capacity. The quantity of tin contained in the concentrate produced, at 6832 tonnes, was 1256 tonnes more than the previous best and the treatment rate was another all-time best. Additionally, a new production record was set by the mine, which supplied 844 711 tonnes of ore.

Time lost due to industrial disputes was lower than in recent years but was still significant at 5%. This was predominantly due to unrest in the mine.

The concentrator problems relating to hydrogen sulphide emission were largely overcome. Evacuation of the plant however did occur. Three of these were genuine events, but five were false alarms caused by accidental activation of the monitoring systems. Several modifications were made aimed at improving industrial hygiene, including the upgrading and enclosing of the reagent mixing area and the construction of a new facility for handling and mixing sodium silico-fluoride.

Mine development included installation of new surface fans to ventilate the Dunns/ Pieman and Ring areas of the mine. Considerable progress was made with the excavation of the new North Bassett pump station.

Capital expenditure for the year was:

			\$
Community projects		330	741
Lease buildings and services		492	467
Underground equipment		569	625
Mill plant and equipment		176	165
Instruments and tools		141	632
Office equipment		69	150
Motor vehicles		123	720
Mobile equipment	1	072	717
Mine development	1	465	667
Shaft project	24.0		284
Total	4	467	168

#### Savage River Mines, Savage River

Crude iron ore production was 15% lower than for 1985–86 at 4.3 million tonnes. Waste rock movement was at a high level to make ore available to meet future requirements and, as a result, a slight increase in the tonnage of all material moved was realised.

The crude ore shortfall was chiefly caused by a major slide on the east wall of the Central Deposit open cut, which first occurred in February and then again in May. Industrial disputation also gave rise to lost production time, which amounted to forty-five days at the mine.

Concentrate produced amounted to 1 866 059 tonnes, which represents only 74% of the nominal plant capacity.

#### Tasmania Mines, N.L. Kara

Construction of the new concentrator was completed early in the year and the plant was immediately put into service. Treatment operations were conducted virtually trouble free. Because of the depressed scheelite market, operating time was restricted to twelve hours per day on five days per week.

Towards the end of the year, operations in the main Kara open cut were terminated and mining was commenced in the southern extension. With the closure of the Kara open cut, the contractor who had been undertaking the mining left. Work at the southern extension is being carried out by Tasmania Mines personnel and equipment.

#### WORKS

#### Comalco, Bell Bay

Production was 122 207 tonnes of aluminium blocks, ingots, billets and granules from 234 637 tonnes of imported alumina. Main areas of activity at the works are manufacturing of carbon products, smelting of alumina, and metal alloying and casting. The carbon products section manufactures carbon anodes for the smelting pots using imported petroleum coke and pitch. Alumina, imported from Gladstone bauxite refinery, is melted in the pot lines by the Hall-Herault process to produce aluminium, which is then alloyed with other metals and cast into various sizes and shapes according to customers' requirements.

The smelter operated at full capacity throughout the year with a workforce of 1134.

Capital expenditure of \$5.8 million allowed for further potline automation, an induction furnace, a degassing system, and a main frame computer.

#### Electrolytic Zinc Company, Risdon

Principal production for the year was:

	tonnes
Zinc	190 042
Cadmium	385
Sulphuric acid	230 468
Superphosphate	99 007

Zinc production was almost 5000 tonnes less than in 1985–86, mainly due to production time lost early in the year through industrial actions.

Construction and installation work associated with the modernisation programme, which began in 1985–86, continued to make good progress. At year end, the second and third mobile zinc stripping machines had been commissioned in the cell room, construction of the strong acid leach plant was well advanced, and the site for the solution preparation plant had been prepared for construction work. Instrumentation of the residue treatment plant was well underway.

In connection with the same programme, designs have been prepared for a gypsum removal plant and a lead residue filtration plant. Work was carried out on the design of a jarosite filtration plant and a neutral leach plant.

#### Goliath Portland Cement Co. Ltd, Railton

Cement production was 405 000 tonnes for the Tasmanian, Australian and overseas markets. Raw materials used included 575 000 tonnes of limestone and 43 000 tonnes of clay from the company's quarry adjacent to the works, and coal from Cornwall Coal at Fingal.

Major items of capital expenditure were purchase of new quarry equipment, a Pyrojet burner for the kiln, new fans for the preheater and an 80 000 tonne clinker handling facility. The clinker hall and blending plant were completed by the end of the year and were being commissioned.

The Asbestos Cement Factory was closed and products containing asbestos are no longer manufactured.

#### Pioneer Silicon Industries Pty Ltd, Electrona

Establishment of the silica smelter on the old Electrona Carbide Industries site, which began in August 1986, progressed swiftly and at year end construction work was almost complete. During the year, \$22.6 million was spent on the project.

The furnace associated with the plant is of 14 MW capacity. Designed output is about 9400 tonnes of crude silicon per annum.

### Tasmanian Electro-Metallurgical Co. Pty Ltd, Bell Bay

Ferro-alloys produced in the four furnaces at Bell Bay included 48 000 tonnes ferro-manganese, 20 000 tonnes of silico-manganese, and 19 000 tonnes of ferro-silicon. In addition over 200 000 tonnes of sinter were produced. Imported raw materials included manganese ore from Groote Eylandt; iron ore, quartz, dolomite and coke from Whyalla; and coal and coke from Newcastle. Local raw materials included woodchips, limestone, dolomite, quartzite and iron ore.

The expansion and upgrading programme begun in 1985–86 was substantially completed at a capital cost of \$42 million. This work included upgrading of three furnaces, and installation of two ferro-manganese continuous casting machines, an energy recovery unit, and a new wharf crane.

#### Tioxide Australia Pty Ltd, Heybridge

Production and sales levels were in line with the company's targets.

Activity costing \$9.7 million took place on capital works. Plant expansion is being undertaken, as is modernisation and automation in various parts of the plant. General cost-saving projects were also embarked upon.

Part of the raw materials storage and handling area at the Pioneer Silicon Industries plant at Electrona.



#### DANGEROUS GOODS DIVISION

#### **DANGEROUS GOODS ACT 1976**

There were no amendments or additions to the Dangerous Goods Act 1976 or to the Dangerous Goods Regulations. The Revised Australian Code for the Transport of Dangerous Goods by Road and Rail No. P15, was published in April 1987.

All imports of class 1, 2.1, 3.1 and 3.2 dangerous goods were supervised by inspectors of the Division.

The number of field inspections covering the handling, storage, import, use and sale of dangerous goods was 2856 compared with 3189 for the previous year.

Dangerous goods Class 1 explosives were destroyed on fifteen occasions during the year.

The up-grading of the Devonport liquefied petroleum gas terminal was completed and commissioned during the year. The construction of the new wharf at the Selfs Point oil terminal was completed and is expected to be operational in July for petroleum products.

Registration of drivers to convey Class 2.1 and Class 3 dangerous goods was completed during the year, and the registration of drivers to convey other classes of dangerous goods is well advanced.

Officers of the Division assisted the Departments of the Environment, Labour and Industry, and Public Health in cleaning up an industrial premises at Rocherlea.

Assistance was given to the Department of Tourism by inspecting LPG systems in caravans at various locations in the State.

Assistance was given to the Department of Education by inspecting school laboratories in the north-west and reporting on the facilities for storing hazardous chemicals.

The Division assisted officers of the Hydro-Electric Commission and others in the collection and export of PCB for disposal overseas.

The Engineering Geology Division and the Dangerous Goods Division carried out a site investigation for the establishment of a Hazardous Substances Disposal Site.

Because of staff shortages, the Division was unable to give lectures to primary school students on the safe use of fireworks, as had been done in previous years.

Members of the Division served on the following committees and groups during the year:

- Chief Inspectors of Explosives Conference
- Australian Transport Advisory Council's Competent Authorities Committee
- Standards Association of Australia ME/17 Flammable and Combustible Liquids

- Standards Association of Australia ME/15 Liquefied Petroleum Gases
- Hazardous Material Plan Committee
- Southern Regional Disaster Planning Group

Eighteen incidents involving dangerous goods were investigated and are listed according to their class.

#### Class 1 Explosives

A fire/explosion occurred in a workshop attached to a private dwelling. A person in the workshop received extensive burns when a spark from an arc welder ignited two bags of black powder, about two kilograms, kept in the drawer of an old dresser being used as a general storage cabinet. When questioned the injured person said he was well aware of the requirements for the storage of explosives and had been intending to put the explosives in a proper locked wooden box for some time.

Walkers reported that they had found abandoned explosives in an area in which timber felling operations were taking place. They reported where the explosives were lying. Later an angler reported the presence of explosives in a stream not too far away from the first report of abandoned explosives. A total of 155 sticks of AN60 gelignite were recovered from the stream. The timber company inspected the area of the first report and could find no explosives and claim they did not leave any lying around. Nobody has reported the loss of 155 sticks of AN60 found at the scene of the second report. The inspector stated that, in his opinion, he considered that these explosives had only been recently abandoned. The coincidence of the two reports raises the question whether they are inter-related and, if so, there are no satisfactory answers for the incidents.

### Class 2.1 Liquified Petroleum Gas (LPG)

A person decanting LPG from a 190 kg cylinder into two 18 kg fork lift cylinders allowed the bleeder valves on the 18 kg cylinders to ice up and could not then turn the bleeder valve off with the 'allen key'. This allowed a serious gas leak to take place. The isolation valve on the 190 kg cylinder was checked and found to be in working order. It is important that people operating such systems are trained in correct and safe procedures.

A fire involving a LPG Companion Rounda-Bout Barbecue was caused by a gas leak at the connection between the cylinder and flexible hose. On examination it was found that the neoprene 'O' ring in the connection had deteriorated. This problem is quite common and users should be made aware of this and how to deal with it.

A substantial gas leak occurred at an installation containing two 190 kg LPG cylinders. It appeared that the system had been vandalised. The Department is requiring these installations at unobserved city locations to be protected from the wilful actions of the less responsible members of our community.

A gas leak occurred at an installation containing two 190 kg cylinders. The leak was caused when the pressure relief valve on one of the cylinders opened. The cylinder had been filled that morning by the gas company employees. On examination of the cylinder it was found that the fixed level gauge tube had fallen from the valve to the bottom of the cylinder. The cylinder also had a magnetic contents gauge which only read up to 70%. As a result the employee filled the cylinder until liquid vented, and the cylinder was grossly overfilled. As a safety measure, a magnetic gauge showing a full mark at 85% is to be used in all 190 kg cylinders. This will make the operators aware of a mechanical problem with fixed liquid level gauges.

An explosion and fire partially destroyed a caravan when the occupant left a gas appliance on and then lit a cigarette. The occupant suffered extensive superficial burns which required hospitalisation.

An explosion occurred in an LP gas-fired pottery kiln two hours after initial firing to 1250° C had been completed. The kiln was a total wreck. On investigation no particular cause for the explosion could be highlighted. It is suspected that there was an entrapment of water that created enough steam under pressure to have created the explosion.

A one-tonne truck converted to use LPG as a fuel developed a leak in the fill valve when the system was being dismantled by untrained personnel.

### Class 2.2 Non-flammable compressed gases

During precommissioning tests of a new medical oxygen gas alarm system in a hospital, a pressure switch exploded violently. It was suspected that there was an oil contamination of the bourdon tube assembly with grease on external parts when the system was installed. This highlighted the fact that some contractors are not always fully conversant with the nature of the dangerous goods to be conveyed by systems which they are installing.

At a fire in a home workshop a 'D' size aluminium cylinder containing oxygen exploded before the burst disc safety device in the cylinder valve could operate. One person, standing some 50 metres from the incident, was injured by flying fragments passing through the workshop's door. The cylinder was part of an oxy-acetylene set, and it is thought that the cylinder wall had been weakened due to exposure to a localised elevated temperature from the venting of the acetylene cylinder fusible

safety device. Another feature of this accident was the haphazard storage of dangerous goods within the workshop.

#### Class 2.3 Poison Gas

A new chlorinator installed at a swimming pool leaked chlorine fumes due to use of a brass fitting as a temporary connection. The Fire Brigade closed the system down and one person was treated for exposure. The incident again illustrated the lack of instruction, at the time, by the suppliers or a lack of knowledge of the dangerous goods being conveyed.

#### Class 3.1 Flammable Liquid

At a panel-beating premises a person was welding a side panel on a motor vehicle just below the petrol tank which had the filling cap missing and a rag stuffed in the fill pipe. The rag ignited causing a fire which severely damaged the vehicle.

During an attempt to steal petrol at night a person lit a match to see what was happening whilst the petrol was being poured into a container. The person was engulfed in flame and died soon after, in hospital. His companions escaped serious injury.

Failure of seals on a floating roof tank led to a leakage of petrol onto the roof. The leakage was contained and there was no damage or fire.

An overhead tank containing some 4000 litres of contaminated Class 3.1 fuel blew over during a gale. The fuel leaked into a stormwater drain. The situation had been exacerbated by three days of heavy rain which caused the legs of the tank to sink unevenly into the ground. There was no injury or fire caused by the incident.

### Class 4.2 Substances liable to spontaneous combustion

A fire occurred at a clayworks using sodium dithionite in cleaning hoppers. Fire was extinguished by the local fire brigade after a request for information.

#### Class 8 Corrosives

A fibreglass tank containing 2500 litres of hydrochloric acid fractured during loading operations at a local transport depot. Although some hydrochloric acid escaped into a local drain it was confined in the drain and treated with soda ash. The spilled contents within the depot were also treated with soda ash. The practice of using fork lifts to load vehicles was questioned and alterations made to operating procedures.

#### GEOLOGICAL SURVEY DIVISION

The systematic work of the Division continued through the year. Major endeavours have included:

- Continuation of the Mt Read Volcanics Project
- The initiation of the programme of geodata mapping in the Hobart metropolitan area
- Drafting of the Regulations for the Groundwater Act 1985
- Organisation of the internationallyattended ANZSLIDE conference
- Foundation studies at the Sheraton Hobart Hotel, Comalco Bell Bay, Electrolytic Zinc Risdon, the Tasmanian State Institute of Technology campus at Newnham, Selfs Point, Tioxide Burnie, Cascade Dam, North Hobart Oval, and the Western Junction woolstore.

Officers of the Division have enthusiastically taken up the additional challenges presented.

Dissemination of information to the public and Government has continued through publications and lectures, the Burnie Symposium (jointly sponsored by the Department, the Geological Society, and the University), as well as servicing routine enquiries. Work has continued on contributions to the Bicentennial Volume on the 'Geology and Ore Deposits of Tasmania' and other Bicentennial projects.

During the year, Rod Hargreaves, Deputy Director of Mines, also took on the duties of Chief Geologist.

#### REGIONAL MAPPING BRANCH

At the start of the financial year the Branch consisted of eleven geologists but, at present, consists of nine. The Branch suffered a serious loss with the death of A. B. Gulline, Senior Geologist, in March 1987, and N. J. Turner was transferred to the Economic Geology Branch. All the projects in which the Branch is engaged, apart from systematic palaeontology, will result in the publication of 1:50 000 map sheets, and supporting laboratory studies will be published in Explanatory Notes.

Project Ben Lomond—mapping has been completed and results are to be published as a 1:50 000 map sheet, which will show such features as the areas of tin granite bodies, the structure of the country rocks, and the location of sequences which elsewhere contain coal measures.

Project Montgomery—mapping has been completed and the 1:50 000 map sheet to be published will include information on the distribution of the Mt Read volcanic

correlates and associated rocks faulted against earlier basaltic volcanic rocks containing disseminated native copper, and a new unit of intermediate volcanic rocks with disseminated pyrite and pyrrhotite.

Project Macquarie—eighty per cent of the region has now been mapped and results are consistent with the earlier discovered relationship of Precambrian sequences thrust over the younger Mt Read volcanic correlates and associated rocks. Some five deformational events appear to have affected the Precambrian rocks, with the youngest event being of the same age as that which folded the Ordovician rocks to the south.

Project Corinna—about 65% of the region has been mapped and much of the western boundary of the Arthur Lineament rocks has been delineated. Within these rocks are the massive sulphide-oxide deposits of Savage River, and the adjacent basic volcanic rocks and dolomite units.

Project Woolnorth—some 55% of the region has now been mapped and the Precambrian rocks have been divided into two mappable shallow-marine sedimentary units. A marker-conglomerate has been discovered at the base of the Smithton Trough. This trough contains, amongst other formations, Cambrian volcanic and sedimentary rocks favoured for mineral exploration.

Projects Snow Hill, Trowutta, Dover and Alberton—regional mapping continued in these regions.

Explanatory Notes have been compiled for the St Valentines and Interlaken map sheets, and are nearing completion for Pedder and Lake River.

The palaeontologist is working on the systematic and taxonomic description of Late Palaeozoic brachiopods, which are largely unrepresented elsewhere in Eastern Australia. The oldest faunas include one new genus and five new species that will be of considerable value in delimiting rock sequences of economic interest. Similarly, the age assessments of Triassic and Tertiary palynofloras have added greatly to knowledge of the distribution of economically notable rock units.

During the year areas of responsibility were changed as follows:

- Dr M. P. McClenaghan, Acting Senior Geologist—granitoids, felsic igneous rocks and folded terrains
- Dr A. V. Brown, Senior Geologist ultramafic/mafic igneous rocks and folded terrains.
- M. J. Clarke, Palaeontologist/Senior Geologist—Parmeener Super-Group and younger deposits.

# ECONOMIC GEOLOGY BRANCH STAFFING

The Branch strength has decreased from eleven to ten and comprises a supervising geologist, a senior geologist and an acting senior geologist, a geochemist, four geologists and two technicians. The staff losses were due to the transfer of P. W. Baillie to the Petroleum Section, the resignation of Dr P. L. F. Collins, and the retirement of V. M. Threader. The staff gains were N. J. Turner, transferred from the Regional Geology Branch, and P. K. Wrigley, appointed as Administrative Geologist. The staff movements have resulted in one position being vacant.

#### MT READ VOLCANICS PROJECT

The major emphasis of the Branch continued to be on this specially funded project. The temporary staff involved have reduced to seven in number comprising one geologist, four field assistants, one clerk and one analyst.

A synopsis of the project components follows:

#### Geological mapping

Three 1:25 000 scale geological maps have been produced in colour for the following areas—Mt Charter-Hellyer, Rosebery-Mt Block and Henty River-Mt Read. Geological notes are being compiled and petrographic and geochemical studies are being carried out.

During last field season, three teams were operating on the Mt Read Volcanics. Map compilation is now completed for two 1:25 000 scale colour maps of the Mt Murchison–Mt Selina and Tyndall Range–Lake Rolleston areas.

In support of the mapping programme, four diamond-drill holes, aggregating 935 m, were completed in the Mt Charter area to solve stratigraphic, structural and mineralisation questions.

A paper titled 'Stratigraphic and structural relationships and evidence for Cambrian deformation at the western margin of the Mt Read Volcanics, Tasmania' was published.

An unpublished report on the geology of the Tullah-Mt Block area was in preparation.

#### Isotope and Alteration Studies

This project involves geochemical, petrological, mineralogical and isotopic investigations of alteration zones associated with ore deposits. Results are available from Hellyer, Hercules, Boco and Mt Cattley, and an investigation of the Rosebery area is planned. The study includes the running of an oxygen isotope line which has been recently redesigned to meet the requirements of the project.

As part of this project, 1:50 000 scale mineral maps of the Mt Read Volcanics have been produced for the Tullah, Rosebery,

Queenstown and Andrew areas. Two new maps (Ulverstone and Cethana) are currently being compiled.

#### Geochemistry

The study is aimed at designing new geochemical techniques for locating mineralisation under the weathering profiles developed in Tasmania. Field activities have included a helicopter-supported water sampling programme on the main drainage systems from Port Davey to Cape Sorell, and an 'A' horizon soil sampling programme over a gravity high adjacent to the Hellyer ore deposit.

Laboratory investigations have evaluated techniques to isolate and measure the metallic contents of the organic molecules in water samples. A new furnace and computer-controlled electronics have been installed which will give increased capability and sensitivity to the AAS machine. A spectro-photometric method is currently being employed for determining the carbon content of water.

#### Remote sensing

The objective of this study is to assess the influence of structural control on the location of mineral deposits. An interpretation of structures derived from satellite (LAND-SAT) imagery has been completed for western Tasmania. Following from the result of this work, an area near Smithton has been selected for detailed exploration.

The Mt Read Volcanics (MRV) project continued to fund the Australian Mineral Industry Reasearch Association (AMIRA) project being carried out in the Geology Department, University of Tasmania on 'Controls on gold and silver grades in volcanogenic sulphide deposits'.

#### Mineral Exploration Data Base

The objective is to make available to the mining and exploration industry an electronically-accessible data base of all mineral exploration undertaken in Tasmania. Exploration report indexing is 80% complete, data input has commenced, and microfilming is 50% complete.

#### Sub-basalt Drilling

A stratigraphic drilling programme was initiated by the Branch to drill through the large expanse of Tertiary basalt in northwest Tasmania and to provide industry with an evaluation of the prospectivity of the Palaeozoic formations including the Mt Read Volcanics beneath the basalt. Seven holes have been drilled to date, amounting to 2541 m of drilling.

#### **COMMODITY STUDIES**

In addition to the Mt Read Volcanics Project, the normal work of the Branch continued with studies of the more important commodities:

#### Silver-lead-zinc

Most of the resources normally available to this project have been channelled into the Mt Read Volcanics Project. Petrographic and mineragraphic work has been undertaken on the mineralised intersection in the Grieve Siding diamond-drill hole. Interesting occurrences of electrum have been noted in the mineralisation.

#### Gold

The mineragraphic investigation of gold and associated minerals has continued in the Mt Lyell mineralisation, the Henty and Rosebery Faults, the King River Delta, and in the Lisle goldfield.

The plotting of gold deposits around Tasmania, both lode and alluvial, is well advanced and some 320 deposits have been entered into the mineral deposit data base (MIRLOCH).

Reports are being produced on the New Henbury and Dan Rivulet projects, where drilling was conducted for alluvial gold and tin.

#### Tin-tungsten

One drill hole in the Luina Exempt Area near Waratah has intersected a 25 metre thick zone of altered and mineralised volcanic rocks with good grades (although narrow widths) of galena and sphalerite which have interesting gold and silver assays. Tin and tungsten values were disappointing. The mineralisation, which is presently assumed to be a ?Devonian vein style, will be investigated further.

An excursion to tin and tungsten areas around the State was arranged for Chinese geologists Song Xuexin and Jian Mei.

Because of lack of staff, this project will be lowered in priority.

#### **Industrial Minerals**

The construction materials register, a data bank containing comprehensive information on construction materials along with the locations of the entries on a standard set of map sheets (1:100 000 scale) for the State, was completed. This was achieved by using temporary clerical help made available to the Branch by other areas of the Department.

A limited programme of shallow drilling, involving thirteen holes for a total of 95 m drilled, was carried out in the Hastings Exempt Area to determine the potential for silica.

Following the retirement of V. M. Threader, two officers will now share responsibility for industrial minerals.

#### Coal

The Department continued to contribute geological work and supervision to the roof stability study being conducted by Australian Coal Industry Research Laboratories at Duncan and Blackwood Collieries.

The coal resources bulletin has been submitted for publication when drafting is complete. A symposium was attended on 'Advances in the Geology of the Sydney Basin' in Newcastle.

#### **PETROLOGY**

The petrologist has carried out routine work and mineral identifications for both external clients and Departmental members. The main investigations have included Temco ferro-manganese slags, Arthur River magnesite, and King River Delta mineralogy.

Asbestos determinations (25) continued to be in demand, and 265 X-ray analyses were carried out by the technical officer, who also determined 137 isotope analyses as well as performing laboratory studies for the Engineering Geology Branch.

The petrologist continued to run the core library, develop the rock cataloguing system (TASROCK), and provide maintenance for the lapidary equipment. The X-ray diffraction (XRD) system has been upgraded to provide quantitative determinations on geological and metallurgical materials as well as industrial dusts. Technical training on computing has been provided by the petrologist to other officers. The economic geology notes were written for the Huntley 1:50 000 map sheet Explanatory Report.

#### GENERAL

Regulation of the mineral exploration industry continued to occupy Branch members in assessing reports (104), Exploration Licence renewals and exploration programmes under the Exempt Tender Area (ETA) system, as well as providing information to clients in industry, Government and the general public. An increase in tenders is expected as the traditional exploration licences terminate and this, taken together with a record number of new applications, will require an increased proportion of time from Branch members. The appointment of an Administrative Geologist to the Branch has been of vital importance, as the co-ordination of the mineral regulation procedures has been made more efficient.

Most of the Branch members are engaged in writing contributions for the Bicentennial Volume on the geology and economic deposits of Tasmania. All of the Mt Read Volcanics project workers delivered papers at the Burnie Symposium in November, to an audience composed largely of industry representatives, and a field excursion was run to the Hellyer–Pinnacles area. A paper was written on the Department's role in exploring the Savage River iron deposits.

Core library storage capacity continues to be a problem, especially with the predicted turnover of exploration licence tenure. The Government is considering several proposals prepared by the Department to provide suitable core storage facilities.

#### **ENGINEERING GEOLOGY**

The Branch consists of a supervising geologist, two senior geologists, three geologists, and a surveyor. Andrew Telfer, a geologist appointed under the National Soil Conservation Program (NSCP) to work on landslides, completed his studies and left in January to a groundwater-modelling post in South Australia. Mrs Veronika Hofto was appointed geologist to the Geodata urban mapping project in March, funded by the southern urban municipalities.

#### GROUNDWATER

Activities in groundwater have included regional surveys at Sheffield and in the Midlands, and monitoring of irrigation areas at Devonport and Barrington. Smaller surveys have been made at many locations including Woolnorth, Tasman, Freycinet, Seven Mile Beach, and the Salvation Army Camp at Carlton.

Regulations have been written for the Groundwater Act 1985, and a paper prepared for a national workshop on groundwater allocation. The Tasmanian section of the National Groundwater Review was completed, and data was added to the data base BORIS. A computer groundwater model GWMOD has been modified and installed.

#### LAND STABILITY

In landslide studies, the NSCP project was completed and the handbook is in preparation. Many inspections and reports were made on sites, and major ground movements were studied at Rokeby and Penna. Searches were continued for solicitors, with over 3000 being made.

The ANZslide Conference has been organised in four States, with the help of coconveners, and the conference takes place in August 1987.

Foundation work has included the International Hotel at Hobart, new construction at Comalco, problems at the Electrolytic Zinc Company's plant at Risdon and the Tasmanian State Institute of Technology at Launceston, and work at Selfs Point, Tioxide, Cascade Dam, North Hobart Oval, and the proposed Western Junction woolstore.

#### **MISCELLANEOUS**

Waste disposal has increased in importance. A hazardous chemical site at Runnymede, sites for oil-spill disposal close to ports, and domestic waste disposal at Tyenna, Browns Mountain and Evandale have been worked on. The Lauderdale tip has been monitored by a number of screened boreholes. A series of workshops was given to municipal officers.

Pipeline surveys for corrosion control and for construction have been carried out on the Derwent and in the Tea Tree-Richmond-Penna area.

Geological information has been provided for a number of planning schemes.

Topographic survey work has been provided for the Queenstown gravity grid, for numerous active landslides, and for Mt Read Volcanics Project boreholes.

Soil erosion has required fieldwork in several areas, including West Hobart, Western Tiers forestry areas, and committee work.

Land information activities are culminating in a pilot project on the Coal River irrigation area to which the Department will make a major contribution, both in data and facilities.

The Geodata Project started in March and is now well underway. Much material is being collated and field data is being collected and analysed.

Several major items of software have been written and/or installed on the Branch Olivetti micro-computer, and the computer is now capable of resistivity, seismic, and stability calculations, as well as data control and word processing. It is over-committed and an additional machine is required.

Hazard studies have included an earthquake swarm at Bream Creek and a flash flood at Sandy Bay.

The field and data aspects of Construction Materials have become part of Engineering Geology and problems vis-a-vis subdivision approvals have not yet been resolved.

Valuation studies have been completed at Cascade Dam and Spreyton, and mineral water and gemstone consultations have also been given, in the latter field to Vietnamese jade workers.

The Branch has entertained and informed both school parties and individual school children with an evident interest in things geological, and occasional teaching programmes at the University and Hobart Technical College have continued.

The Branch has been occupied at well over capacity, and the service function has spilled over and much reduced the basic data acquisition function. Government should be aware that with an overall limitation on expansion in a grewing field, quality and value of service will be sacrificed to short term problem-solving, with no longer term progress in the assessment of the true potential of the State of Tasmania.

# PETROLEUM EXPLORATION AND MARINE GEOLOGY SECTION

#### GENERAL

The Petroleum Division was disbanded following the resignation of the State Petroleum Engineer in December 1986. In its place was created a Section within the Geological Survey Division to look after

Table 2
OIL EXPLORATION PERMITS

Title	Holder	Blocks E.	xpiry Date
T/14P	Amoco Aust. Petroleum Co. and Others	30	24.8.92
T/15P	Weaver Oil and Gas Corp. Aust	136	26.5.92
T/16P	Weaver Oil and Gas Corp. Aust	Expired	1.6.87
T/19P	Bridge Oil Ltd	Expired	27.3.87
T/22P	Amoco Aust. Petroleum Co. and Others	52	3.9.90

matters relating to petroleum exploration, both onshore and offshore, and also the geology of the Tasmanian continental margin.

#### **OFFSHORE**

Petroleum exploration during 1986–87 continued at very low levels, largely due to the collapse of international oil prices early in 1986. In the period of review no wells were drilled and no new seismic surveys were undertaken.

Acreage held under permit declined during the year. The offshore permit T/15P was renewed during the period, and renewals are currently pending for T/14P and T/18P. Former permits T/16P and T/19P were allowed to expire.

Early in 1987 two areas on the west Tasmanian continental shelf were made available for work-programme tendering. Despite the downturn in exploration caused by the 1986 price collapse, interest in the areas was high and one tender was received for each area. These tenders are currently being assessed.

#### **ONSHORE**

Conga Oil Limited increased their exploration activities in south-eastern Tasmania during the year. Exploration is directed to finding hydrocarbons sourced from Ordovician carbonate sequences, and it is anticipated that a drilling programme will commence late in 1987.

#### **GEOPHYSICS**

# MOUNT READ VOLCANICS PROJECT Gravity

The regional coverage of the Mt Read volcanics in the area between Elliott Bay and Tullah is complete. Field work is proceeding in the area north of Waratah. The detailed coverage over Mt Lyell is also complete. A report interpreting the data from Elliott Bay to Tullah is available.

#### Aeromagnetics

Reports are now available for the 1981 West Coast survey, the south-west, north-west, and Devonport areas.

#### **Physical Properties**

Two hundred and eighty seven (287) bulk samples have been collected and had remanence measurements made. About 45 of these have yet to have any physical properties recorded. Core from Electrolytic Zinc, Aberfoyle, Mt Lyell, Renison and

Department of Mines holes has been tested for physical properties. A number of the sample sites have also been tested for natural radioactivity.

#### Signature Studies

The report on the gravity and magnetic signatures of western Tasmanian mineralisation is available. Further detailed gravity at Hellyer showed a small coincident gravity and geochemical anomaly southwest of the main Hellyer orebody. Interpretation and documentation of other studies is continuing.

#### GRAVITY

The onshore component of the Tasmanian gravity data base has been released, accompanied by a report describing the data correction and quality.

#### BOREHOLE LOGGING

A number of boreholes have been logged on request in all areas of the State. To provide faster logging and improved data quality, a combined density/caliper tool and heavy duty winch have been ordered. Transfer of data between the logging system and the mini-computer is now possible.

#### COMPUTING

The computer network based on the minicomputer is now fully operational and software has been purchased to allow communication between IBM personal computers and the mini-computer. New data bases implemented include the construction materials register, the grain size analysis data base, and the index to open and closed file mineral exploration reports.

#### **ELECTRONICS**

A major part of the year was devoted to the design of sensors for the Unidata data loggers, the installation of data loggers, and the replay of collected information. Locations monitored included roof collapse at the Duncan Mine after pulling pillars, a house at Windermere, and Grooms Slip at Penguin.

Interfacing of the replay unit for the borehole logger to the mini-computer, and equipment maintenance, were the other major activities.

#### MISCELLANEOUS

Dr J. W. Hudspeth was seconded to the Health Department and has been absent since early February. He has now accepted a position with the Health Department.

### GEOLOGICAL SUPPORT SERVICES

#### FIELD ASSISTANCE

A total of 1686 thin sections and 295 polished thin sections were completed and returned to geologists during the year from the Petrological Laboratory. Two officers were employed approximately 90% of the year in the laboratory, the other 10% in field duties. At least 50% of the work carried out was associated with the Mt Read Volcanics program.

Groundwater programs were carried out, mostly in conjunction with the Engineering Geology Branch in the following areas—Arthur River, Seven Mile Beach, Salvation Army Hostel Carlton, South Arm School, Stanley Golf Club. Fifteen sand spears were installed for Clarence Council to measure leakage of groundwater around the perimeter of the Lauderdale tip, and Wesley Vale monitoring was continued.

Several holes were drilled in the Tamar area and piezometers installed to monitor landslip and expansive clay areas.

Well logging and bore hole surveys were carried out on all holes associated with the Mt Read and Waratah basalt drilling program. Several holes were logged throughout the Midlands area.

A total of 2500 gravity readings were taken in the regional program and added to the State grid. Intensive gravity and seismic surveys were carried out in the Mt Lyell, Boco Siding and Hellyer areas.



Technician Rohan Sedgman installing a data logger for monitoring roof collapse at the Duncan Mine on Fingal Tier.

#### **PUBLICATIONS**

The following publications were printed during the year:

Report of the Director of Mines for 1984–1985

Report of the Director of Mines for 1985–1986

Mines News No. 20

1:50 000 Explanatory Report— Eddystone, by P. W. Baillie

Bulletin 62—Geology of the Dundas–Mt Lindsay–Mt Youngbuck region, by A. V. Brown

Several new leaflets were produced, including:

Mineral tenements—Guidelines for Reporting

Retention Licences—General conditions

Mt Read Volcanics Project

Notes on the occupation of land for mining puposes (11th edition)

Publications in progress include 1:50 000 Explanatory Reports for St Marys, Huntley and Interlaken, and Bulletins on coal and on landslides. A new edition of 'The Mines and Mineral Resources of Tasmania' is in

Departmental publications were on sale at the Mt Read Volcanics Symposium, held in Burnie, with recorded sales totalling \$4 555.00.

#### Unpublished reports

Unpublished reports issued during the year are listed in the appendices to this report.

#### Computing

press.

Following the aquisition of a Brother M-1509 printer, text for Unpublished Reports is now input to the mini-computer. This makes it easier to insert special characters in the text and also allows text searches when required. Text for most publications is now entered on computer and transferred via magnetic tape to the Government Printer.

#### Data bases

Details of programs available for several Departmental computers are now maintained on a computer data base (software register).

Programs for the transfer of data to the Australian Earth Science Information System (AESIS) data base via magnetic tape were revised, following changed requirements by the Australian Mineral Foundation. The AESIS database was transferred from AUSINET to CLIRS in 1987 and forms part of the Australian Resource Industry Database (ARID). E. L. Martin was appointed to serve on the newly-formed ARID Advisory Council and Government Geoscience Database Policy Advisory Committee, and continues to serve on the AESIS Advisory Committee.

#### Photography

A large number of lecture slides were prepared for departmental staff. Several hundred photographs of fossil brachiopods, and other laboratory and field photographs were taken. Progress was made in overtaking the backlog of indexing and over 2500 slides have now been entered in a new computer-based catalogue.

#### CARTOGRAPHIC DRAFTING

1:50 000 geological series

St Helens-drafted and printed

Lyell—drafting near completion, to be printed in October

Ben Lomond—drafting commenced Montgomery—drafting commenced

1:63 360 geological series

Sheffield—this older sheet was reprinted using the four colour process.

Mt Read Volcanics 1:25 000 geological maps

Mt Charter-Hellyer—drafted and printed Rosebery-Mt Block—drafted and printed Henty River-Mt Read—drafted and printed

Mt Murchison—drafting commenced Tyndall Range—drafting commenced

1:50 000 mineral deposit maps
Tullah—drafted and printed
Rosebery—drafted and printed
Queenstown—drafted and printed
Andrew—drafted and printed
Cethana—drafting commenced
Ulverstone—drafting commenced

The computer-aided drafting system, set up earlier in the year, has proven to be a very valuable drafting tool. It has been in almost constant usage with report diagrams, display text and numerous other miscellaneous jobs.

Approximately eighty black and white diagrams for bulletins and unpublished reports were produced.

#### LIBRARY

The Librarian, Margaret Ellis, took three months unpaid leave from September to November 1986. John Swift was Acting Librarian for part of this period. Janet Richardson, who had been the Library Assistant since 1981, transferred to another section of the Department in December 1986. Sandra Eiszele was temporarily appointed to fill the vacancy in January 1987.

#### Collection

Journal subscriptions have been a problem due to the low rate of exchange for the Australian dollar. It may be necessary to cancel some overseas journals next year.

Additions to the library were seven journal titles and three monographs, many acquired as a result of the gifts and exchange program.

#### Reference and Information

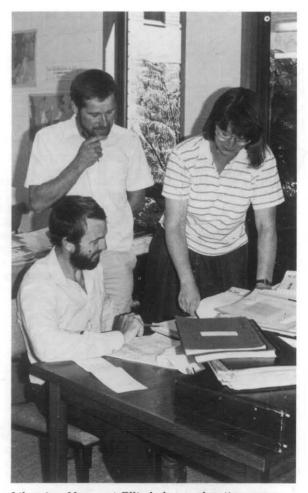
During the year, 714 items (excluding 161 journal titles circulated regularly) were borrowed by staff.

Of the 1875 reference queries received by the library during the year, 1213 were readily answerable, while 662 involved literature searches. The library had 781 users from outside the Department and more than 2100 open file company and offshore reports were consulted during the year.

The release of offshore petroleum exploration areas T87-1 and T87-2 generated interest in the Department's offshore data and resulted in 33 requests for copies of data.

#### **Technical Services**

In addition to the standard library functions of accessioning and cataloguing library materials, library staff accessioned and undertook the bibliographic indexing of 104 Exploration Licence reports received during the year. The indexes of the closed file petroleum exploration data were also updated.



Librarian Margaret Ellis helps exploration company geologists gain access to information about previous exploration which is contained in open-file reports held by the Department.

#### CHEMICAL AND METALLURGICAL DIVISION

The past year has been one of greatly increased activity within the Division. This is attributed to:

- A continuing upsurge in prospecting and exploration.
- A greater awareness by mining companies, exploration companies and industry in general of the comprehensive and high quality range of services available from the laboratory, covering chemical and instrumental analysis and metallurgical testing and research.

A total of 54 individual companies or organisations used the laboratory services during the year. In addition to this, a significant volume of work was performed for the Geological Survey, Resource Development, and Mines Inspection divisions of the Department.

Other Government Agencies and Local Government Authorities have also made use of the laboratory services, and various determinations, examinations and identifications were carried out for the general public.

There has been a significant increase in the numbers of Miners Rights and Prospecting Licences issued from this office, demonstrated by a 48% increase in revenue collection from this source. Frequent enquiries regarding lease areas and Tamar Valley landslip zones have also been dealt with.

The Metallurgical Section has been active in pursuing various projects both in the laboratory and in consultancy work in the field. In the past year there has been an increasing trend apparent towards the submission of very large exploration samples requiring use of the pilot plant for preconcentration of metals or elements of interest for assay by chemical or instrumental means, whereby detection limits can be as low as parts per billion. Such detection limits are being asked for more and more frequently; this is reasonable and logical from the point of view of the client, but has put great pressure on the sample handling and sample preparation section of the laboratory.

Sampling of the South Esk River system continued. Results were made available to the Department of Agriculture and local farmers. These results show a decline in the contribution of zinc and cadmium to the river from Storys and Aberfoyle Creeks since rehabilitation and diversionary work was done by the Department of Mines on the precipitate dam and drainage system.

The number of samples registered was 5748, an increase of 152% over the previous year. The increase is partly accounted for by now having to register environmental water samples as 'acidified' and 'unacidified', i.e. two samples for the same number of determinations as were previously done on one.

The total number of determinations made, including metallurgical tests, was 31 145, an increase of 54% over the previous year. Assays of metallurgical products have increased from 366 to 2593 (608% increase), reflecting increased activity by the Metallurgical section and a greater involvement in the mining industry.

Laboratory revenue from outside sources was \$79 590, an increase of 290% over the previous year. The value of work performed for other divisions of the Department has not previously been reported, but this year is estimated to be in excess of \$70 000 at normal commercial rates.

Gold assays have increased from 463 to 1011, an increase of 118% over the previous year. Tungsten assays have increased from 498 to 2081, an increase of 318%, reflecting involvement in consultancy and monitoring of the Kara scheelite plant. The number of whole rock analyses has increased from 199 to 352, an increase of 76%. This work was done for the Geological Survey Division. Tin was again at a comparatively low number of 337.

The volume of work has increased greatly over the past year and this has highlighted delays in our handling and processing of samples. The Government has provided funds to upgrade our facilities, and this will improve productivity and service provided.

Following are the classifications of type of sample received, analytical methods used and types and number of tests undertaken.

TYPE OF SAMPLE RECEIVED

Туре	Number	% increase (+) decrease (-) over last year
Water	1 566	+84
*Industrial liquor	47	-27
Metal or alloy	27	-18
Metallurgical product.	2 593	+608
Rock or mineral	1 278	+93
Miscellaneous	237	N/A
Total	5 748	+ 152

<sup>\*</sup>Industrial waste waters have not been included here but are accounted for in water samples.

### TYPE OF ANALYTICAL METHOD USED

Туре	Number	% increase (+) decrease (-) over last year
Atomic Absorption		
(AAS)	6 176	+64
X-ray fluorescence		
(XRF)	$16\ 271$	+62
Fire assay	658	+43
Miscellaneous	7 403	+38
Total	30 508	+55

#### TYPE AND NUMBER OF TESTS

Overall Total	31 145
Total	647
Qualitative: Examination* *Metallurgical	10 637
Total	30 498
Elements	26 780 3 230 38 450
Quantitative:	00.700

\*These are individual tests and do not include unit operations involved in research projects. The 637 tests show an increase of 7% over last year.

### RESEARCH INVESTIGATIONS (PUBLISHED OR IN PROGRESS)

Type	Number
Magnesite flotation	1
Cyanide	1
Ferromanganese	1
Strontium carbonate (grinding)	1
Tungsten	2
Gold/barium/copper/cobalt	1
Gold/chromite/osmiridium	1
Gold	3
Feldspar	1
Corrosion (furnace water jacket)	1
Iridium (assay method	
development)	1
Coal	1
Total	15

This is an increase of 36% over last year.

### SUMMARY OF INVESTIGATIONS

#### MAGNESITE

#### R869-Lyons River Deposit: C.R.A.

A five-tonne parcel of high grade magnesite concentrate was produced by continuous ball mill grinding and flotation in the pilot plant. The concentrate was for shipment to Norway for further test work on magnesium production.

#### CYANIDE

#### R871-Director of Mines

A laboratory investigation was undertaken on methods of determination of free and complex cyanides and amounts of sodium hypochlorite required for neutralisation of potentially dangerous cyanide solutions. The source of material was the Golconda retaining dams at Beaconsfield.

#### **FERROMANGANESE**

#### R872-TEMCO, Bell Bay

A sample of 'remelt' material was examined to determine the mass balance of ore, furnace slag, coke, and limestone to enable a furnace charge to be calculated using this material.

#### STRONTIUM CARBONATE

### R875—Electrolytic Zinc Company, Risdon

A method of ultra-fine grinding of this material was investigated and recommended. A cost advantage was available to the company if a relatively cheap coarse product could be ground to the required fineness, rather than purchase the already ground material.

#### TUNGSTEN

### R870—Tasmania Mines: New Kara Mill

Metallurgical staff have an ongoing function in sampling, assessing and optimising the performance of the new mill at the Kara scheelite mine. The mill is now running well enough for meaningful sampling and appraisal to be done.

### R877—Tasmania Mines: Sulphide removal from concentrate

Several flotation tests have been done and a molybdenum sulphide (MoS<sub>2</sub>) concentrate produced. Results are not yet published and the company has not yet installed the equipment to achieve this. A successful outcome is envisaged.

#### GOLD/BARIUM/COPPER/COBALT

### R873—Aberdare Inc: Macquarie Harbour sediments

This investigation dealt with recovery of gold, copper, cobalt in flotation concentrates, solution of gold by cyanidation and information on placement of various other minerals in metallurgical products.

#### GOLD/CHROMITE/OSMIRIDIUM

### R880—R. Gregory, Corinna: Sluice box concentrates

Magnetic separation and jigging tests were undertaken to separate the gold and chromite. Amalgamation tests to separate gold and osmiridium are in hand.

#### GOLD

### R878—Epoch Minerals exploration, Mathinna

Assaying and cyanidation tests were done on samples from spent heaps from the company's heap leaching project at Mathinna to assess whether any further recovery was obtainable.

### R882—Epoch Minerals exploration, Mathinna

Residues from heap leaching were cyanided at different temperatures to assess influence of temperature on cyanide leaching.

Untreated dam sand was treated by sizing, flotation, and column cyanide leaching to assess recoveries obtainable.

#### **FELDSPAR**

### R881—V. Threader: Gilligan Creek granite

A feldspar concentrate suitable for ceramic use has been produced from this material by grinding and froth flotation. By-products of mica and silica sand may have some industrial application.

#### CORROSION

#### R879—Johns Perry Castings, Launceston

An investigation into causes of corrosion in the cooling water jacket of an induction furnace was carried out. Causes of corrosion were identified and recommendations given for prevention in the future.

#### **IRIDIUM**

#### R883—Director of Mines

A laboratory investigation was undertaken to establish a method of iridium assaying suitable for this laboratory. The method established is fire assay, collection of iridium in nickel sulphide, and AAS measurement. With the present interest in osmiridium it was essential that a method of assay be researched.

#### COAL

#### R874—Cornwall Coal Co, Fingal

A build up of slime material in the dense medium cyclone and magnetic separator circuit was adversely affecting the coal washery performance. Examination of new and old medium by sizing, magnetic separation and ferrous iron assays was undertaken. A visit to the washery and observations made there indicated that inadequate settling in the thickener was the cause of the problem.

### STATISTICAL TABLES

#### STATISTICAL TABLES

TABLE 3
EMPLOYMENT AND ACCIDENTS 1986–1987 (AS1885)

Employer	Man Hours Exposure	No. of Injuries	Frequency Rates	Days Lost	Incid. Rate	Mean Dur.	No. of Employees
APPM Tonganah	34 688	2	58	4	9	2.0	22
Aberfoyle	51 225	5	98	25	18	5.0	28
Hellyer Cleveland	161 148	7	43	41	13	5.9	54
EZ Rosebery	1 214 739	270	222	4 088	43	15.1	630
Golconda	64 403	19	304	140	77	7.4	25
King Island Scheelite	164 992	8	49	112	10	14.0	83
Mt Lyell	1 036 858	130	125	1 538	25	11.8	528
Que River	180 893	12	66	407	11	33.9	106
Renison	916 003	184	201	2 102	38	11.4	486
Savage River	855 267	104	122	1 220	24	11.7	441
Tasmania Mines	82 488	3	36	33	9	11.0	35
All Mines	4 762 704	744	156	9 710	31	13.1	2 438
Comalco	2 184 513	172	78	3 081	15	17.9	1 134
EZ Risdon	2 495 191	329	132	3 574	22	10.9	1 500
Goliath Cement	467 096	27	58	448	12	16.6	219
Mole Creek	35 103	1	28	4	5	4.0	18
Pioneer Silicon	124 800	4	32	15	4	3.8	100
Port Latta	358 963	8	22	120	4	15.0	192
Temco	1 130 910	122	108	1 531	24	12.5	498
Tioxide Aust	854 592	24	28	276	5	11.5	448
Ceramics	248 650	38	153	229	35	6.0	109
All works	7 899 818	725	92	9 278	17	12.8	4 218
Collieries	280 914	43	153	455	29	10.6	147
Quarries	189 178	10	53	338	11	33.8	91
TOTALS	13 132 614	1 522	116	19 781	22	13.0	6 894

#### **DEFINITIONS**

#### FREQUENCY RATE

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

Lost time injury frequency rate = Number of lost-time injuries  $\times$  1 000 000/manhours exposure

#### INCIDENT RATE

This is the number of lost-time injuries per employee during the year, as follows:

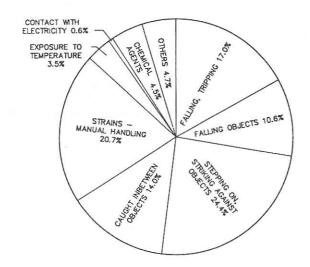
Lost-time injury incidence rate = Number of lost-time injuries  $\times$  100%/ Number of employees

#### **MEAN DURATION**

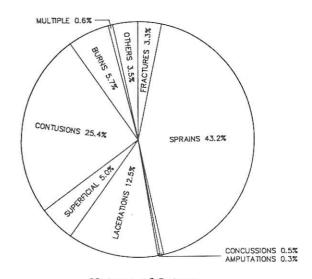
This is the time lost per lost-time injury, as follows:

Mean Duration = Time lost (shifts)/number of lost-time injuries

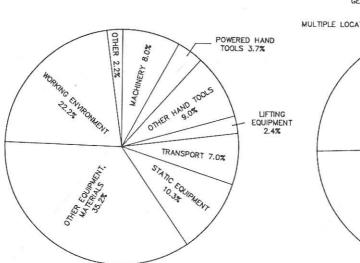
# MINE INJURY CLASSIFICATION, 1986-87 (Australian Standard AS1885)



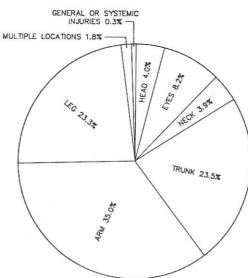
Type of Accident



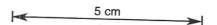
Nature of Injury



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  $Mines\ Inspection\ Act\ 1968$ :

#### MINE MANAGER'S CERTIFICATES

Certificate Number	Name	Date	Mine
Metalliferou 307/87 308/87	Josef Carel Moorman Philip John Allsopp	4. 3.87 4. 3.87	Que River Renison
Colliery 30/87	Iain Hillis MacPhedran	30. 3.87	Cornwall Coal
Open-cut 4-86	Hoo Chow Tan	26. 8.86	Savage River
Restricted R6-86	Anthony John Weston	30.10.86	Hellyer

Unrestricted certificates were issued following written examinations in legal knowledge and examination viva voce.

In addition 34 crane drivers' and two winder drivers' Certificates of Competency were issued.

Table 5
MINERAL PRODUCTION FOR THE YEAR 1986–1987 FROM TASMANIAN SOURCES

	Golconda	Cornwall Coal Co.	E.Z. of Aust.	King Is. Scheelite	Mt Lyell	Que River Mines (1)	Renison Ltd	Savage Rvr Mines	TEMCO	Tasmania Mines	Small Producers	Totals
Cadmium (tonnes)	3000	2000	161		747		100		****			161
Cobalt oxide (tonnes)	2222	10000	11		****	15555	2.000					11
Copper (tonnes)	****	****	1 593	****	23 5 1 9	1986	****	20000		****	Terr	25 112
Crocoite	1	****	****	••••	••••	****	****	****	****	office	Specimens only	5375
Gold	253	****	1 281	200	545	0.000	****	1,51720	2222			2 079
Iron ore (tonnes)	****	38888	****	(0.4.4.4.0)		2000	****	1 840 200	****	71111	****	1 840 200
Lead (tonnes)	****	****	19 306			****		7444				19 306
Manganese dioxide (tonnes)	2	****	116						****	FF-040-		116
Molybdenum (tonnes)	****		****	18		****	****	****	****		1000	18
Silica (tonnes)	9999	****	****	****					****		26 969	26 969
Silicon compounds (tonnes)	****	200000	465274	*****	****	2000	****	****	39 119	****	C.West District	39 119
Silver	****		79 404		3 705	1222	2000	1,		2502	100	83 109
Sulphuric acid (mono tonnes)			67 113		****			100000		*****		67 113
Tin (tonnes)	****	19994	****	2000	****		6 832		****	****	32	6 864
Tungsten (tonnes)	****		****	903			••••			287	****	1 190
Zinc (tonnes)	****	****	68 077	(****	****		****	****		*****	556	68 077
Coal (tonnes)	2222	622 635	****									622 635
Peat (tonnes)	****	(18888)		****	****	16557	****	****	****	****	2000	
TOTAL MINED (tonnes)	261 036	619 988	874 634	85 535	1 579 789	308 000	851 435	4 733 426	23 519	138 951		

<sup>(1)</sup> Production breakdown combined with E.Z. Company. These figures take stockpile fluctuations into account.

## TABLE 6 VALUE OF THE MINERAL INDUSTRY

	Year end 198	led 30 June 36	Year ended 30 June 1987		
Commodity Unit	Total Quantity	Value	Total Quantity	Value	
METALLIC MINERALS—		\$		\$	
Cadmium(tonne)	167	634 600	161	564 659	
Cobalt oxide(tonne) Copper(tonne)	24 613	104 158 50 981 041	$\frac{11}{25112}$	146 893 53 926 555	
Crocoite (specimens only)	24 013	3 357	25 112	33 920 333	
Gold(kilogram)	2 185	33 672 614	2 079	40 265 232	
Iron ore pellets(tonne)	2 240 743	73 906 003	1 840 200	62 781 933	
Iron oxide(tonne)	20 167	11 691 923	19 306	14 266 361	
Lead(tonne) Manganese dioxide(tonne)	177	32 745	116	21 460	
Molybdenum(tonne)	8	21 281	18	36 826	
Silica for silicon alloy(tonne)	25 522	638 050	26 969	440 000	
Silicon as silicon alloys(tonne)	55 539	25 277 348	39 119	23 875 000	
Silver(kilogram) Sulphur—Sulphuric acid from zinc	84 006	22 393 480	83 109	24 139 967	
concentrates(mono tonne)	144 267	7 516 044	67 113	4 232 874	
Tin(tonne)	4 383	59 433 613	6 864	47 712 486	
Tungsten as tungstic oxide(tonne)	1 439	11 269 983	1 190	8 087 322	
Zinc(tonne)	75 545	85 940 381	68 077	91 323 303	
Value of metallic minerals		383 516 621	••••	371 820 871	
NON-METALLIC MINERALS—					
Clay— Brick(metre 3)	99 959	499 795	79 440	779 550	
Other (metre <sup>3</sup> )	29 684	148 420	21 693	108 467	
Dolomite(tonne)	15 380	284 995	11 464	248 958	
Kaolin(tonne)	26 878	2 894 299	29 387	3 453 383	
Limestone— Agricultural(tonne)	66 660	616 264	65 964	594 381	
Cement(tonne)	671 773	1 504 672	539 146	370 906	
Chemical and metallurgical(tonne)	123 514	1 242 357	118 978	1 055 017	
Other(tonne)	29 842	130 512	22 178	80 337	
Pebbles(tonne)	999 16 087	100 500 92 380	1 160 216	121 000 12 320	
Silica(tonne)		7 514 194		6 824 319	
Value of non-metallic minerals	****	7 314 194	****	0 624 319	
FUEL MINERALS— Coal(tonne)	500 163	14 775 395	622 635	18 293 545	
Peat(tonne)	180	41 200			
Value of fuel minerals	••••	14 816 595		18 293 545	
CONSTRUCTION MATERIALS—					
Building stone—					
Freestone (metre 3)	556	8 019	753	6 030	
Granite (metre 3)	4 040	40 400	274	34 333	
Granite (red) (metre <sup>3</sup> ) Other (metre <sup>3</sup> )	2 540	41 940	5 840	62 820	
Crushed and broken stone—	2010	11 010		02 020	
Basalt (metre 3)	457 619	6 090 145	411 419	5 577 549	
Dolerite (metre 3)	487 121	6 108 105	512 050 10 282	6 434 987	
Limestone	10 137 28 143	174 337 281 430	42 167	181 185 474 126	
Other (metre <sup>3</sup> )	213 655	2 143 833	79 935	824 774	
Gravel(metre 3)	667 997	4 168 346	424 887	2 628 569	
Sand (metre 3)	415 148	2 662 734	240 529	1 708 995	
Other road materials (metre 3)	235 545	1 181 086	29 425	150 235	
Value of construction materials	••••	22 900 375	****	18 083 403	
TOTAL VALUE WITH AUSTRALIAN METAL PRICES		428 747 785		415 022 138	
METALLURGICAL PRODUCTION FROM OTHER THAN TASMANIAN ORES—Aluminium Aluminium sulphate		120 / 17 / 00		110 022 100	
Cadmium Calcium carbide Cobalt oxide Ferro-manganese Titanium dioxide	*****	495 457 247	••••	575 319 542	
Zinc VALUE OF MINING AND METALLURGICAL PRODUCTION	S*************************************	924 205 032		990 341 680	
AVERAGE NUMBER OF EMPLOYEES	7 436		6 915		
AVERAGE NUMBER OF EMPLOTEES	1 430		0 910		

TABLE 7
PRODUCTION OF INDUSTRIAL MINERALS (tonnes)

			Limes	tone			
Company	Kaolin	Agri- cultural	Chemical and Cement Metall.		Other	Iron Oxide	Silica
Ballarat Clay Co. (APPM).	29 387						
A. R. Beams Benders Spreading	••••	29 187		12 376		****	
Services	••••	5 912		51 432			
Goliath Portland Cement.	****	26 053	539 146		9 830	****	
Mole Creek Limestone		4 812		55 160	12 348		
F. R. Lazenby Dalcoath Mining		••••	••••	****	••••		****
Company							
Small Producers		••••		10		****	216
Total	29 387	65 964	539 146	118 978	22 178		216

TABLE 8
IMPORTED ORES

	Product (tonnes)									
Company	Alumina	Lead-zinc ore	Ilmenite	Manganese ore	Phosphate rock					
Comalco (Bell Bay)	234 915									
E.Z. Company		194 546			71 119					
Tioxide Aust			64 575							
TEMCO	****	****		56 266						

TABLE 9
PRODUCTION OF CONSTRUCTION MATERIALS 1986–87 (cubic metres)

	Bui	lding Stone			Crushed	and Broken	Stone		Other			
Operator —	Freestone	Granite	Other	Basalt	Dolerite	Limestone	Sandstone	Other	Road Materials	Gravel	Sand	Brick Clay
Assoc. Forest Holdings	****		****	19 508		****	****		****	22 438	****	
Brambles Holdings	2000			134 007	46 059		****	****	****	****	21 911	****
BMG Resources	****			208 106	91 405	5 212		50 644	3 379	26 657	15 348	
Forestry Commission	9740	DAME.	1000	****	5 100	100000000000000000000000000000000000000	2 023	1444	7 500	19 175	384 10035-S	20.00
Hobart Blue Metal Industries	****		1000		276 357	7.7.5	1914	X1002V	****		****	
C. R. Johnson	****	13157	****	****	5 158		****	(100.00)	****		****	
Pioneer Quarries	····			****	83 638	****	****	****	****	****	****	****
Department of Main Roads	****		****						****			
BHP		(2555)					****	****	****	18 605		0100
Longford Municipal Council	****	****	****	****	****	****				23 765		
Circular Head Municipal Council	8000	(	1000	N. 555 C	****	****	****	••••		43 500		
	****	****	2000	****	••••	****	3.55	555551	3555		48 446	****
Besser Tasmania	****	••••	****		****		****	****	7***	E0 E71	40 440	••••
G. Creswell	****	(3231)	****	(1000)	****	****	1000	****	10.000	50 571		****
L. G. Holloway	****		****	****			****		10 297	2000	****	****
Mt Lyell Mining and Railway Company	****		****	****	5750	255	(577.5	25 460	****	****	****	
G. Males	****	****	****		****	****	****	****	****	****	30 072	
Scottsdale Municipal Council	****	1000	****				9 714				****	
Woodberry	****	****		34440	****	****	26 155		****	****	****	****
Small Producers	753	274	5 840	49 798	4 333	5 070	4 275	3 831	8 249	220 176	124 752	79 440
TOTAL	753	274	5 840	411 419	512 050	10 282	42 167	79 935	294 425	424 887	240 529	79 440

# Table 10 MINERAL PRODUCTION FROM TASMANIAN SOURCES SINCE 1880 QUANTITY OF PRODUCTION AS AT 30 JUNE 1987

Commo	dity	Unit	Quantity in Current Year	Total Quantity
	LIC MINERALS mony(t	onne)		3
	nuth (kilo		••••	110 080
	mium(t		161	4 164
	omite(t		77	2 687
Coba	alt oxide	gram)	11	2 020 169 273
	per (blister) to 1918 (now shown under Silver and Copper) (t per matte(t		****	6 326
Copi	per ore to 1918 (now shown under Copper)(t	onne)		42 439
Cop	per (from 1919)(t	onne)	25 112	957 394
Croc	coite (specimens	only)		
	l(kilo		2 079	114 537
	ore pellets		1 840 200	40 639 619 558
	oxide (including hematite, limonite and magnetite) (t		••••	346 226
	i (from 1919)(t		19 306	720 163
	ganese(t			1 1
	ganese dioxide (from 1957)(t		116	13 276
	oury		18	7 697 126
	azite(t			34
	iel			237
Osm	iridium (kilo	gram)	••••	881
Pyri	te (to 1971)(t	onne)	••••	2 124 070
	te (from 1972)(t		****	1 524 975
	le (concentrates)(t			40 027
Sche	celite (concentrates)(t	onne)		57 261
Silic	a for silicon alloy production(t	onne)	26 969	476 184
Silic	on as silicon alloys(t	onne)	39 119	643 243
	er-lead ore to 1918 (now shown under Silver and Lead)(t		00 100	1 101 295
	er (from 1919)		83 109 67 113	2 746 100 4 929 030
	indi as sulphuric acid		6 864	268 865
	gsten(t		1 190	29 201
Zinc	Č(t	onne)	68 077	1 970 122
	sulphate (from 1957)(t		••••	3 251
	on (concentrates)(t TALLIC MINERALS	onne	****	39 001
	estos(t	onne)		4 044
	te(t			2 240
	(from 1958)(t		151 700	3 812 582
	mite(t		11 464	224 555
	ohite		29 387	41 330 399
	estone—	ome	29 301	330 399
	Agricultural and other(t	onne)	88 142	1 976 763
	Carbide(t		****	1 081 509
	Cement(t		539 146	15 052 050
	Chemical and metallurgical(t		118 978	5 833 324 2 949
	re		1 160	31 757
	l (moulding)			864
	a(t		216	536 525
	(t	onne)		338
	INERALS	onnol	622 635	14 959 778
	(t e(t		022 033	42 239
	(t		••••	13 376
CONSTR	RUCTION MATERIALS			
	ding stone—		1 100	00 555
	Freestone(t		1 130	28 557 130 748
	Granite		455 8 760	35 068
	shed and broken stone (from 1958)	OIIIIC)	0 700	50 000
2007 4000 200	Basalt(t	onne)	658 270	12 857 461
I	Dolerite (t	onne)	819 280	24 875 782
	Limestone(t		15 834	869 819
	Sandstone(t		63 672 119 903	271 017 10 423 075
	Other		637 330	47 832 350
JIAV	i (from 1958)		341 551	6 706 839
Sand				

Table 11

NUMBER AND AREA OF LEASES AND LICENCES APPLIED
FOR DURING THE YEAR TO 30 JUNE 1987

Leases and Licences	Number	Area (ha)	Sluiceheads
Clay	1	54	
Gold	12	756	
Minerals	62	4 634	
Sand and gravel	37	555	
Stone	11	272	
Tin			
Easements			••••
Water			
	123	6 271	

TABLE 12

NUMBER AND AREA OF NEW LEASES AND LICENCES ISSUED DURING THE YEAR TO 30 JUNE 1987

Leases and Licences	Number	Area (ha)	Sluiceheads
Coal (peat)			
Gold	20	1 473	
Minerals	10	303	••••
Sand and Gravel	25	555	
Stone	19	472	
Tin	6	269	
Water	1		3
Osmiridium			
	81	3 072	3

TABLE 13
TOTAL NUMBER OF LEASES AND LICENCES
IN FORCE ON 30 JUNE 1987

Leases and Licences	Number	Area (ha)	Sluiceheads
Bauxite	5	183	••••
Clay	17	340	****
Coal	10	5 695	
Copper	6	1 294	
Crocoite	1	4	
Dolomite	4	126	
Gemstones	4	67	
Gold	77	4 196	
Granite	4	12	
Iron ore	12	3 528	
Kaolin	1	340	****
Limestone	10	1 243	10000
Marble	1	8	
Minerals	33	6 040	
Osmiridium	1	20	****
Peat	2	172	
Sand and Gravel	167	8 799	
Silica	13	827	10000
Slate	1	84	2222
Stone	180	9 087	
Silver, lead and zinc	16	895	
Tin	286	13 899	****
Wolfram and tin	7	144	
Water	73		649
Easements	84	1 696	
	1 015	58 689	649

TABLE 14
TOTAL NUMBER OF ALL TYPES OF PROSPECTING RIGHTS HELD AS AT 30 JUNE 1987

Mining Tenement	Number	Area	
Exploration Licences	133	12 869	km²
Miners Rights/Water Rights	12	15	ha
Prospectors Licences Permits to explore for Petroleum under	35	692	ha
Petroleum Act 1967	4	348	blocks
Owners Consent	. 1	21	ha

TABLE 15
LICENCES, PERMITS AND APPROVALS ISSUED FOR THE IMPORT, MANUFACTURE, STORAGE, USE AND SALE OF DANGEROUS GOODS

Licences to Keep Flammable Liquids and Dangerous Goods	2 439
Licences to Sell Explosives and Safety Cartridges	182
Licences to Sell Fireworks	340
Private Magazine Licences	97
Import Explosives Licences	27
Licences to Convey	18
Licences to Manufacture Dangerous Goods	6
Exemptions Granted	
Applications for Plans Approved	318
Licence to Manufacture Explosives	1
Gas Suppliers Licence	2
Shotfirer's Permits Issued	70
Landing Permits	16
Import Dangerous Goods	18

TABLE 16
IMPORTS OF FLAMMABLE LIQUIDS

Bell Bay	Burnie	Devonport	Hobart	Total
3 495	****		15 504	18 999
6 200		12 615	6 455	25 270
4 400	2 262	7 302	8 990	22 954
62 715	26 367	72 689	123 170	284 941
7 600			9 611	17 211
3 000			650	3 650
••••	3 544	2 600	21 004	27 148
32 925	36 851	53 182	46 830	169 788
7 600	16 686	11 071	24 934	60 291
127 935	85 710	159 459	257 148	630 252
26	12	29	26	93
	3 495 6 200 4 400 62 715 7 600 3 000  32 925 7 600 127 935	3 495          6 200          4 400       2 262         62 715       26 367         7 600          3 000           3 544         32 925       36 851         7 600       16 686         127 935       85 710	3 495        6 200        12 615         4 400       2 262       7 302       62 715       26 367       72 689         7 600             3 000             32 925       36 851       53 182       7 600       16 686       11 071         127 935       85 710       159 459	3 495        15 504         6 200        12 615       6 455         4 400       2 262       7 302       8 990         62 715       26 367       72 689       123 170         7 600         9 611         3 000         650          3 544       2 600       21 004         32 925       36 851       53 182       46 830         7 600       16 686       11 071       24 934         127 935       85 710       159 459       257 148

TABLE 17
IMPORTS OF EXPLOSIVES

Product	Devonport	Burnie	Currie Que	enstown	Smithton	Total
Ammonium nitrate for ANFO (t) Blasting explosives Class 1.1.D	****	3 733			••••	3 733
(cartons)		46 281	120	87	46	46 534
Propellants Class 1.1.C (cartons) Detonating fuses Class 1.1.D	****	****	****	••••	****	****
(cartons)	30	619				649
Detonators Class 1.1.B (cartons)	30	3 285	35	2	16	3 368
Total Cartons	60	50 185	155	89	62	50 551
Number of Shipments	1	40	10	1	2	54

No imports into Hobart and Wynyard.

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
Iron Ore (Savage River) Agreement Act 1965
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 1987

Administration	34
Mines Inspection	10
Dangerous Goods	9
Geological Survey	46
Chemical and Metallurgical	13
R.P. and P.D	6
Diamond Drilling	11
Others	_13
Total	142

#### Table 20 DRILLING DETAILS 1986–87

Location	Pu	rpose	Drill	No. of Holes	Total Depth (m)
DIAMOND/AUGER DRILLING—					3 15
Penguin/Howth	Road foundations	Gemco 2	10D	15	265.8
Akaroa	Quarry site	Gemco 2		6	94.6
Ledgerwood Creek		Gemco 2		4	57.4
Dial Road		Gemco 2		3	22.9
Selfs Point		Gemco 2			53.2
Snug		Gemco 2	10D	2 2 5	30.5
Hobart Southern Outlet		Gemco 2			66.8
Hobart Civic Square	Site investigation	Gemco 2	10D	4	70.9
North Hobart Oval	Site investigation	Gemco 2		9	26.7
E.Z. Risdon		Gemco 2		2	16.7
Hadspen	Road foundations	Gemco 2		8	113.6
Pine Main Road		Gemco 2		5	67.4
Creamery Road Corinna	Pridge foundations	Gemco 2 Gemco 2		2 9	18.0 255.4
Hobart	Site investigation	Gemco A		2	14.0
Hobart Southern Outlet	Road foundations	Gemco A		5	77.4
Orford		Triefus		6	60.0
011014				-	
	Sub Total	*******		89	1 311.3
DIAMOND DRILLING					
Windermere	Landslip investigation	Gemco 2	10D	1	97.6
Windermere		Warman		1	177.6
Grieve Siding	EST 25 62 9	Longyear		15 E 17 T	2020 E.
	Stratigraphic	No. 1		Completion	68-9
Mount Charter	5 <del>2</del> 777 33.0 9.6	Longyear	44		
W Ob	Stratigraphic	No. 1	00	2	467.6
Mount Charter	Ctuationanhia	Longyear	38	- 1	740
Mount Charter	Stratigraphic	No. 1	20	1	74.0
Mount Charter	Stratigraphic	Longyear No. 2	30	1	407.0
Lenah Valley	Ottatigrapine	Longyear	44	-	407.0
Delian Vancy	Stratigraphic	No. 2	• •	1	247.0
Waratah	ou angrapane	Longyear	38		
	Sub-basalt programme	No. Ĩ		1	383.0
Waratah		Longyear	44		
	Sub-basalt programme	No. 1		2	733.9
Waratah	62 ( S 72) S1	Longyear	44		STUDENS
	Sub-basalt programme	No. 2			1 471.0
Geeveston	Wharf foundations	Warman	1000	10	<u>159.4</u>
	Sub Total			24	4 287.0
ROTARY/DOWN HOLE HAMMER					
DRILLING—					
Botanical Gardens	Waterbore	Mayhew	1000	1	61.0
Dodges Ferry		Mayhew		î	60.0
Runnymede				7	110.0
Sheffield area	Groundwater investigation	Mayhew		19	1 056.5
Lune River	Silica resources	Mayhew		15	151.5
Sheffield area		warman l	000	3	162.5
Cressy		Warman		1	130.2
Carlton		Warman		1	72.0
Dunalley		Warman		4	218.0
Tea Tree		Warman		4	252.0
South Arm		Warman Warman		$\begin{array}{c} 7 \\ 12 \end{array}$	535.0 432.0
King River, Crotty Waratah	Sub-basalt programme	Warman		2	97.0
maratan	• • • • • • • • • • • • • • • • • • • •		1000		
	Sub Total			_77	3 337.7
	Total			190	8 936.0

# TABLE 21 TYPE AND NUMBER OF TESTS, CHEMICAL AND METALLURGICAL DIVISION

V-	METADDORGICAL	DIVIDION
I.	Quantitative—	
	A. Elements:	
	Aluminium	536
	Antimony	116
	Arsenic	849
	Barium	373
	Bismuth	706 771
	Cadmium Calcium	669
	Carbon	342
	Cerium	61
	Chlorine	516
	Chromium	478
	Cobalt	296
	Copper	1 279
	Cyanide	95
	Fluorine	701
	Gallium	104 1 011
	Gold Indium	58
	Iron (ferric)	1 528
	Iron (ferrous)	335
	Lanthanum	204
	Lead	1 839
	Magnesium	745
	Manganese	1 087
	Mercury	358
	MolybdenumNeodymium	116 61
	Nickel	395
	Niobium	325
	Nitrogen	23
	Phosphorus	450
	Platinum	15
	Potassium	466
	Rubidium	325 325
	Scandium Selenium	6
	Silicon	537
	Silver	430
	Sodium	578
	Strontium	325
	Sulphur	2 004
	Tantalum	4
	Tellurium Thorium	6 106
	Tin	337
	Titanium	358
	Tungsten	2 081
	Uranium	129
	Vanadium	325
	Yttrium	325
	Zinc Zirconium	1 343 325
	Zii comum	_323
	B. Miscellaneous:	
	Waters	
	Conductivity	366
	Dissolved solids	441
	Suspended solids	706
	Turbidity	238
	pH	864
	AcidityAlkalinity	$\frac{2}{111}$
	Permanent hardness	107
	Temporary hardness	107
	Dissolved oxygen	64
	Carbonate	109
	Bicarbonate	115

## TYPE AND NUMBER OF TESTS, CHEMICAL AND METALLURGICAL DIVISION—continued

C. Industrial Liquors:			
Acid acceptance	4		
Acid titration	4		
	4		
Cleaner concentration	4		
Deoxidiser	100		
Reaction products	4		
Hydroxide	8		
Carbonate	4		
pH	6		
D. Other:			
Combined water	290		
Corrosion test	1		
Fusion point	$\hat{2}$		
~ · · · ·	1		
Geiger test	144		
Loss on ignition	3		
Insoluble	4		
Non volatile	4		
pH (soil)	-		
Specific gravity	4		
II OUALITATIVE			10
II QUALITATIVE			10
III METALLURGICAL—			
Drying, riffling, sampling		180	
Compositing		26	
Density		20	
Log washing	*****	12	
Screening	****	17	
Cycloning	****	5	
Sizing	2000	84	
Cyclosizing		25	
Magnetic separation	10000000	15	
Ball mill grinding		2	
	••••	6	
Flotation	(****	6	
Cyanidation	S****		
Panning	••••	33	
Amalgam (gold) recovery	••••	3	
Examination	••••	12	
Settling tests	••••	.5	
Spiral	••••	12	
Heavy liquid separation	••••	148	
Crushing	****	4	
Grit	••••	1	
Ceramic	****	1	
Fineness of gold		1	
Tabling	••••	19	637
Total	••••		31 145

### FINANCIAL STATEMENT

#### SUMMARY OF EXPENDITURE FOR THE YEAR ENDED 30 JUNE 1987

	1984-85	1985–86	1986–87
	\$'000	\$'000	\$'000
CONSOLIDATED FUND—			
Division 41— Recurrent Services—			
AGENCY RESOURCE SUMMARY—			
Administration—	700	700	==0
Salaries and payments related to salaries  Departmental expenses	762 280	762 268	778 262
Other expenditure	200		202
; <del>-</del>	1 042	1 030	1 040
Mines Inspection—	es 2000	0.00 (5.)	
Salaries and payments related to salaries	705	718	676
Departmental expenses Other expenditure	147 257	137 252	169 213
	1 109	1 107	1 058
Geological Survey—		1 101	1 000
Salaries and payments related to salaries	1 369	1 483	1 496
Departmental expenses	375	291	328
Other expenditure	8	79	77
	1 752	1 853	1 901
Chemistry and Metallurgy— Salaries and payments related to salaries	379	387	343
Departmental expenses	54	42	48
Other expenditure		26	31
2024 S 2	433	455	422
Resource Planning and Policy Development—			
Salaries and payments related to salaries	145	205	219
Departmental expenses	32	16	30
Other expenditure	177	221	344 593
Potroloum Funlanation	1//	221	393
Petroleum Exploration— Salaries and payments related to salaries		8	42
Departmental expenses	****	4	18
Other expenditure		••••	****
	****	12	60
Dangerous Goods Inspection—	004	200	000
Salaries and payments related to salaries	234 37	200 40	262 52
Departmental expenses Other expenses	29		
	300	240	314
Total Consolidated Fund Expenditure	4 813	4 918	5 388
Consolidated Fund—	1010	1010	0 000
Works and Services—			
Agency Resource Summary—	0.4		1.5
Administration	24 83	32	17 129
Mines InspectionGeological Survey	145	221	156
Chemistry and Metallurgical	45	47	33
Resource Planning and Policy Development			****
Total Works and Services Expenditure	297	300	335
Trust Fund—			
In accordance with the provisions of the Public Account Act 1957—			
National Soil Conservation Programme—			
Salaries and payments related to Salaries	9	21	13
Other expenditure	1	4	1
	10	25	14
Deposit Account—	40	0.5	
Deposits refunded	43	35	3
	43	35	3
Community Employment Programme—	30	27	
Salaries and payments related to salaries	32	27	••••
D. J. Div. D. D. J. W. B. J. V. J. V. J.	32	27	****
Gordon River Power Development—Mt Read Volcanics—		227	314
Salaries and payments Other expenditure		1 089	714
		1 316	1 028
		1 010	1 020

### FINANCIAL STATEMENT

#### SUMMARY OF EXPENDITURE FOR THE YEAR ENDED 30 JUNE 1987—continued

	1984-85	1985-86	1986-87
	\$'000	\$'000	\$,000
Mining Trust Fund—			380 ABOUT 10
Aid to Mining Loans	16	****	35
	16		35
Mt Cameron Water Race Suspense Account—			
Salaries and payments	19	••••	
Other Expenditure		11001111	
	19		****
Ringarooma and Cascade Water Suspense Account—			
Interest on loan	2	2	2
	2	2	2
Performance Deposits Account—	-		
Restoration		2	
		2	
Small Tin Miners Assistance Scheme—	The second of the		
Subsidy payments			6
	****		6
TOTAL TRUST FUND EXPENDITURE	122	1 407	1 088
Total Expenditure from all Sources	5 232	6 625	6 811

#### SUMMARY OF REVENUE FOR THE YEAR ENDED 30 JUNE 1987

	1984-85	1985-86	1986-87
	\$'000	\$'000	\$'000
CONSOLIDATED FUND—			
Public Works and Services— Drill hire	116	140	223
Survey fees	3	2	1
Geological services	10	48	50
	129	190	274
Lease Rentals and Fees—			0. 120020
Lease Rents under the Mining Act	164	161	169
Fees under Petroleum (Submerged Lands) Act	15	50	3
Sale of maps and publications	12	14	18
Other lees under the mining Act	223	175	277
Territorial Revenue—	414	400	467
Royalty on iron ore pellets	318	372	317
Sale of Government property	4	8	1
Storage of explosives and flammable liquids	44	85	100
Mineral Royalties—			
Metallics	609	985	1 163
Sand and gravel	116	150	162
	1 091	1 600	1 743
Other Sources—	724		202
Miscellaneous	5	39	12
	5	39	12
Total Revenue from Consolidated Fund	1 639	2 229	2 496
Consolidated Fund—Works and Services—	10	40	0.1
Repayments	18	48	31
Total Revenue from Works and Services	18	48	31
Trust Fund— Deposit Account	44	67	30
Deposit Necount	44	67	30
Mining Trust Fund—		0,	
Loan Repayments	32	23	22
	32	23	22
Mt Cameron Water Race Suspense Account—			
Sale of Water	1		
	1		
TOTAL REVENUE FROM TRUST FUNDS	95	90	83
Total Revenue from All Sources	1 734	2 367	2 610

## 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 through supervision of the activities of the mineral processing industries.
- 3. Seek and, where necessary, initiate positive participation in all discussions and decisions involving land use status, or changes to such, with other State Departments, State and Federal Government, or their instrumentalities.
- 4. Continue to 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 cooperation 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 and 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 affect 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

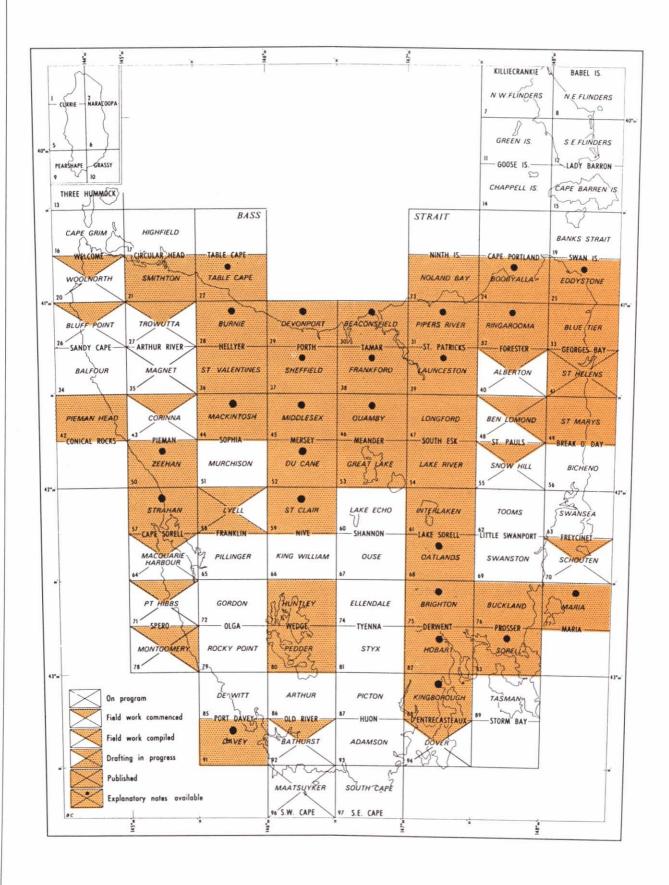
- 1. Provide the Director of Mines with information and advice on matters of a metallurgical or chemical nature relating to the mining industry, and all matters concerning the operational administration of the laboratory.
- 2. Provide a metallurgical and analytical service, and information and advice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

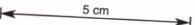
#### Administration Division

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





### LIST OF UNPUBLISHED REPORTS 1986-87

No.	Title	Author	Date
1986/31	Erosion problems at a proposed subdivision at Shannuk Drive, West Hobart	W. L. Matthews	28.8.86
1986/36	DORIS—A drill log record information system (Revision 1)	R. G. Richardson A. L. Telfer	24.7.86
1986/40 1986/41	ISOLIBRARY—An isotope data indexInvestigation of a cracked house at Alanvale Road, Newnham,	A. L. Telfer	3.7.86
1986/42	LauncestonBlue coloration of water from bores near the Forth River	W. R. Moore W. L. Matthews	22.7.86 9.7.86
986/43 986/44	Coal in Tasmania	C. A. Bacon A. L. Telfer	1.9.86 18.7.86
986/45	Chromite in the Owen Conglomerate, Lyell area	R. S. Bottrill	2.9.86
986/46	A bore log register for Tasmania	V. M. Threader C. G. Bain	31.7.86
986/47	Geology and exploration history of the west Tasmanian continental margin.	P. W. Baillie	28.7.86
986/48	Subsurface investigation of three proposed house sites at Wulf's subdivision at Underwood.	W. R. Moore	5.8.86
986/49 986/50	Spear bores near the mouth of the Arthur River	W. L. Matthews E. L. Martin	6.8.86
986/51	Foundation conditions of a proposed extension to the Burnie Technical College	D. J. Sloane	25.8.86
986/52	Mineralogy/petrology of some Dan Rivulet BH1 samples	R. S. Bottrill	2.9.86
.986/53 .986/54	Investigation of a cracked house at Sorell Street, George Town  Portion of St Helens 1:50 000 geological map sheet	W. R. Moore M. P. McClenaghan	28.8.86
000/01	Totali of of ficiens 1.00 000 geological map sheet	N. J. Turner	
986/55	Stability of land at Glenwood Road Leichardt, Launceston	P. R. Williams W. L. Matthews	29.8.86 5.9.86
986/56 986/57	Masonry cracks at 14 Ellison Street, Punchbowl, Launceston SEDSAM: A FORTRAN program for size of sediment analysis (Revi-	B. D. Weldon	5.9.86
	sion 2)	J. W. Hudspeth	5.9.86
986/58 986/59	CONMAT—The Tasmanian construction materials register ELSORT—A program for sorting Exploration Licence report numbers	R. G. Richardson	16.9.86
986/60	(Revision 1) Correlation of coal seams in north-eastern Tasmania	R. G. Richardson C. A. Bacon	12.9.86
		C. R. Calver	17.9.86
986/61 986/62	A summary of the oil shale resources of Tasmania	C. A. Bacon	9.4.87
986/63	other) data (Revision 2)	R. G. Richardson	9.10.86
986/64	3)STNDSTN—A FORTRAN program for plotting the distribution of	R. G. Richardson	9.10.86
986/65	areally sampled data (Revision 1)	R. G. Richardson W. L. Matthews	9.10.86 3.10.86
986/66	Mineralogy of gold-bearing concentrates from Synfields Lease (Tas-		
986/67	manian Alluvials), Lisle goldfield Potential landslide and erosion problems, Great Western Tiers and	R. S. Bottrill	14.10.86
986/68	Mt Barrow	D. J. Sloane	21.11.86
986/69	Institute of Technology campus at Newnham Offshore well data held by the Tasmania Department of Mines	W. R. Moore P. W. Baillie	16.10.86
986/70	(Revision 3)	J. W. Hudspeth	15.10.86
986/72	at Powers Road, Lilydale: a case study	W.R.Moore	18.12.86
986/73	specified area (Revision 3)	R. G. Richardson P. W. Baillie	5.11.86
	Head, western Tasmania.	C. A. Bacon	31.10.86
986/74 986/75	Operations report—1985/86 Mt Read gravity survey	R. G. Richardson R. S. Bottrill	14.11.86 31.10.86
986/76	Slope stability at a proposed subdivision at Rosevears	B. D. Weldon	10.11.86
986/77 986/78	Geophysical surveys at Boco Siding—Stage 1.  Dolerite weathering at Runnymede.	R. G. Richardson W. L. Matthews	10.11.86 19.11.86
986/79	West Coast gravity tie stations (Revision 1).	R. G. Richardson	
986/80 986/81	High groundwater levels along Shark Point Road, Penna FORTRAN programs for verifying the areal distribution of data points	M. J. Dix B. D. Weldon	1.6.87 5.1.87
986/82	(Revision 2)	R. G. Richardson	5.12.86
986/83	a Perkin-Elmer 3200 series mini-computer	R. G. Richardson	20.1.87
986/84	Windermere.  Measured values of pore pressures and leak-off pressures in the Bass	W. R. Moore	3.12.86
986/85	Basin	P. H. Winchester	9.12.86
	deposit	R. S. Bottrill	1.12.86
.986/86	Major, trace and REE chemistry of Eocambrian—Cambrian basaltic suites from the Dundas Trough and Smithton Basin, western	H. M. Waldron	
986/87	Tasmania Mineralogy of some King River Delta metallurgical products	A. V. Brown R. S. Bottrill	22.12.86 19.12.86
987/02	TASGRAV—The Tasmanian Gravity data base	D. E. Leaman	
987/03	Modifications to Boonstra and de Ridders' computer programs for	R. G. Richardson	6.2.87
	numerical modelling of groundwater basins on the Department of Mines Perkin-Elmer minicomputer	B. D. Weldon	23.1.87
987/04	Graphing with Excel	M. Power	13.1.87
987/06	Engineering geology report on five subdivisions at the Blackstone Heights Project, Launceston	W. R. Moore	28.1.87

### LIST OF UNPUBLISHED REPORTS 1986-87—(continued)

No.	Title	Author	Date
1987/09	Industrial minerals in Tasmania—Ochre.	C. A. Bacon	20.2.87
1987/12	Test pits at a proposed wool store at Western Junction	W. L. Matthews	23.2.87
1987/13	Petroleum geochemistry of crudes from Yolla-1 and Pelican-5, Bass Basin	P. W. Baillie	23.2.87
1987/14	Industrial minerals in Tasmania—Graphite	C. A. Bacon	25.3.87
1987/15	Industrial minerals in Tasmania—Slate	C. A. Bacon	25.3.87
1987/16	Petrography of altered and mineralised Cambrian rocks from beneath		
	Tertiary basalt in the Mt Cattley area	G. R. Green	9.3.87
1987/17	Geological investigation of a proposed refuse disposal site for the		
	Evandale municipality.	B. D. Weldon	6.3.87
1987/18	Foundation conditions at a proposed hospital site at Cooee	W. L. Matthews	10.3.87
1987/19	Grain size analyses of magnesite, Pinner deposit, Lyons River	R. S. Bottrill	17.3.87
1987/20	Subsurface examination of proposed lots, Pleasant Hills Subdivision,		
	Rosevears	B. D. Weldon	16.3.87
1987/21	A Paleocene radiometric age for basalt at Bream Creek, south-eastern		
	Tasmania.	P. W. Baillie	31.3.87
1987/22	Stormwater drainage study at Comalco Aluminium, Bell Bay	B. D. Weldon	6.4.87
1987/23	Geology and exploration history of the Tasmanian sector of the		
	Gippsland Basin	P. W. Baillie	15.4.87
1987/24	Middle Palaeozoic rock sequences in Tasmania	P. W. Baillie	29.4.87
1987/25	Industrial minerals in Tasmania—Talc	C. A. Bacon	18.5.87
1987/26	Vitrinite reflectance data for Tasmanian offshore wells	P. W. Baillie	20.5.87
1987/27	CARP—Computer assisted retrieval of plans (Revision 2)	R. G. Richardson	22.5.87
1987/28	Petroleum geochemistry of a sample of Tasmanites oil shale	P. W. Baillie	15.6.87
1987/29	Foundation investigations at Kings Car Park, Argyle Street,		
	Hobart.	D. J. Sloane	18.6.87
1987/30	Stability assessment of a proposed subdivision at Flinders Street,	D 1 01	00 0 05
	Beauty Point	D. J. Sloane	22.6.87
1987/31	Stability of land at Norwood	W. L. Matthews	23.6.87

#### REPORT OF THE MOUNT CAMERON WATER RACE BOARD FOR THE YEAR ENDED 30 JUNE 1987

The Minister for Mines,

We submit the report of the Mount Cameron Water Race Board for the year ended 30 June 1987.

In our report for the year ended 30 June 1986 it was implied that the Board was being wound up and the water-race done away with. Since then the situation has been reevaluated and the decision taken to retain the race for possible re-emergence of the northeast tin industry.

In the meantime the possibility of utilising the race as part of an irrigation scheme on the Great Northern Plain is being closely studied, and should this prove feasible will justify retention of the race.

As the present members of the Board resigned in anticipation of winding up, a new Board will be required in the next year.

H. MURCHIE, Chairman

V. WOOD, Member

K. R. DAVEY, Member

## MOUNT CAMERON WATER RACE SUSPENSE ACCOUNT STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 30 JUNE 1987

	1986	1987
Receipts—	\$	\$
Balance from last account		338.98
Appropriation Act 1985-1986 (Loss 1984-1985)	18 073-60	
Sale of Water—		
Fixed scale		
Royalty scale		****
Domestic		****
Other Receipts	424.72	****
	18 498-32	338.98
Payments—		
Balance from last account	18 073.60	****
Salaries wages and payroll tax Travelling allowance		
Travelling allowance	85.74	
Balance to next account	338-98	338-98
	18 498-32	338-98

# REPORT OF THE RINGAROOMA AND CASCADE WATER RACE BOARD

FOR THE YEAR ENDED 30 JUNE 1987

The Minister for Mines,

As previously indicated the responsibilities for the water race were assumed by the Rivers and Water Supply Commission during the year.

Responsibility for the Suspense Account remained for the year with the Board, but in future will rest with the Rivers and Water Supply Commission.

H. MURCHIE, Director of Mines

### RINGAROOMA AND CASCADE (WATER) SUSPENSE ACCOUNT T754 STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 30 JUNE 1987

	1986	1987
Receipts—	\$	\$
Appropriation Act 1985–1986 (Loss 1984–1985) Rivers and Water Supply Commission C103 Minor	2013-58	5
Works Contribution (Loss 1985–86, 1986–87).	****	4196.71
Balance to next account	2080.46	
	4094.04	4196.71
Payments—		
Balance from last account	2013.58	2080-46
Interest on Capital Cost	2080.46	2116.25
	4094.04	4196.71



Electric trolley-wire charging car levelling the surface of the furnace charge with a silica/woodchip/coal mixture, Pioneer Silicon Industries, Electrona.