

1980/69  
BMR PUBLICATIONS COMPACTUS  
(LENDING SECTION)



077385

# BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

## RECORD

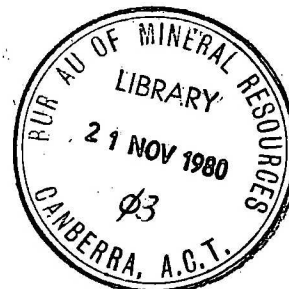
Record 1980/69

OPERATIONS BRANCH

SUMMARY OF ACTIVITIES

1980

AND STAFF LIST



BMR  
Record  
1980/69  
c.3

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Record 1980/69

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## CONTENTS

	<u>Page</u>
PUBLICATIONS AND INFORMATION SECTION	1
Publications Subsection	1
Information Subsection	2
LIBRARY	6
ADP APPLICATIONS SECTION	8
PLANNING AND CO-ORDINATION SECTION	11
CARTOGRAPHY SECTION	13
ADMINISTRATIVE SECTION	16
 APPENDIX 1 : Publications issued in period 1/10/79 to 30/9/80	 22
APPENDIX 2 : Records issued on open file in period 1/10/79 to 30/9/80	 25
APPENDIX 3 : Data released through Australian Government Printer copy service during period 1/10/79 to 30/9/80	 32
 LIST OF BMR STAFF (as at 31 October 1980)	 34

## PUBLICATION AND INFORMATION SECTION

Head of Section : A. Renwick

A. Renwick administered the Section for rather more than half the year. For the remainder, when he was either acting as Assistant Director (Operations) or oversea on leave or duty, W.H. Oldham was in charge. He attended the 26th Session of the International Geological Congress in Paris, handing over as Secretary-General of the Congress at the Opening Ceremony.

The year was one of consolidation rather than innovation, although it did see the development of the miscellaneous monograph to supplement the serial publications which form the framework of the publishing program. Both the BMR Speakers' Handbook and the Australian Geological Delegation to China fall into this category and were published during the year. A series of loose-leaf maps and commentaries entitled the BMR Earth Science Atlas of Australia was also launched.

### Publications Subsection

Principal Editors : W.H. Oldham, J.F. Truswell (until June),  
A.G.L. Paine (from June)

Further reduction of staff increased the problems of the Subsection. Some work has fallen behind schedule, but the BMR Journal and the Australian Mineral Industry periodicals were not affected.

Planning has been greatly assisted by the fortnightly meetings of the Publications Co-ordinating Committee. For a trial period the Publications Production Group has been transferred from the Administrative Section to the Publication and Information Section.

The first of the 1:100 000 map commentaries, for the Marraba geological sheet, was issued during the year.

The Wordplex-2 word processors acquired last year are working well. After investigation, it was recommended that purchase of an Optical Character Recognition scanner would be the best way to extend our word processing capacity.



### Information Subsection

Principal Information Officer : E.P. Shelley

#### General services

A large part of the Subsection's activities was directed towards the continuous flow of enquiries from Government, industry, and the public. The demand from schools and students for project material continued at a high level throughout the year. In the 8-month period February-September, 523 requests from schools and 1925 from students were received; a total of 15 402 brochures were mailed in response to these requests.

The Subsection co-ordinated BMR contributions to various publications including the Arid Zone Newsletter, AAEC Annual Report, Newsletter of the NSW Committee for the Co-ordination of Government Geological Programs, the Department's Annual Report, and various yearbooks and directories. The Subsection also co-ordinated answers to Parliamentary questions and Ministerial correspondence, and prepared briefs and background papers for the Minister and the Department.

A brief was prepared for the Department for the 36th meeting of ESCAP.

#### Information Systems

Considerable effort was put into development of the GEODX data base during the year. This data base is shared with the Stratigraphic Index and is maintained on BMR's HP-1000 computer using the IMAGE Data Base Management System.

All BMR publications and Records issued since October 1979 have been fully indexed and entered into the data base. Bibliographic information for all other BMR Reports, Bulletins and Records is now in the data base and indexing of older material is being done as time permits. At the end of October, the data base contained bibliographic details of 206 Bulletins (37 indexed), 222 Reports (5), and 4688 Records (132). Flexible updating, interrogation, and reporting programs have been provided by the ADP Applications Section.

The list of Records in the 'Quarterly list of publications of BMR' is now compiled from the data base, as was the annual list which appears as Appendix 2 in this Record.

BMR continued its support of the Australian Earth Sciences Information System (AESIS). \$7000 was contributed towards AESIS computing costs in 1979/80 and a further \$7000 has been provided for 1980/81. A. Renwick and E.P. Shelley represented BMR at the AESIS Advisory Committee Meeting in Canberra in October.

#### Publications

A list of all Records on open file for the period 1971-78 was compiled, printed and distributed. An updated list of publications is at an advanced stage of compilation. Edition 4 of the two brochures 'The geological and geophysical activities of BMR in Australia and Antarctica' was issued in April.

The Subsection produced the 'Quarterly List of Publications of BMR' during the year. BMR Records were despatched monthly to open file centres.

The 11th issue and one supplement of the list of coming events in the earth sciences were compiled and distributed within BMR and to some other organisations and individuals.

Ten project brochures were re-printed in January; several others have been revised prior to re-printing.

#### Internal information services

The Subsection continued to provide a watching brief on UN activities in the earth sciences and mineral and energy resources relevant to BMR, and briefed officers and circulated material as appropriate. Hansard was scanned for items of interest to BMR and these were circulated to relevant officers.

4.

Seismic surveys	1978/ 91	
	1979/ 49	
	1979/ 54	
	1979/ 57	
	1979/ 73	
	1979/ 78	
	1980/ 12	(a) Subject index

Seismographs	1979/ 7
Seismology	1980/ 51
Self potential survey method	1978/ 60
Silurian	1980/ 7

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Blake D.H.	1979/ 86
	1979/ 93

Brown C.H.	1979/ 51
	1979/ 52
	1979/ 72

Bultitude R.J.	1980/ 16	(b) Author index
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Burne R.V.	1979/ 32
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Chaproniere G.C.	1980/ 50
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Collins C.D.N.	1979/ 7
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SF/53-14	1979/ 47
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SF/54-05	1980/ 16
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SF/54-06	1979/ 86
	1979/ 93

SF/55-01	1979/ 78	(c) Map sheet index
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SF/55-10	1979/ 78
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SF/55-11	1979/ 78
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Adavale Basin	1979/ 78
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Arafura Basin	1979/ 51
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Arunta Block	1979/ 47
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Bedout Sub-basin	1979/ 32
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Bonaparte Gulf Basin	1979/ 52	(d) Basin/province index
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Bowen Basin	1979/ 49
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Broome Arch	1979/ 32
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Canning Basin	1979/ 32
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Fig 1: Examples of index listings of BMR Records from GEODX data base.

### Symposium and lectures

The 9th BMR Symposium was held in Canberra on 29-30 April. There were 119 registrations by geoscientists from industry, tertiary institutions, and Commonwealth and State organisations. Twenty papers were presented by BMR scientists. The Harold Raggatt Award for the best presentation was awarded to Dr G. Derrick for his paper 'Anatomy of a Proterozoic rift'.

The Subsection organised the Tuesday morning lecture series which was held at BMR during January-May and November-December periods.

### Public relations and publicity

Several student groups visited BMR during the year; most visits were in co-operation with Museum staff. A group of science teachers visited BMR in September during the National Science Teachers Conference.

Careers information in the earth sciences and cartography was provided at 'Careers 80' at CCAE in June.

In the 12-month period to September 1980, 29 news releases were made on various BMR activities, publications, and availability of data.

A program of advertising of BMR publications commenced this year. The first series of advertisements were for resources-related publications (Australian Mineral Industry Annual Review, etc) and the response has shown this program to be cost-effective.

### Displays and exhibitions

The main display in the BMR foyer was changed at the end of 1979 to one featuring BMR research projects in fields covered by the International Union of Geodesy and Geophysics. A display featuring the BMR Earth Science Atlas of Australia was set up in the foyer in February.

The flashing-light map display was lent to the Canberra Public Library Service in June for its Kingston Branch.

A display featuring Australia's mineral and energy resources was lent to the Myer Emporium in Adelaide in June. When this was returned

it was updated and refurbished and, together with the flashing-light display, was sent to the Westfield Shopping Organisation for resources displays in two of their Sydney stores.

Construction of a fluorescent mineral display unit for the 'Questacon' (science education centre) in Canberra was completed and the display installed.

#### LIBRARY

Librarian-in-charge : M.A. Thompson

#### Computerised loan system

Further development of the library's computerised loan system, LIBLN, took place during the year. New code numbers were devised for serials and a major clean-up of the data base was made to remove duplicate and erroneous entries. The application programs were re-written to conform with a new version of the IMAGE data base management system.

A new procedure for entering serial details was considered but, at the time of writing, had not been implemented as new software and an additional terminal have not yet been provided.

On average 300 new entries per week are being made to the data base.

The data base is being used to routinely print recall notices and to assist in stocktaking. The first 'List of additions to the library' - for the period January-March 1980 - was produced from the data base in August.

#### Computer-based reference searches

During the year, the Reference Librarian made good use of the keyword set in LIBLN in answering reference queries. Up-to-date subject information is thus obtained to supplement the subject card catalogue which is always several months out-of-date.

Ten searches of overseas data bases were made using OTC's MIDAS satellite link to TYMNET in USA.

### Bibliographies

The following bibliographies were issued during the year -

- No. 10. Uranium deposits of Australia to 1975; compiled by S. Spannari.  
No. 11 Production of oil shale, compiled by R. Lorenz & D. Gibson (supplement to No. 9).

A cumulative listing of the oil shale bibliography was prepared from the OSHAL data base for inclusion as a microfiche appendix in BMR Record 1980/27.

A bibliography of the geology of the A.C.T. was compiled for issue as a Record.

### Seminars and courses

Library staff attended the following seminars and courses during the year:

- 24-25 January - Mrs Lorenz attended a DIALOG System Seminar, presented by Lockheed Information Systems at the R.G. Menzies Building, ANU Library, Canberra. It was a training workshop for new users of DIALOG.
- 28 March - Mrs Lorenz attended a Seminar on 'How or How Not to COM Your Catalogue' organised by the ACT Branch of the Library Association of Australia.
- 3 June - Mrs Lorenz attended a joint meeting in Sydney of the Australian Geoscience Information Association and the Sydney Mineral Exploration Discussion Group. Mr R.A. Miller of the United States Department of Energy spoke on the Minerals Availability System (MAS) of the United States Bureau of Mines.
- 24-25 July - Ms A. McCall, Loans Officer, and Ms K. Burchett, Serials Accessioning Officer, spent two mornings at the Orientation Course for recent arrivals in the Department, organised by the Training Section.
- 6-7 August - Mrs S. Norfolk, Serials Librarian, attended a Lockheed DIALOG System Seminar held in Canberra.

Statistics

A statistical summary of library activities for the period November 1979 to October 1980 is given in the following table. The figures in parentheses are for the previous 12-month period.

## Loans (internal - including circulation of serials):

	17466	(17942)
Reference Searches: total	414	(375)
for BMR staff	187	(201)
for others	227	(174)

Recall notices issued by computer:	15483	(7512)
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## Inter-library Loans:

Requested from BMR	4116	(3128)
Requested by BMR	967	(440)

## Acquisitions:

New Serials	104	(201)
Books (\$10 and over in value)	400	(342)

## Cataloguing (new and revised):

Books, Pamphlets, maps, company reports, and microfiche	847	(1040)
Serials	120	(259)

Visitors to the Library:	606	(475)
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ADP APPLICATIONS SECTION

Head of Section : A.J. Barlow

General

The section provided the same on-going services as in previous years. These functions included on- and off-line data preparation, data digitising, CSIRO node operation, operation of the Hewlett Packard computer system, and provision of consultant services to user groups.

### CSIRO Computing

Most of the Bureau's computing continued to be done using the CSIRO CYBER 76 system. Availability of the system was mostly satisfactory. Although delays of up to 24 hours are incurred, most production jobs have continued to be run at lowest priority in order to conserve funds.

The User Assistance Group at CSIRO continued to provide constructive assistance in reading magnetic tapes created at other installations and in providing advance warning of changes to the system allowing the ADP Section to evaluate their impact before general use.

### Finance

Computing funds were adequate in 1979/80 but an increase in CSIRO charges of approximately 25% on 1 July 1980 will force further economies to be effected. Computing expenditure for the year 1979/80 was \$567 000 including \$200 000 for consumables, repairs and maintenance. Expenditure for 1980/81 is expected to be \$620 000.

### Information storage and retrieval

There are now 18 data bases in operation on the Hewlett Packard computer system using the IMAGE software package. The ultimate size of some of the larger data bases is placing a heavy load on the resources of the H-P system. The full capacity of the 120 Mbyte disc purchased in 1979 has been reached and a further 120 Mbyte disc has been ordered with delivery expected in January 1981.

### Automated cartography

Little progress has occurred on this project owing to the pressure of other work; some advice is being given to user groups. The Calcomp 936 drum plotter has been connected on-line to the Hewlett Packard system. A Tektronix graphics terminal and packaged software is being ordered to provide a basis of development of various computer-assisted cartography projects.

### ANU joint projects

The mass spectrometer system was upgraded with additional computer memory and installation of RTE III operating system software. This enabled all the data acquisition programs to be rewritten as relatively simple FORTRAN



programs greatly simplifying maintenance and future program enhancement. ANU have appointed a research assistant to help with the development of the system.

Again little progress was made with the ion microprobe software in 1980 owing to technical problems with the machine. Major modifications have delayed testing of several of the application programs.

The first stage of a data acquisition system for the cryogenic magnetometer at the Black Mountain palaeomagnetic laboratory was completed after replacing the obsolete H-P computers with a model 2100A CPU. This system will later be upgraded to include several other magnetometers and a graphics display terminal as well as change to a memory-based RTE operating system as new hardware becomes available. The data will be processed at BMR and stored as an IMAGE data base.

#### Computer review

The feasibility study on the acquisition of a larger in-house computer system to handle a significant proportion of the work now done on the CYBER was suspended owing to staff being required for higher priority work. An assessment of BMR's short-term computing requirements and the cost and performance of suitable systems has been initiated and report and recommendations should be available in 1981.

#### Assistance to other Branches

Assistance was provided to other branches in the areas of program design and development, and program conversion. Further assistance was given to the Engineering Services Section in the conversion to the CYBER 76 computer and in the operation of some additional computer aided design packages.

Considerable effort is also being devoted to assisting the development of a new seismic processing system. Some of this system was purchased with the assistance of NERDDC grants to enable high-level processing of seismic data in-house. Some of this processing is presently done by a contracting company at relatively high cost.

Software was developed for the multi-channel gamma-ray spectrometer installed in the Twin Otter survey aircraft. The new system eliminates the difficult and error-prone set-up procedures of the 4-channel system. Equipment calibration now involves only two operator adjustments. System stability is constantly monitored by the computer using the location of prominent peaks in the natural gamma-ray spectrum. Output data is provided in two formats: raw multi-channel counts, and counts per second in four energy bands representing total count, potassium, uranium, and thorium. Recording of multi-channel data on a routine basis will not be possible until a high data capacity cartridge tape drive is added in 1981.

### Training

Section staff assisted the Department's Training Section in providing introductory ADP and FORTRAN courses.

### Hewlett Packard Computer System

Use of the system continued to expand in 1980. The 2100A computer was replaced by the model 2117F computer with 512 Kbytes of memory, the RTE 4B operating system was installed, and the 120 Mbyte disc fully utilised. These enhancements have greatly increased the capacity of the system. Reliability has been good and no extended periods of down-time have been experienced.

Integration of the electron microscope data into the acquisition system is proceeding and is expected to be completed before the end of the year. Delivery of the colour monitor for LANDSAT image processing is expected in November and should be integrated with the computer before the end of the year. This subsystem will require a considerable portion of the capacity of the new 120 Mbyte disc drive.

### PLANNING & CO-ORDINATION SECTION

Head of Section : K.M. Kennedy

### Program

Following preparation for the final meeting concerning the 1980 Program, a detailed program document was produced and program summaries written for the Minister, as a BMR Record, and for BMR80.

Four new program initiatives were documented for consideration at budget discussions; two of these, an accelerated airborne program and a feasibility study for a national coal data-base were subsequently included in BMR's forward program.

The Section addressed itself to the need for more complete information on project objectives and work programs, both to assist program considerations by the Director and the proposed Advisory Council, and to improve documentation of BMR program. A new proforma was adopted for project proposals for 1981 onwards as a basis for program meetings held late in the year. A computerised data-base was also developed to assist with retrieval and analysis of program data.

#### AMSTAC & ARPAC

K.M. Kennedy represented the Director at meetings of the Australian Marine Science and Technology Advisory Committee (AMSTAC) and the Antarctic Research Program Advisory Committee (ARPAC). AMSTAC/FAP funding was granted to two BMR research projects on the Great Barrier Reef. A number of Working Groups within AMSTAC reviewed and reported on different aspects of marine science; those of particular interest to BMR are Research Vessels, Archiving and Curating, Physical Survey Methods, and Oil Spills and Countermeasures.

#### Marine Committee

K.M. Kennedy continued to convene the Marine Committee and co-ordinated preparation of evidence for the Senate Standing Committee inquiry into the Marine Sciences heard in May 1980.

#### General

Throughout the year assistance and advice on BMR program matters was given to the Director and Assistant Director (Operations). Meetings were held with the Department of Administrative Services concerning a new building complex for BMR and liaison was maintained with NERDDC Branch concerning BMR NERDDC projects and applications for grants.

CARTOGRAPHY SECTION

Chief Cartographer (Production) : P.A. Boekenstein

Chief Cartographer (Resources) : M.E. Nancarrow

Management and Staffing

At 31 October 1980 the staff of the section consisted of 74 Draftsmen, 1 Graphic Designer, 4 Photographers, 1 Technical Officer, 11 Drafting Assistants, 1 Assistant (Printing), and 1 Clerical Assistant.

The section continued to operate with the Mapping Sub-section located at Canberra and the Publication Sub-section at Queanbeyan. Project management continued to be applied successfully and a number of staff interchanges were made between groups to ensure continued staff development.

Three draftsmen accompanied parties on field surveys: I. O'Donnell, Pine Creek (geology); J. Stirzaker, Huckitta (geology); and G. Butterworth, Lyndhurst (geology). A fourth draftsman, T. Brown, accompanied the marine geology team on the research vessel 'Sonne' to Fraser Island.

E. Feeken visited four geological field parties during a field supervisory visit between 25 August and 11 September 1980. He also visited the NT Mines Department at Darwin to discuss geological map compilation methods with their Cartographer-in-Charge.

F. Simonis visited R.C. Todd and Associates Pty Ltd at Brisbane from 4 to 8 February 1980 to check the progress and accuracy of the Naracoorte-Horsham flight path recovery contract.

M. Nancarrow and P. Boekenstein attended the 9th Chief Draftsman's Conference at Brisbane from 15 to 18 April 1980.

G. Lamberts attended the 8th World Computer Exhibition at Melbourne on 17-18 October 1980.

M. Nancarrow attended two meetings of the PSB Drafting Standards Committee at Melbourne on 14 April and 13-14 October 1980.

L. Kerec continued work on the Visual Aids Manual, assembling text and illustrations supplied by the working group.

Production (November 1979 to October 1980)

1. <u>Geological maps</u>	<u>1:100 000</u>	<u>1:250 000</u>	<u>Other scales</u>
Photoscale compilation in progress	10	1	-
Photoscale compilation completed	2	-	-
Preliminary Edition:			
Compilation by BMR, in progress	5	2	7
Compilation by BMR, completed (ready for printing)	3	-	12
Printed	18	6	3
1st and 2nd Edition:			
Fair drawing in progress,			
BMR:	-	-	3
contract*:	1	2	-
Fair drawing completed,			
BMR:	-	-	5
contract*:	4	8	5
Printing in progress**	3	7	4
Printing completed**	5	5	13

Notes:

\* Contract drafting stages: Specifications prepared - 15 maps; contractor recommended - 11 maps; first proof checked - 12 maps; second proof checked - 15 maps.

\*\* Printing stages: specifications prepared - 19 maps; printing contracts recommended - 11 maps; colour designs and colour guides - 21 maps; screen masters and dyeproofs checked - 23 maps; machine proofs checked - 21 maps; printed maps checked - 28 maps.

The above statistics include eight 1:10 million maps for BMR Earth Science Atlas.

2. <u>Geophysical Maps</u>	<u>1:250 000</u>	<u>1:500 000</u>	<u>Other scales</u>
Pre-survey compilation in progress	6	-	-
Pre-survey compilation, completed	7	-	-
Flight path recovery, in progress	6	-	-
Flight path recovery, completed	11	-	-
Preliminary releases: magnetic and radiometric	154	-	25
Total magnetic intensity contours (updating)	-	-	47
Officer Basin total magnetic contours	-	-	1
Gravity Series maps, in progress	35	-	2
Marine Surveys (computer drawn) completed:			
Track maps	-	-	41
Stream Sediment Geochemical Series (computer drawn), completed:			8
3. <u>Text Figures, diagrams etc. completed</u>			
BMR Journal (issues 5/2, 5/3, 5/4, 6/1)			188
Bulletins (196: 20 figures 8 plates; 198: 46 figures; 205: 64 figures; 206: 34 figures; 207: 12 figures; 208: 12 figures; 209: 39 figures; 210: 60 figures, 25 plates)			320
Reports			20
BMR Earth Science Atlas commentaries			37
Records and miscellaneous (includes AMI)			790
External publications			352
Transparent slides for BMR Symposium and lectures			324
Isogal sketches			70

ADMINISTRATIVE SECTION

Administrative Officer : B.M. Williams

The Administrative Section provided assistance throughout the year in the areas of office services, finance, staff and personnel, publications processing, sales and distribution, typing services, registry services, vehicles, overseas duty, and day to day general administrative support.

Staff

There was a turnover of 40 staff. Many positions remained vacant for varying periods and several are still vacant. Continuous rearrangement of staff for purposes of higher duties, vacancies, and the need to train new staff, has reduced the standard and availability of support services expected of the Section. It has only been possible to provide relief clerical support on an ad hoc basis.

Reviews were undertaken of the Staff and Relief, and Publications Printing and Distribution Subsections as well as the two Branch Clerk positions, one of which was abolished. A review of the structure of the top level of the Section was also undertaken.

Finance

The level of both commitment and cash funds for 1980/81 are, in real terms, marginally higher than in 1979/80.

Table 1 sets out the Final Estimates for 1980/81 and actual expenditure for 1979/80.

In 1979/80, Additional Estimates were obtained for salaries and allowances (\$103 400), travelling and subsistence (\$24 500), and freight and cartage (\$8 100). An advance of \$60 000 was also obtained from the Advance to the Minister for Finance for general stores. All of the increased provisions were offset by offering savings from within the original Appropriation.

Total BMR expenditure of \$13 310 837 was 1.4% less than available appropriations.

A change of funding procedures of field parties was introduced during 1980. A major bulk finance requisition was raised to cover field parties of a particular Branch in lieu of bulk finance requisitions for each field party. This has been a success.

The Accountant met and discussed with party leaders proposals to improve procedures for handling field finances and payment of allowances.

The Finance Subsection maintained a continuous review of all commitments and expenditure and provided advice to management as and when appropriate.

#### Works Program

The program for 1980-81 is shown in Table 2.

In 1979-80 work was completed at Tannadice Street, Darwin, to improve security and provide three new security holding bays for use by field parties.

Plans and specifications for the proposed Palaeontological Rock Store at Fyshwick were available by June 1980. Owing to financial constraints, NCDC has deferred this proposal for reconsideration in its 1981-82 program. On present indications construction may commence after June 1981.

#### Vehicles

Seven accidents were reported involving ten BMR vehicles. Three vehicles were extensively damaged and are to be disposed of without repair, one vehicle required substantial repairs, while the others sustained only minor damage.

Seven SWB Landrovers, due for replacement at the end of 1980, may not be replaced before the 1981 field season as the Transport and Storage Division, Department of Administrative Services, have not yet negotiated a period contract for SWB 4 x 4 vehicles. It is unlikely therefore that replacement vehicles would be available before May 1981, too late for modification to BMR's specifications. In addition, replacement vehicles are likely to be Toyota vehicles rather than Landrovers.



Six International D1310 30 cwt 4 x 4s were to be replaced by June 1980 with Chevrolet CK 20 4 x 4s. These had not been delivered as at 30 September.

In the past two years BMR has deferred replacement of several vehicles for periods in excess of the normal hire periods to assist the Transport and Storage Division because of its financial difficulties. This has resulted in BMR having a vastly increased replacement program for 1980/81.

#### General

The area provided for counter sales of BMR's publications had to be expanded to meet increased storage and display space. This was achieved with the minimum of expenditure by an exchange of working areas occupied by the Staff and Relief, and Publications Printing and Distribution Subsections.

Following the closure of the Department's publications sales outlet in Melbourne, all stocks of BMR's publications were returned to the Publications Bulk Store, Canberra.

Sales of BMR publications in Canberra exceeded \$92 000 during the 12 months to September, an increase of \$12 000 over the same period last year.

Official stocktakes of publications and furniture and fittings were finalised.

Arrangements to exchange the current IBM Copier II for a mark III were completed. Delivery is expected by November 1980. The new copier has several advantages over the mark II in that it can use several types of paper and has reduction and double-sided facilities.

The Chief Fire Warden with the assistance of Fire Wardens and the Canberra Fire Brigade conducted a fire drill involving the total evacuation of the BMR Building.

Future audit inspections by Commonwealth auditors are expected to concentrate on systems audits rather than existing voucher audits.

Officers of the Auditor General's Department were temporarily located at BMR to undertake a training exercise during which they examined procedures and systems in use in BMR. No official comment has been received although unofficial remarks indicated the training exercise was well worth while and procedures and systems appeared to be satisfactory.

TABLE 1Expenditure for 1979-80 and Final Estimates for 1980-81

Item	Description	Final Estimate 1980-81	Actual Expenditure 1979-80
432-1-01	Salaries and allowances	9 574 000	8 693 272
02	Overtime	159 000	144 144
		<u>9 733 000</u>	<u>8 837 416</u>
432-2-01	Travelling and subsistence	544 000	474 757
02	Office requisites and equip- ment, stationery and printing	145 000	123 393
03	Postage, telegrams and telephone services	226 000	220 636
04	Office services	43 000	37 960
05	Printing and distribution of maps and publications	348 000	324 951
06	Motor vehicles - hire and maintenance	620 000	560 667
07	Aircraft - maintenance and running expenses	511 000	297 670
08	General stores	550 000	567 133
09	Contract services	680 000	567 896
10	Freight and cartage	61 000	60 850
11	Repairs and maintenance of plant and equipment	73 000	70 146
12	Computer services	620 000	566 449
13	Incidental and other expenditure	73 000	71 707
		<u>4 505 000</u>	<u>3 944 215</u>
	Total Division 432	<u>14 238 000</u>	<u>12 781 631</u>
891-1-01	Plant and equipment	<u>710 000</u>	<u>529 206</u>
	Total BMR	<u>\$14 948 000</u>	<u>\$13 310 837</u>

TABLE 21980/81 Works Program

	BMR \$	DAS \$
Major New Works	nil (1)	260 000 (3)
Minor New Works	12 100	20 000
Repairs and Maintenance	20 500	133 000
Furniture and Fittings	114 800 (2)	

(1) A sum of \$220 000 was provided for new Palaeontological Rock Store, however, NCDC advised this item has been deferred for 1 year owing to financial constraints.

(2) Includes \$102 300 for compactus units in existing storage area of Core and Cuttings Laboratory.

(3) Fume Cupboard modifications	\$160 000
Upgrade airconditioning	\$100 000

APPENDIX 1Publications issued during period 1/10/79 to 30/9/80Bulletins

- 185. TASCH, P.\*\* , & JONES, P.J. - Carboniferous, Permian, and Triassic conchostracans of Australia - three new studies.
- 189. BURGER, D. - Palynological studies in the Lower Cretaceous of the Surat Basin, Australia.
- 190. NICOLL, R.S., & DRUCE, E.C.\* - Conodonts from the Fairfield Group, Canning Basin, W.A.
- 197. BLAKE, D.H., HODGSON, I.M., & MUHLING, P.C.\*\* - Geology of The Granites-Tanami region, Northern Territory and Western Australia.
- 199. EXON, N.F., & WILLCOX, J.B.\* - The Exmouth Plateau: Stratigraphy, structure, and petroleum potential.
- 203. VANDEN BROEK, P.H.\* - Engineering geology of Darwin East, NT.
- 204. OWEN, M., & WYBORN, D. - Geology and geochemistry of the Tantangara and Brindabella 1:100 000 Sheet areas, New South Wales and Australian Capital Territory.

Reports

- 210. MUTTON, A.J.\*, & ALMOND, R.A. - Geophysical mapping of buried Precambrian rocks in the Cloncurry area, northwest Queensland. (Microform MF95).
- 215. GREGSON, P.J., & PAULL, E.P. - Preliminary report on the Cadoux earthquake, Western Australia, 2 June 1979. (Microform MF100).
- 218. ANFILOFF, W., & TERRON, O.\* - Bibliography of gravimetry in Australia. (Microform MF106).
- 222. Geological Branch Summary of Activities 1979. (Microform MF119).
- 223. Geophysical Branch Summary of Activities 1979. (Microform MF120).

\* former BMR officer

\*\* non-BMR officer

BMR 79 - Yearbook of the Bureau of Mineral Resources.

Australian Mineral Industry Annual Review 1978 - Preprints of the General Review, Aluminium, Black Coal, Copper, Gold, Iron Ore, Lead, Nickel, Petroleum, Tin, Titanium, Uranium, and Zinc chapters.

Australian Mineral Industry Quarterly  
Vol. 32 (1979), nos. 2, 3, 4.

BMR Journal of Australian Geology and Geophysics  
Vol. 4, no. 4;  
Vol. 5, nos. 1, 2.

The Petroleum Newsletter  
Nos. 76, 77, 78, 79, 80.

Petroleum Exploration and Development Titles (Map and key)  
1 January 1979  
1 July 1979  
1 January 1980

Other Publications

DERRICK, G.M. - Commentary on geology of Marraba 1:100 000 Sheet area, Qld.

DRUCE, E.C.\*, & JENSEN, A.R. - BMR Speakers' Handbook.

1:250 000 Geological maps and explanatory notes  
CROWE, R.W.A.\*\* - Morris, W.A.

CROWE, R.W.A.\*\* & CHIN, R.J.\*\* - Runton, W.A.

GRIMES, K.G.\*\* & SWEET, I.P. - Westmoreland, Qld (2nd edition).

1:100 000 Geological maps  
Brindabella, ACT & NSW  
Hedleys Creek, Qld  
Kennedy Gap, Qld  
Seigal, NT  
Tantangara, ACT & NSW

BMR Earth Science Atlas of Australia (map and commentary)

Bouguer gravity anomalies  
 Earthquakes  
 Free-air gravity anomalies  
 Geology  
 Major structural elements  
 Plate tectonics

Stream-sediment geochemistry maps (1:100 000-scale)

Hedleys Creek, Qld (5 maps: lead-arsenic-zinc, nickel-copper-zinc,  
 uranium-arsenic-bismuth, uranium-cerium-thorium, uranium-copper-tin).

Seigal, NT (6 maps: lead-arsenic-zinc, nickel-copper-zinc, tungsten-  
 beryllium-niobium, uranium-arsenic-bismuth, uranium-cerium-thorium,  
 uranium-copper-tin).

Preliminary geological maps

1:100 000

Abudda Lakes, Qld  
 Alsace, Qld  
 Araluen, NSW  
 Ardmore, Qld  
 Denison, NT  
 Forest Home, Qld  
 Jim Jim, NT  
 Lawn Hill, Qld

Mount Angelay, Qld  
 Mount Whelan, Qld  
 Mundogie, NT  
 North Head, Qld  
 Riversleigh, Qld  
 Selwyn, Qld  
 Toko, NT

1:250 000

Alice Springs, NT (2nd edition)  
 Alligator River, NT (2nd edition)  
 Anketell, WA

Napperby, NT (2nd edition)  
 Pender, WA  
 Yarrie, WA

APPENDIX 2  
Records issued on open file  
in period 1/10/79 to 30/9/80

- 1971/ 37 Rew P.M.  
Miscellaneous chemical, petrographic and mineragraphic investigations carried out in the Geological Laboratory, 1970.
- 1975/100 Shaw R.D. Warren R.G. Senior B.R. Yeates A.N.  
Geology of the Alcoota 1:250 000 sheet area, NT.
- 1977/ 34 Gardiner J.E.  
Heavy-mineral sand deposits along the coast of Western Australia.
- 1977/ 43 Stagg H.M.J.  
Scott Plateau - structure, isopach, and potential field maps.
- 1977/ 56 Gardiner J.E.  
Bibliography of Australian heavy-mineral sands.
- 1978/ 3 Kurylowicz L.E.  
A review of the concepts and practice of wire-line log interpretation: and the application of computer program 'LOG4'.
- 1978/ 11 Crick I.H.  
Interim report on the Batchelor 1:100 000 Sheet (5171), NT.
- 1978/ 12 Seidel G.E.  
Hydraulic calibration of the GABHYD model of the Great Artesian Basin.
- 1978/ 23 Draper J.J.  
Progress report on Georgina Basin geochemistry - results from 1975, 1976 field seasons.
- 1978/ 60 Major J.A. Wilson D.R.  
Geophysical surveys at the Jubilee Plunger gold deposit, Georgetown Inlier, Queensland, 1974-1976.
- 1978/ 87 Mock C.M.  
Geology of the Oban 1:100 000 Sheet area, northwest Queensland: progress report.
- 1978/ 91 Robertson C.S. Cronk D.K. Mayne S.J. Townsend D.G.  
A review of petroleum exploration and prospects in the Otway Basin region.
- 1978/ 94 Milson J.S.  
Papua New Guinea isogal gravity survey, 1967.
- 1978/100 Marshall J.F.  
Morphology and shallow structure of the continental shelf of southern Queensland and northern New South Wales.
- 1978/103 Needham R.S. Crick I.H. Stuart-Smith P.G. Roarty M.R.  
Mundogie 1:100 000 sheet area data record.



## APPENDIX 2

Records issued on open file  
in period 1/10/79 to 30/9/80

- 1978/105 Colwell J.B.  
The late Cainozoic sediments of southeastern South Australia - lithology and mineralogy.
- 1978/110 Robertson C.S. Lockwood K.L. Nicholas E. Soebarkah H.  
A review of petroleum exploration and prospects in the Gippsland Basin.
- 1978/113 Needham R.S. Stuart-Smith P.G.  
Progress report of the Alligator River party, 1973-76 fieldwork.
- 1979/ 5 Robertson C.S. Nicholas E. Lockwood K.L.  
A review of petroleum exploration and prospects in the Bass Basin.
- 1979/ 7 Collins C.D.N.  
Adaptation of the synthetic seismogram program "REFLEX" to the CSIRO CYBER 76 computer.
- 1979/ 24 Wilson I.H. Hill R.M. Noon T.A. Duff B.A. Derrick G.M.  
Geology of the Kennedy Gap 1:100 000 Sheet area (6757), Queensland.
- 1979/ 27 Purcell D.C.  
Molonglo Valley interceptor sewer, ACT: engineering geology completion report, 1978.
- 1979/ 28 Ogilvy R.D.  
MAG3D: An interactive computer program to calculate the magnetic anomaly of a finite dipping prism.
- 1979/ 29 Ogilvy R.D.  
GRAV3: An interactive computer program to calculate the gravity anomaly of a finite horizontal prism.
- 1979/ 32 Gorter J.D. Rasidi J.S. Tucker D.H. Burne R.V. Passmore V.L. Wales D.W. Forman D.J.  
Petroleum geology of the Canning Basin.
- 1979/ 33 Pettifer G.R. Polak E.J.  
Christmas Island (Indian Ocean) geophysical survey for groundwater, 1976.
- 1979/ 35 Timoney E.  
A ready reckoner for early evaluation of open-pit base and precious metal projects.
- 1979/ 36 Shergold J.H. Walter M.R.  
BMR stratigraphic drilling in the Georgina Basin, 1977 and 1978.
- 1979/ 37 Rossiter A.G. Scott P.A.  
Stream-sediment geochemical data, Seigal 1:100 000 sheet area, Northern Territory.
- 1979/ 38 Rossiter A.G. Scott P.A.  
Stream-sediment geochemical data, Hedleys Creek 1:100 000 sheet area,

APPENDIX 2  
Records issued on open file  
in period 1/10/79 to 30/9/80

northwest Queensland.

- 1979/ 41 Everingham I.B.  
Papua New Guinea earthquake intensity data 1953-1959.
- 1979/ 44 Plumb K.A.  
McArthur Basin research, March quarter, 1979.
- 1979/ 45 Sweet I.P. Hutton L.J.  
Gregory Downs and Riversleigh 1:100 000 Sheet areas: catalogue of geological compilation sheets.
- 1979/ 47 Shaw R.D. Langworthy A.P. Offe L.A. Stewart A.J. Allen A.R. Senior B.R.  
Geological report on 1:100 000-scale mapping of the southeastern Arunta Block, Northern Territory.
- 1979/ 48 Devenish A.B.  
Sixteen-channel digital multiplexer: BMR type XDM-1.
- 1979/ 49 Bauer J.A. Dixon O.  
Denison Trough seismic survey, Queensland: operational report for 1978 survey and proposed program for 1979 survey.
- 1979/ 51 Brown C.M.  
Arafura and Money Shoal Basins explanatory notes and stratigraphic correlations.
- 1979/ 52 Brown C.M.  
Bonaparte Gulf Basin explanatory notes and stratigraphic correlations.
- 1979/ 53 Shergold J.H.  
Georgina research, June quarter 1979.
- 1979/ 54 Drummond B.J.  
Pilbara crustal survey, 1977: operational report.
- 1979/ 55 Cull J.P.  
Resolving heat flow anomalies in shallow boreholes - feasibility studies
- 1979/ 56 Wilson I.H. Noon T.A. Hill R.M. Duff B.A.  
Geology of the Quamby 1:100 000 sheet area (6957), Queensland.
- 1979/ 57 Plumb K.A.  
McArthur Basin research, June quarter, 1979.
- 1979/ 58 Passmore V.L.  
Sydney Basin explanatory notes and stratigraphic columns.
- 1979/ 61  
Geological Branch summary of activities 1979.
- 1979/ 62 Exon N.F.

APPENDIX 2  
Records issued on open file  
in period 1/10/79 to 30/9/80

Deep-sea sediments and manganese nodules from the southern Tasman Sea.

- 1979/ 63 Hill P.J.  
Detailed geophysical investigations, Tennent Dam sites 2 and 3, ACT.
- 1979/ 64 Vanden Broek P.H.  
Sand and gravel deposits and extraction operations in the Canberra region, ACT and NSW, 1977.
- 1979/ 65 Bennett D.G. Ramsay D.C.  
Field tests of Geonics EM 31 and EM 34-3 terrain conductivity meters.
- 1979/ 66 Devenish A.B.  
Development of 8-channel digital-to-analogue conversion card for HP2100 series computers.
- 1979/ 67 Scott P.A. Rossiter A.G.  
Stream-sediment geochemical data - Georgetown 1:100 000 sheet area.
- 1979/ 68 Scott P.A. Rossiter A.G.  
Stream-sediment geochemical data - Gilberton 1:100 000 Sheet area.
- 1979/ 69 Sheraton J.W.  
Inventory of Antarctic rock specimens held in Australian institutions.
- 1979/ 70 Shergold J.H.  
Georgina Research September quarter 1979.
- 1979/ 71  
Operations Branch summary of activities 1979, and staff list.
- 1979/ 72 Brown C.M.  
Murray Basin hydrogeological project progress report, September quarter 1979.
- 1979/ 73  
Geophysical Branch summary of activities 1979.
- 1979/ 78 Pinchin J. Schmidt D.L. Anfiloff W.  
Eastern Galilee Basin seismic survey, Queensland 1976.
- 1979/ 79  
Petroleum Exploration Branch summary of activities 1979.
- 1979/ 81  
Mineral Resources Branch summary of activities 1979.
- 1979/ 82 Plumb K.A.  
McArthur Basin research, September quarter 1979.
- 1979/ 83 Goldsmith R.C.M.  
Geological report on the construction of the Googong Dam, Queanbeyan

APPENDIX 2  
Records issued on open file  
in period 1/10/79 to 30/9/80

River, New South Wales.

- 1979/ 84 Wilson E.G.  
Observations on geology, soils, and groundwater relevant to pavement failure in Canberra, 1979.
- 1979/ 85 Derrick G.M.  
Geochemical data, Marraba 1:100 000 sheet area, northwest Queensland.
- 1979/ 86 Blake D.H. Jaques A.L. Donchak P.J.T.  
Precambrian geology of the Selwyn region, northwest Queensland - preliminary data.
- 1979/ 89 Johnson K. Hone I.G. Ingram J.A. Crick I.H.  
Stratigraphic drilling in the Rum Jungle area, NT, 1973-74: geological and geophysical results.
- 1979/ 90  
Interim Engineering Services Branch summary of activities - 1979.
- 1979/ 91 Petrie E.  
Wells and metres drilled for petroleum exploration and development in Australia in 1978.
- 1979/ 92 Finlayson D.M.  
1978 seismic crustal investigations in southeast Australia: operational report for the DART78 and MANESI surveys.
- 1979/ 93 Donchak P.J.T. Blake D.H. Jaques A.L.  
Precambrian geology of the Mount Angelay 1:100 000 sheet area (7055), northwestern Queensland - preliminary data.
- 1980/ 1 Ward J. McLeod I.R.  
Mineral resources of Australia, 1980.
- 1980/ 2 Withnall I.W. Oversby B.S. Bain J.H.C. Baker E.M.  
Geology of the Gilberton 1:100 000 sheet area (7659), north Queensland: data record.
- 1980/ 5 Plumb K.A.  
McArthur Basin research - December quarter 1979.
- 1980/ 6 Major J.A.  
Geophysical investigation of regional aeromagnetic and radioelement anomalies in the Georgetown and Forsayth 1:100 000 sheet areas, north Queensland, 1976.
- 1980/ 7 Strusz D.L.  
Supplement to 'The Encrinuridae and related trilobite families....'
- 1980/ 9 Habermehl M.A.  
Wire-line logging of water wells in the Great Artesian Basin - ADP data

## APPENDIX 2

Records issued on open file  
in period 1/10/79 to 30/9/80

transcription manual.

- 1980/ 12 Bauer J.A. Dixon O.  
Denison Trough seismic survey, Queensland, 1979: operational report.
- 1980/ 13 Perry W.J.  
Murray Basin hydrogeological project progress report, December quarter 1979.
- 1980/ 14 Jacobson G. Hill P.J.  
Groundwater resources of Nive Island.
- 1980/ 15 Stuart-Smith P.G. Wallace D.A. Roarty M.J.  
Pine Creek Party 1978 data record: Point Stuart, Mary River, and Mundogie 1:100 000 sheet areas, NT.
- 1980/ 16 Bultitude R.J.  
Precambrian geology of the Ardmore 1:100 000 sheet area, northwestern Queensland - preliminary data.
- 1980/ 17  
Abstracts: 9th BMR Symposium, Canberra, 29-30 April 1980.
- 1980/ 19 Wallace D.A.  
Shallow stratigraphic drilling in the Munmarlary area, Alligator Rivers region, NT, 1978.
- 1980/ 20 Kennewell P.J.  
Lithological logs of stratigraphic holes and water-bores drilled to 1976 in the Wiso Basin, Northern Territory.
- 1980/ 21 Goldsmith R.C.M. Evans W.R.  
Notes to accompany a geological map at 1:10 000 scale of the Googong Reservoir, Queanbeyan River, New South Wales.
- 1980/ 22 Seidel G.E.  
The model algorithm for the GABHYD model of the Great Artesian Basin.
- 1980/ 23 Wyborn D.  
GANOVEX 1979-80 - Brief comments on the planning, implementation, and results of the German North Victoria Land Expedition to Antarctica.
- 1980/ 25 Smith S.E.  
Bureau of Mineral Resources 1980 Program.
- 1980/ 26 Robertson C.S. Mayne S.J. Townsend D.G.  
A review of the geology, petroleum exploration, and petroleum prospects of the Officer Basin region.
- 1980/ 27 Gibson D.L. White J.A.W.  
Notes and a bibliography on oil shale in Australia.

APPENDIX 2  
Records issued on open file  
in period 1/10/79 to 30/9/80

- 1980/ 28 Hohnen P.D.  
Investigation of a soil drainage problem at Cook Primary School, ACT.
- 1980/ 29 Hohnen P.D.  
Groundwater supply for National Fitness Camp at Block 10, Paddys River District, ACT.
- 1980/ 32 Harrison P.L. Mathur S.P. Moss F.J. Pinchin J. Senior B.R.  
Central Eromanga Basin Project, program proposals, 1980-1982.
- 1980/ 34 Shergold J.H.  
Georgina Basin Project progress report 1974-1979.
- 1980/ 35 Whitworth R. Stagg H.M.J.  
Marine magnetic surveys aboard the M.V. Nella Dan, 1979/80 - operations manual.
- 1980/ 36 Perry W.J.  
Murray Basin hydrogeological project progress report 3, March quarter 1980.
- 1980/ 37 Simpson C.J.  
Georgina research for the period October 1979-March 1980.
- 1980/ 38 Plumb K.A.  
McArthur Basin research March quarter 1980.
- 1980/ 42 Passmore V.L.  
Browse Basin region explanatory notes and stratigraphic columns.
- 1980/ 46 Murray A.S.  
ERTIDE1: A computer program to calculate tidal gravity corrections.
- 1980/ 48 Stuart D.C. Ogilvy R.D.  
Electrical geophysical mapping surveys, Rum Jungle area, N.T., 1974.
- 1980/ 49 Mutton A.J.  
Regional radioelement characteristics of the Koolpin Formation, Pine Creek Geosyncline, Northern Territory.
- 1980/ 50 Chaproniere G.C.  
Supplement to 'Biometrical studies of Early Neogene larger Foraminifera from Australia and New Zealand'.
- 1980/ 51 Gregson P.J.  
Mundaring Geophysical Observatory annual report 1979.
- 1980/ 55 Plumb K.A.  
McArthur Basin research: June quarter, 1980.

APPENDIX 3

Data released through the Australian Government Printer copy service  
during period 1/10/79 to 30/9/80

A. Photoscale geological compilations1:100 000 sheet areas

Mary River, NT (1 sheet at 1:89 000, 6 sheets at 1:25 000, 12 sheets  
 at 1:15 000)

Mount Oxide, Qld (8 sheets at 1:25 000)

Mundogie, NT (16 sheets at 1:25 000)

Oban, Qld (8 sheets at 1:25 000)

Point Stuart, NT (1 sheet at 1:89 000)

B. Geochemical surveys1:100 000 sheet areas

Gilberton, Qld	)	
Hedleys Creek, Qld	)	Sample location maps at 1:100 000, and
Seigal, NT	)	analytical data on microfiche

C. Marine geophysical mapsTrack maps at 1:2 500 000

Timor Trough

Northwestern Margins

Southwestern Margins

Great Australian Bight

Tasmania

Tasman Sea

Coral Sea

Gulf of Papua and Bismarck Sea

Revised track maps at 1:1 000 000

SC51	SE50 (Rowley Shoals)
SC52 (Melville Island)	SE51 (Broome)
SD50	SF49 (Cloates)
SD51 (Brunswick Bay)	SF50 (Hamersley Range)
SD52 (Darwin)	

D. Airborne geophysical maps1:250 000 sheet areas

(Key: 1 = Magnetic contours. 2 = Magnetic profiles.  
 3 = Total-count radiometric contours. 4 = Total-count radiometric profiles. 5 = Potassium radiometric profiles. 6 = Uranium radiometric profiles. 7 = Thorium radiometric profiles.  
 8 = Radioaltimeter profiles. 9 = Flight lines. 10 = Th/K, U/Th, U/K ratio profiles.)

Northern Territory

Arnhem Bay/Wessel Islands (2,3,4,5,6,7,8,9), Blue Mud Bay/Port  
 Langdon (2,3,4,5,6,7,8,9), Gove/Truant Island (2,3,4,5,6,7,8,9),  
 Mililingimbi/Junction Bay (2,3,4,5,6,7,8,9), Mount Marumba (2,3,4,5,6,7,8,9),  
 Roper River/Cape Beatrice (2,3,4,5,6,7,8,9).

Western Australia

Bremer Bay (1), Forrest (1,2,9), Jubilee (1,2,9), Mason (1,2,9),  
 Mount Barker (1,3), Pemberton (1).

South Australia

Adelaide (part)/Renmark (part) (1,3 - 1.5 km line spacing),  
 Barker (part)/Pinaroo (part) (1,3 - 1.5 km line spacing);  
 Adelaide (part)/Renmark (1,3 - 3.0 km line spacing), Barker (part)/  
 Pinaroo (1,3 - 3.0 km line spacing).

New South Wales and Victoria

Dubbo (1,2,3,4,5,6,7,8,9,10), Murrumbidgee (2,9), Warburton (1,2,9).



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D.N. Downie, B.Sc.

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M. Jorritsma  
 R.G. Symons

## TECHNICAL OFFICER GRADE 1

\*D. Park

## PHOTOGRAPHER

W. Harvey

## CLERK CLASS 8

B.M. Williams

## CLERK CLASS 7

D. Crombie  
 G.C. Scott

## CLERK CLASS 6

P.J. Corrigan  
 P.J. Flanagan  
 D.B. McGlynn

## CLERK CLASS 5

G.C. Mortimer  
 T.J. Pobje

## CLERK CLASS 4

A. Alps  
 J. Bayliss  
 W. Coulson  
 W. Cox  
 D. Lamont  
 A.J.H. Mears  
 M. Preston-Stanley  
 S.R. Ross  
 J. Somerville  
 S.J. Styles  
 S. Westerhuis

## CLERK CLASS 2/3

C.B. Bryan  
 J. Lane  
 \*A.J. Neilsen  
 A.J. Ryan  
 R. Weber

## CLERICAL ASSISTANT GRADE 6

E.A. Pasfield

## CLERICAL ASSISTANT GRADE 5

A.G. Bright  
 N.A. Elgood  
 M. Harding

## CLERICAL ASSISTANT GRADE 4

L.A. Hansen  
 J. Kuta  
 K. Moloney  
 A.L. Parker  
 M. Santosuosso  
 L.M. Woods

## CLERICAL ASSISTANT GRADE 3

\*B. Blewitt  
 K. Burchett  
 L.J. Damcevski  
 F. Kane  
 P.S. Kilduff  
 \*C. Menezes

## CLERICAL ASSISTANT GRADE 2

H. Harrison  
 P.J. Knobel  
 J. Mason  
 A.L. Millynn  
 A. McCall  
 \*B. Polovic  
 T. Scheld  
 G. Sinclair

## CLERICAL ASSISTANT GRADE 1

J. Arno  
 M. Dawes  
 O. Domitrjak  
 J. Jones  
 J.P. McGuire  
 S.V. Riggs  
 A. Witherdin

## ASSISTANT (PRINTING) GRADE 3

R. Heathcote

## ASSISTANT (PRINTING) GRADE 1

J. Murphy

\* Acting in that position.

STENO-SECRETARY GRADE 2	J. Magro
STENO-SECRETARY GRADE 1	R. Hearn D. Shaw J.C. Syne *J. Walsh A. Westwood
TYPIST SUPERVISOR	L.A. Stafford M.L. Thomas
TYPIST GRADE 2	Y.A. Aitken S. Bilton P. Evans D.J. Leonard B. Marshall
TYPIST GRADE 1	I.M. Hillier L. Kendall J. McCoombs P. Nambiar P. Porter A. Walker
MOTOR DRIVER	J. Donnan
ATTENDANT (T)	C. Casadei P. Darman L. Mackintosh E. Moreno G. Recupero
JANITOR	V. Mraz

MINERAL RESOURCES BRANCH

ASSISTANT DIRECTOR	J. Ward, B.Sc., M.Aus.I.M.M.
ENGINEER CLASS 5	E.G. Timoney, A.W.A.S.M., M.I.E.Aust., M.I.M.M., M.Aus.I.M.M.
MINERAL ECONOMIST CLASS 5	I.R. McLeod, M.B.E., M.Sc., M.Aus.I.M.M.
MINERAL ECONOMIST CLASS 4	A.J.B. Driessen, B.Sc., B.Ec., A.M.Aus.I.M.M. D. Perkin, B.A., B.Econ., A.M.Aus.I.M.M.
MINERAL ECONOMIST CLASS 3	A.J. Gourlay, B.Sc. *C.R. Pratt, B.Sc., A.M.Aus.I.M.M.
MINERAL ECONOMIST CLASS 2	M.B. Huleatt, B.Sc.(Hons) N.D. Knight, B.Sc., Dip.Ed. C. Mock, B.Sc.(Hons)

\* Acting in that position

PETROLEUM EXPLORATION BRANCH

ASSISTANT DIRECTOR	*E.R. Smith, B.A., B.Sc., F.A.I.E.
GEOSCIENTIST CLASS 5	*D.J. Forman, B.Sc.(Hons), A.M., Ph.D., F.A.I.E.
PETROLEUM TECHNOLOGIST CLASS 5	J.A.W. White, B.Sc., A.R.S.M., F.A.I.E.
GEOSCIENTIST CLASS 4	*K.S. Jackson, M.Sc., Ph.D. C.S. Robertson, M.Sc.
PETROLEUM TECHNOLOGIST CLASS 4	B.A. McKay, B.Sc., (Geol.), M.S.P.E. K. Stillwell, B.S.
GEOSCIENTIST CLASS 3	A.R. Fraser, B.Sc. K. Lockwood, B.Sc. W.J. McAvoy, B.Sc., B.A. E. Nicholas, M.Sc. E.L. Smith, M.Sc., M.Aus.I.M.M. P.R. Temple, B.Sc.
PETROLEUM TECHNOLOGIST CLASS 3	P.G. Duff, F.M.T.C., M.Aus.I.M.M. J.M. Henry, A.C.S.M., A.M.Aus.I.M.M., M.S.P.E. L. Kurylowicz, M.Sc.
GEOCHEMIST CLASS 2	C. Boreham, B.Sc.(Hons), Ph.D.
GEOSCIENTIST CLASS 2	E.A. Felton, B.Sc.(Hons) *V. Passmore, M.Sc. M.J. Roarty, B.Sc.
PETROLEUM TECHNOLOGIST CLASS 2	*D.G. Bennett, B.Sc.(Hons)
CLERICAL ASSISTANT GRADE 5	W. Turner
CLERICAL ASSISTANT GRADE 4	M. Watson
SENIOR TECHNICAL OFFICER GRADE 1	I. Donald Z. Horvath
TECHNICAL OFFICER GRADE 1	R. Bresnehan M. Ellis R. DeNardi *J. Staunton
TECHNICAL ASSISTANT GRADE 2	W. Hessler A. Haupt D.B. Pryce K. Reine
ROTARY DRILLING SUPERVISOR GRADE 2	L.T.J. Hodgins J.B. Morgans
ROTARY DRILLING SUPERVISOR GRADE 1	B.G. Findlay
ROTARY DRILLER GRADE 2	E.H. Cherry A. Zoska

\* Acting in that position

## ROTARY DRILLER GRADE 1

J.L. Henry  
K. Huth  
L. Keast  
E. Lodwick  
T. Shanahan

## ASSISTANT ROTARY DRILLER

G. Brandon  
R. Clarke  
D. Eaton  
B. Watler

## MECHANIC

A. Crawford  
T. Johnson  
J. Keyte

GEOLOGICAL BRANCH

## ASSISTANT DIRECTOR

J.N. Casey, B.Sc.(Hons), M.Aus.I.M.M.

## GEOLOGIST CLASS 5

E.K. Carter, B.Sc., Ph.D., A.M.Aus.I.M.M.  
D.B. Dow, M.Sc.  
K. Walker, B.Sc.(Hons), Ph.D.  
G.E. Wilford, O.B.E., B.Sc., Ph.D., M.I.M.M.

## GEOLOGIST CLASS 4

D.J. Belford, M.Sc., Ph.D.  
\*G.M. Derrick, B.Sc.(Hons), Ph.D.  
J.M. Dickins, M.Sc., Ph.D.  
R.G. Dodson, B.Sc.(Hons), Ph.D., M.Aus.I.M.M.,  
F.I.M.M.  
\*H.F. Douth, B.Sc.  
\*A.D. Haldane, B.Sc., A.R.A.C.I.  
H.J. Harrington, M.Sc., D.Phil.  
H.A. Jones, M.A., Ph.D.  
W.J. Perry, B.Sc.  
K.A. Plumb, B.Sc.(Hons)  
\*C.J. Simpson, B.Sc., A.M.Aus.I.M.M.  
D.S. Trail, B.Sc.(Hons)  
M.R. Walter, B.Sc.(Hons), Ph.D.  
E.G. Wilson, B.Sc.(Hons), M.Sc., A.A.I.E.

## GEOLOGIST CLASS 3

J.H.C. Bain, B.Sc., M.Sc.  
D.H. Blake, B.Sc.(Hons), Ph.D.  
R.V. Burne, B.Sc.(Hons), D.Phil.  
G. D'Addario, D.Sc.  
P.J. Davies, B.Sc., Ph.D.  
N.F. Exon, B.Sc.(Hons), Ph.D.  
J. Ferguson, B.Sc.(Hons), Ph.D.  
John Ferguson, B.Sc., M.Sc., Ph.D., D.Sc.  
A.Y. Glikson, B.Sc., M.Sc., Ph.D.  
M.J. Jackson, B.Sc.(Hons)  
G. Jacobson, B.Sc.  
R.W. Johnson, B.Sc.(Hons), Ph.D., A.R.C.S., D.I.C.  
P.J. Jones, B.Sc., M.Sc., Ph.D.  
\*J.F. Marshall, B.Sc.(Hons), M.Sc.  
R.S. Needham, B.Sc.(Hons)  
M. Owen, B.Sc.(Hons), Ph.D.  
S. Ozimic, B.Sc.  
R.W. Page, B.Sc.(Hons), Ph.D.

\* Acting in that position

## GEOLOGIST CLASS 3 (Cont'd)

W.D. Palfreyman, B.Sc.(Hons)  
 P.E. Pieters, D.Geol.  
 C.J. Pigram, B.Sc.(Hons)  
 M.D. Plane, B.Sc.(Hons), M.A.  
 C.E. Prichard, B.Sc.  
 R.J. Ryburn, M.Sc.  
 B. Senior, M.Sc., Ph.D.  
 S.K. Skwarko, M.Sc., Ph.D.  
 R.D. Shaw, B.Sc.(Hons), D.I.C., M.Sc.  
 \*A.J. Stewart, M.Sc., Ph.D.  
 D.L. Strusz, B.Sc.(Hons), Ph.D.  
 R.J. Tingey, B.Sc.(Hons)  
 E.M. Truswell, B.Sc.(Hons), Ph.D.

## CHEMIST CLASS 3

B.I. Cruikshank, B.Sc.(Hons), Ph.D., A.R.A.C.I.

## GEOLOGIST CLASS 2

R.S. Abell, B.Sc.(Hons), Ph.D.  
 L.P. Black, B.Sc.(Hons), Ph.D.  
 C.M. Brown, B.Sc.(Hons), M.Sc., D.I.C.  
 D. Burger, M.Sc., Ph.D.  
 G.C.H. Chaproniere, M.Sc., Ph.D.  
 \*J.B. Colwell, B.Sc.(Hons), M.Sc.  
 A.T. Brakel, B.Sc.(Hons), Ph.D.  
 I.H. Crick, B.Sc.(Hons), Dip.Ed.  
 D.L. Gibson, B.Sc.(Hons)  
 M.A. Habermehl, M.Sc., Ph.D.  
 G.A.M. Henderson, B.Sc.  
 A.L. Jaques, B.Sc.(Hons)  
 D.E. MacKenzie, B.Sc.(Hons)  
 \*J.E. Mitchell, B.Sc.(Hons)  
 K. Modrak, B.Sc., Grad. Dip. Lib.  
 A. Mond, Provmany Geol.  
 R.S. Nicoll, B.S., M.A., Ph.D.  
 B.S. Oversby, B.Sc., M.A., Ph.D.  
 B.M. Radke, B.Sc.(Hons), Ph.D.  
 G.P. Robinson, B.Sc.(Hons), Ph.D.  
 P.A. Scott, B.Sc.(Hons)  
 \*P.G. Stuart-Smith, B.Sc.(Hons)  
 I.P. Sweet, B.Sc.(Hons)  
 R.R. Towner, B.Sc.(Hons)  
 J.W. Sheraton, M.Sc., Ph.D.  
 R.G. Warren, B.Sc., M.Sc., D.I.C.  
 D. Wyborn, B.Sc.(Hons)  
 A.N. Yeates, B.Sc.(Hons)  
 G.C. Young, B.Sc.(Hons), Ph.D.

## CHEMIST CLASS 2

\*G.R. Ewers, B.Sc.(Hons), Ph.D.  
 L. Offe, B.Sc.(Hons)

## GEOPHYSICIST CLASS 4

B.C. Barlow, B.Sc.(Hons), A.A.I.P.

## GEOLOGIST CLASS 1

R.J. Bultitude, B.Sc., M.Sc.  
 V.F. Dent, B.Sc.  
 W.R. Evans, B.Sc.  
 J.R. Kellett, B.Sc.  
 J. Knutson, B.A.(Hons), Ph.D.  
 R.P. Lorenz, B.Appl.Sc., A.L.A.A.  
 P. O'Brien, B.Sc.(Hons)  
 S. Shafik, M.Sc.  
 D.A. Wallace, B.Sc.(Hons)  
 L.A. Wyborn, B.Sc.(Hons), Dip. Ed., Ph.D.



## TECHNICAL OFFICER GRADE 2

M.J. Bower  
 D. Fitzsimmons  
 \*J.L. Fitzsimmons  
 K. Heighway, Dip.Appl.Geol.  
 J.G. Pyke  
 T. Slezak, Dip.Anal.Chem.  
 \*A.T. Wilson  
 T. Zapasnik

## TECHNICAL OFFICER GRADE 1

K. Armstrong  
 \*R.W. Brown  
 N. Davis  
 H.M. Doyle  
 \*K. Ellingsen  
 J.E. Price  
 \*J. Reid, F.G.A.A.  
 G. Sparksman, B.Sc.  
 B.G. West, B.Appl.Sc.

## TECHNICAL ASSISTANT GRADE 2

M. Amar  
 P.W. Davis  
 D. Guy  
 L. Kraciuk  
 L. Pain  
 A.W. Schuett

## TECHNICAL ASSISTANT GRADE 1

N.C. Hyett

## CLERK CLASS 6

P. Wildey

## CLERICAL ASSISTANT GRADE 4

L. Kay  
 J. Morrissey

## FIELD ASSISTANT

D. Gregg  
 R. McPake  
 \*J. Pollard

GEOPHYSICAL BRANCH

## ASSISTANT DIRECTOR

\*J.C. Dooley, B.A.(Hons), M.Sc., F.A.I.P.

## GEOPHYSICIST CLASS 5

\*D. Denham, B.Sc.(Hons), Ph.D., Grad.A.I.P.,  
 M.Inst.P., Grad. Dip. Appl. Geoph., Grad. Dip.  
 Statistical Communication Theory  
 A. Turpie, B.Sc.(Hons), Grad.A.I.P.  
 G.A. Young, M.Sc., A.M.Aus.I.M.M.

## GEOPHYSICIST CLASS 4

\*F.W. Brown, B.A.Sc., Grad.A.I.P.  
 \*D.M. Finlayson, M.Sc., A.A.I.P.  
 P.M. McGregor, B.Sc.(Hons)  
 F.J. Moss, B.Sc.  
 D.C. Stuart, B.Sc.  
 R. Wells, B.A.  
 R. Whitworth, B.Sc.(Hons)

## GEOPHYSICIST CLASS 3

\*W. Anfiloff, B.Sc.(Hons)  
 J.C. Branson, B.Sc.(Hons)  
 \*J.P. Cull, B.Sc.(Hons), Ph.D.  
 I.B. Everingham, B.Sc.(Hons), M.Sc., Grad.A.I.P.  
 M.Inst.P.

\* Acting in that position

## GEOPHYSICIST CLASS 3 (Cont'd)

J.E.F. Gardener, B.Sc., A.M.Aus.I.M.M.  
 P.J. Gregson, B.Sc.(Hons)  
 \*I. Hone, B.Sc.(Hons)  
 M. Idnurm, B.Sc., Ph.D.  
 \*C.R. Johnston, B.Sc.  
 C.O. Leary, B.Sc.  
 S.P. Mathur, B.Sc., A.I.S.M., M.S., Ph.D.  
 J.M.H. Mulder, Dip.Geol/Geophys.  
 J. Pinchin, B.Sc.(Hons)  
 J. Rees, B.Sc.(Hons)  
 G.R. Small, B.Sc., Grad.A.I.P.  
 R.S. Smith, B.Sc., M.A.I.P.  
 A.G. Spence, B.Sc., B.Comm.  
 F.J. Taylor, B.Sc.(Hons)  
 P. Wellman, M.Sc., Ph.D.

## GEOPHYSICIST CLASS 2

J.A. Bauer, B.App.Sc.  
 \*F. Brassil, B.A., Dip.Geoscience  
 \*C.D.N. Collins, B.Sc.(Hons)  
 J.B. Connelly, B.Sc.  
 J.W. Giddings, B.Sc.(Hons), M.Sc., Ph.D.  
 \*P.R. Gidley, B.Sc.(Hons)  
 K. Horsfall, B.Sc.  
 G.D. Karner, B.Sc.(Hons)  
 J.A. Major, B.Sc.  
 A.J. McEwin, B.Sc.(Hons)  
 M.W. McMullan, B.Sc.  
 A.S. Murray, B.Sc.(Hons), Grad.A.I.P.  
 J.C. Mutter, B.Sc.  
 E.P. Paull, B.Sc.(Hons)  
 D.C. Ramsay, M.Sc., Grad.Dip.App.Geoph.  
 N. Sampath, M.Sc., Ph.D., A.M.Aus.I.M.M.  
 S. Sheard, B.Sc.(Hons)  
 H.W. Stagg, B.Appl.Sc.(Hons)  
 P.A. Symonds, B.Sc.(Hons)  
 L.A. Tilbury, B.Sc.(Hons), Grad.Dip.Stats.  
 B. Wyatt, B.Sc.(Hons)  
 I. Zadoroznyj, B.Sc.(Hons)

## GEOPHYSICIST CLASS 1

P.M. Davies, B.Sc.(Hons)  
 B.J. Drummond, B.Sc.(Hons)  
 B.A. Gaull, B.Sc.  
 J.M. Lock, B.Sc.(Hons)  
 A.S. Marks, Dip.Appl.Sc., Grad.Dip.Comp.  
 M.J. Sexton, B.Sc.(Hons)  
 K. Wake-Dyster, B.Sc.(Hons)  
 W. Williams, B.Sc., B.E., M.Eng.Sc., M.A.A.P.

SENIOR TECHNICAL OFFICER  
GRADE 2

\*J.K. Grace

## TECHNICAL OFFICER GRADE 2

\*D. Gardner  
 G.S. Jennings  
 W. Meyer  
 G. Woad

\* Acting in that position

## TECHNICAL OFFICER GRADE 1

V. Carberry  
 T. Hegvold  
 H.R. Hughes, F.G.A.P.  
 B.J. Page  
 D. Pfister  
 G.B. Price  
 P. Swan  
 G.H.Y. Thomas

## TECHNICAL ASSISTANT GRADE 2

N.A. Ashmore  
 \*E.C. Chudyk  
 P. Fowler  
 H.G. Reith  
 J.F. Salib  
 S.J. Wilcox

## CLERK CLASS 5

P.J. O'Rourke

## CLERK CLASS 4

P. Black

## CLERICAL ASSISTANT 3

Y. Moiler

## COMPUTING ASSISTANT

U. Hammerling

## FIELD ASSISTANT

R.D.E. Cherry  
 L.O. Rickardsson  
 A. Takken

ENGINEERING SERVICES SECTION

## GEOPHYSICIST CLASS 5

M.G. Allen, B.Sc., Grad.A.I.P.

## GEOPHYSICIST CLASS 4

K. Seers, B.Sc., A.A.I.P., A.M.I.E.E.

## GEOPHYSICIST CLASS 3

Y.S.B. Liu, B.E., M.E.Sc., M.I.E.E., M.I.E.Aust.  
 P.E. Mann, B.Sc., Grad.A.I.P.

## GEOPHYSICIST CLASS 2

R.W. Cobcroft, B.Sc., Grad.Dip.App.Sci.  
 A.B. Devenish, B.Sc., Grad.Dip.Comp.Stud.  
 M. Gamlen, B.Sc.(Hons)

SENIOR TECHNICAL OFFICER  
GRADE 2

\*G. Thom

SENIOR TECHNICAL OFFICER  
GRADE 1

W. Burhop  
 \*R. Dulski  
 G.A. Green  
 W. Greenwood  
 J. Rutledge  
 A. Zeitlhofer, Dip.B.I.E.T.

## TECHNICAL OFFICER GRADE 2

R. Curtis-Nuthall  
 J.W. Eurell  
 R. Gan  
 R.B. Grigg  
 K. Jurello  
 \*C.J. Rochford  
 A.S. Scherl  
 \*D.O. Stevens

\* Acting in that position

## TECHNICAL OFFICER GRADE 1

W. Gunner  
 \*K. Mort  
 \*L. Miller  
 \*S. Prokin  
 \*G. Russell-Smith  
 M.H. Tratt

## TECHNICAL ASSISTANT GRADE 2

L.S. D'Arcy  
 D. Foulstone  
 W. Harkness  
 G. Lockwood  
 E.C. McIntosh  
 R. Westmore

## MAINTENANCE MECHANIC

D.K. McIntyre

## MOTOR DRIVER

R.L. Gibbs

Officers under Contract to Geological Survey of Papua New Guinea at 31 October 1980

<u>Name</u>	<u>BMR Designation</u>
R.A. Almond	Geophysicist Class 2
I. Ripper	Geophysicist Class 2
G.K. Anderson	Geologist Class 1
H.L. Davies	Geologist Class 4
G.D. Knight	Draftsman Grade 2
P. Hill	Geophysicist Class 2
G. Seidel	Geologist Class 2

Officers on Study Leave at 31 October 1980

B. Drummond	A.N.U., Canberra
J. Mutter	Columbia University, New York, USA
G. Karner	Lamont-Doherty Geophysical Observatory, Palisades, USA
J. Shergold	Wurzburg University, F.G.R.
I.P. Sweet	University of Reading, U.K.

\* Acting in that position