



DEPARTMENT OF NATIONAL RESOURCES

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS



RECORD 1978/93

051484

OPERATIONS BRANCH

SUMMARY OF ACTIVITIES

1978

AND STAFF LIST

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PUBLICATION AND INFORMATION SECTION

Head of Section: A. Renwick

On several occasions A. Renwick acted as Assistant Director (Operations) and during these periods, K.M. Kennedy or W.H. Oldham assumed control of the Section.

As an aid to publication management, a new format for the presentation of the publishing program was introduced. This allows for constant up-dating of the master copy and for frequent, inexpensive, printouts of the updated program to be made available.

Publication Subsection

Supervisors: W.H. Oldham, H.L. Higginson/J.F. Truswell

H.L. Higginson was absent during several periods of sick leave and was finally invalided out of the Service. In spite of this reduction in the editorial staff the BMR Journal and the Australian Mineral Industry Annual Review and Quarterlies were sent for printing on time, but some Bulletins have fallen behind the planned schedule for editing.

The Australian Government Publishing Service has provided a faster service for printing our hard-copy publications, but conversion of the Report series to Microfiche format is still encountering problems within the Micrographics Bureau of the Government Printing Office.

A list of amendments to the Guide to Authors was issued, and a series of writing courses was held.

The setting-up of a weekly discussion group for editors has provided substantial benefits. Editors now have a regular forum in which to share experience, solve problems, and adopt uniform policies.

The redesign of Bulletins and the AMI Annual and Quarterly has achieved more readable products at a substantially lower cost.

Information Subsection

Supervisor: E.P. Shelley

Staff

L. Emmett continued on higher duties in the Science 2 position until 30 June. P.A. Smith was seconded to the Interim Engineering Services Branch until 30 June when he resumed normal duties in the Subsection. He was temporarily transferred to the Planning and Review Section (vice R. Thieme) from 7 August to 3 November. It was not possible to obtain a replacement for this period.

Staff development

Mrs Bartlett attended an 'Introduction to ADP' course early in the year, and a 'Geoscience Information' workshop and seminar at AMF in October. Mrs Young spent three weeks with the McArthur Basin party to become familiar with current field operations and methods.

General services

Much of the group effort was directed towards the continuous flow of enquiries from Government, Industry, and the public. Enquiries range from requests for project material from school children to complex technical questions from industry. The former are answered simply by sending BMR pamphlets or other relevant material. The latter may require considerable research and effort to obtain the desired information.

The Subsection co-ordinated BMR contributions to various publications, including the AAEC Annual Report and the Newsletter of the NSW Committee for the Co-ordination of Government Geological Programs. The group revised articles for the Australian Information Service and updated careers information articles for the Department of Employment and Industrial Relations. The group also provided updated material for the Minister's Background Brief, and completed various questionnaires and returns on BMR activities.

Detailed comments were provided on the draft of the Australian national paper for the 1979 UN Conference on Science and Technology for Development.

Information systems

The major achievement for the year was the development of a computerised index for BMR Records and publications. The BMR Data and Documentation Index (DADEX) has been set up on BMR's Hewlett-Packard computer system using the IMAGE data base management system.

Input formats and some general-purpose output programs have been developed in co-operation with the ADP Applications Section and systematic input of data has commenced. By the end of October, authors and titles of all Bulletins, Reports, and several hundred Records had been entered. Existing lists and card indexes are being used to avoid having to code the input. Input of all material is expected to take between four and six months.

When all retrospective and current material is in the data base it will be used to produce regular, up-to-date lists and catalogues. The format of the data base is such that its use need not be confined to BMR-generated material, and it is already being used by the Library to compile special bibliographies.

Expansion of the computerised photo and slide index (PHODX) did not proceed as fast as hoped. Discussions are currently being held with the Cartography Section with the aim of generating a sufficiently large data base to convince BMR field staff of the usefulness and flexibility of the system. It is hoped that in this way their co-operation can be obtained.

Indexing of open file Records for AESIS (Australian Earth Sciences Information System) has been scaled down now that the Australian Mineral Foundation has become an open file centre and therefore receives all open file Records. BMR contributed \$5000 for AESIS computing costs in 1977/78 and a further \$5000 has been provided for 1978/79. E.P. Shelley assisted at a seminar on AESIS in Adelaide in October.

Considerable assistance was given to the Library in the design of a computer system (LIBLN) for library loan information.

Funds have been provided in 1978/79 for the purchase of additional microfiche readers, additional lenses for existing single-lens units, and modifications to one of the reader/printers.

Developments relevant to national scientific and technical information systems were kept under review during the year.

Publications

Part 1 of the List of Publications was re-issued during the year. Part 2 (maps), a revised Record author list, and Part 7 of the list of Records are currently in preparation.

The second edition of the two brochures 'The Geological and Geophysical Activities of BMR in Australia and Antarctica' were issued in April.

The ninth issue and two supplements of the list of coming events in the geosciences were compiled and distributed within BMR and to some other organisations and individuals. A revised brochure on careers at BMR was also produced.

Distribution of BMR Records, supervision of Record microfilming, and oversight of the Open File System continued throughout the year.

The Department's publications sales offices in Sydney and Melbourne have now become sales outlets for NATMAP publications. NATMAP has agreed to handle limited sales of BMR maps, hold a reference set of BMR publications, and assist clients in the ordering of BMR publications. A general-purpose order form has been produced to facilitate this arrangement.

The Alice Springs office of the Northern Territory Geological Survey has recently become a sales agent for BMR publications.

Internal information services

The Subsection continued to provide a watching brief on UN activities in the earth sciences and mineral resources areas relevant to BMR. Briefing notes were prepared for the Australian representatives to the 34th Session of ESCAP, and the 5th Session of the ESCAP Committee on Natural Resources.

Hansard was scanned for items of interest to BMR and these were circulated to relevant officers.

In August a half-day induction course was held for all staff who had joined BMR since January 1978.

The Subsection continued to provide advice to BMR groups on information storage and retrieval, and the use of microfilm. Informal discussions were held with the Petroleum Exploration Branch on the long-standing need to microfilm all PSSA reports.

Symposium and lectures

The 7th BMR Symposium was held on 2-3 May. There were 199 registrations by geoscientists from industry, tertiary institutions, and Commonwealth and State organisations. Nineteen papers were presented by BMR officers, and a panel discussion was held on 1:100 000 scale mapping projects in northern and central Australia. The Harold Raggatt Award for the best presentation was awarded to Dr John Ferguson.

Workshops on 'Involvement of government organisations in geochemical surveys' and 'Georgina Basin, NT and Qld' were held on 4 May.

The Subsection organised the in-house Tuesday morning lecture series which was held from January to April and November to December.

The Subsection, in co-operation with the Australian Geoscience Information Association, organised a half-day seminar on AESIS and GEOARCHIVES, two earth science data bases now available on the CSIRO computer network.

Public relations

The number of visits to BMR by school groups increased during the year. These are organised in cooperation with Museum staff. The Subsection is grateful for the cooperation and support of the staff in the work areas that were visited. Officers of the Subsection participated in careers sessions at Lyneham, Melba, and North Cooma high schools.

Assistance was given to the Department's training centre in the production of an audio/visual display on the work of the Department.

News releases were made during the year on various BMR activities, new publications, and availability of data from the Government Printer copy service.

The Subsection assisted in the visit of the ASTEC Committee in June and July, and the visit of the Minister and Acting Secretary in August.

Displays and exhibitions

A display of earth science teaching materials was provided for a conference of the ACT Science Teachers' Association in March.

One of the foyer displays was changed in June to feature ACT fossils. The Antarctic display (ex IGC) was lent to QANTAS for an exhibition in Brisbane.

A major exhibit was sent to the 2nd Circum-Pacific Energy and Mineral Resources Conference in Hawaii in July-August. The exhibit featured Australia's mineral and energy resources, and the geological and geophysical mapping of Australia and its margins.

Display material was prepared for the Minister's offices at Parliament House and Launceston.

LIBRARY

Librarian-in-charge: M.A. Thompson

Statistics for 1978 (Previous year's figures in brackets)

Internal loans	10 348	(10 978)	
Reference searches: Total	309	(510)	No reference service available from 1 November 1977 to 22 March 1978.
for BMR staff	184	(305)	
for others	125	(205)	
Recall notices issued:	431	(349)	for 4655 items (not recorded 1977)
Serials circulation:	8 079	(4 590)	During the previous year circulation had been suspended for three months.
Inter-library loans:			
Requested from BMR	2 577	(2 748)	
Requested by BMR	481	(624)	
Accessioning:			
Books:	429	(359)	
Binding:	301	(112)	

Cataloguing (new and revision):

Books, pamphlets, maps and company reports	921 (1 030)
Serials	292 (280)
Visitors to Library:	315 (274)

Staff

The Reference Librarian position was vacant until 23 March when Mrs R. Lorenz commenced duty. The Inter-library Reference Officer position was vacant for almost all the first half of the year. Mrs I. Toth commenced duty on 27 June. The improved staffing situation resulted in the Library being re-opened on Tuesdays from 11 July.

The Monograph Cataloguer position was reclassified from Library Officer Grade 1 to Library Officer Grade 2.

Seminars and courses

- 27 April - L. Leitch (Serial Librarian) attended a seminar at the Canberra College of TAFE on their new Library Technician Course.
- 4 May - Mr Leitch (as acting Librarian-in-Charge) attended a meeting at the National Library to discuss changes in that Library's inter-library loan procedures and charges.
- 13 July - The Librarian-in-Charge and the cataloguers attended a Seminar on the Supply of Catalogue Data held at the National Library and organised by the Cataloguing Section of the ACT Branch of the LAA.
- 26 July - The librarians and library officers attended the AGIA Seminar on GEOARCHIVES and AESIS held at BMR.
- 17-19 August - The Librarian-in-Charge attended a seminar on Effective Approaches to the Organisation of Australian Government Libraries, organised by the ACT Branch of the LAA.
- 11-15 September - The Reference Librarian attended the Course for Authors, conducted by the Publication Subsection.
- 2-6 October - M. Murnieks (Monograph Cataloguer) attended a Geoscience Information Workshop, and Seminar on AESIS at the Australian Mineral Foundation, Adelaide.

Bibliographies

The Reference Librarian compiled and issued six bibliographies under the following titles:

1. Leaching of copper sulphates
2. Gypsum: Resources, production and mining geology
3. Open cut mining
4. Uranium in Australia
5. Oceanography : a list of periodicals
6. Tin-bearing granites.

The following are compiled but not yet printed.

Basin reading list in palaeontology

Government policy and mineral exploration.

Discussions were held with officers of the Geological Branch on a proposal to compile a bibliography of the geology of the Canberra area. This project is planned for 1979.

Duplicate lists

Over 30 requests were received for material on the duplicate list of serials which was produced late in 1977 and distributed through the National Library Clearing Centre. A list of surplus monographs was compiled and distributed during the year and requests from other libraries are now being received. Distribution of surplus material in this way assists other libraries to fill gaps in their holdings and provides the BMR Library with much-needed space for new acquisitions.

Photocopying voucher system

To simplify the processing of inter-library charges for photocopying, the Library Association of Australia introduced from 1 July a redeemable photocopying voucher system. BMR is participating in this arrangement as the major Australian libraries will not now supply photocopying without receiving a voucher with each request.

ADAB Trainee

On 17 July Ms Crescentia Jack, Library Officer of the Geological Survey of Papua New Guinea, commenced six weeks' training in BMR Library. This was arranged by the Australian Development Assistance Bureau. The first two weeks were spent in cataloguing monographs and during the remaining four weeks Ms Jack was given practical experience in all the types of library work relevant to that in her own library. Some visits to other libraries were also arranged.

Computerised loan system

A computer-based loan system commenced on 30 October. The system is on BMR's Hewlett-Packard computer and uses the IMAGE data base management system. The new loan system will result in greater efficiency in the control of loans and stocktaking, and as staff will be freed from some time-consuming clerical duties, a better service will be provided to library users.

ADP APPLICATIONS SECTION

Head of Section: A.J. Barlow

General

The section carried on the same activities as in previous years and also expanded into some new areas. Service functions included on- and off-line data preparation, digitising of data, CSIRO node operation, software development for the joint ANU-BMR mass spectrometer data acquisition system, software development for the ANU ion-microprobe, in-house software development, and advice to users.

CSIRO's Cyber 76 computing system continued to be the major system used by BMR staff, although more work has been shifted to the in-house 2100/21MX dual computer system in an effort to conserve money.

The Cyber 76 system has stabilised at a more satisfactory up/down-time level - satisfactory for getting most BMR work done, although not what could be expected from a commercial or in-house system. User assistance from the CSIRO Division of Computing Research is now almost nil and must be provided by ADP Section staff.

Finance

Computing charges at CSIRO increased by approximately 25% during the year. As the same funds were allocated as in the previous year, computer usage had to be restricted by about 20%. The situation was partly overcome by running more jobs overnight at lower charges. The computing bill alone for 1977-78 was \$397 000 exclusive of maintenance and consumables. Expenditure for 1978-79 is expected to be \$400 000 plus \$160 000 for consumables, repairs, and maintenance.

Staff

The Data Processing Operator Grade 3, Computer Operator Grade 1, and Clerk 2/3 left during the year and were replaced. The CS01 seconded to Geological Branch was promoted to another Department and has not yet been replaced. It is hoped that this position will be reclassified in the near future.

Information storage and retrieval

There are now eleven data bases in operation on the in-house system, running under IMAGE 1000. There are two systems operational on the CYBER 76 - the Georgina project and reference minerals collection. The Georgina Basin index is now up to 6 megabytes in size (4.7 megabytes in 1977). The library loans and palaeontology data bases are already up to 8 megabytes each and are growing rapidly. The need for more on-line disc storage is becoming more urgent and it is hoped that delivery of a 120-megabyte disc next year will alleviate the problem.

Automated cartography

Little progress has occurred on this project owing to lack of staff; some advice has been given to user groups. The Princeton graphics display unit became fully operational during the year and is being used for a number of graphics and imagery applications in the Bureau.

ANU joint projects

The ion microprobe software being written by BMR for the ANU (Research School of Earth Sciences) system became operational during the year. The mass spectrometer system was upgraded from RTE 1 to RTE 2 and the hardware was upgraded to a 21MX and 7905 disc. The system will be further enhanced next year to cope with more of RSES's current processing requirements. BMR's commitments to this project will continue for the foreseeable future.

Computer review

A comprehensive study of the practicability of buying and installing a large in-house computer was begun; a report should be available in early 1979.

Assistance to other Branches

Considerable assistance was provided to other Branches in the area of program development and advice. The Mineral Resources Branch in particular received considerable help from the Section's two CS02s.

Training

Section staff assisted the Department's Training Office by providing a number of introductory ADP courses.

Laboratory data acquisition and processing system

The volume of work processed on the Hewlett-Packard 2100A-2108A computer system continued to expand as more users became aware of the advantages of the in-house computer facility.

Memory size on the 2108A was increased to 256K bytes allowing more users to simultaneously access the system and still maintain a reasonable response time.

The crustal seismic playback facility became fully operational in February and has been used heavily. The first stage of a LANDSAT image processing system was developed using the 2100 computer and the Princeton display terminal. The X-ray diffraction unit is the only specialised hardware device that remains to be interfaced.

It is expected that the 2108 computer will be using the new RTE4 operating system software early in 1979. This will be a significant step forward as the memory space available to user programs will be effectively increased by a factor of three. A batch processing facility will also be introduced allowing programs with large data arrays to be run overnight. This system will use a virtual memory paging scheme and should provide approximately 100K bytes of memory for data arrays.

PLANNING AND CO-ORDINATION SECTION

Head of Section: K.M. Kennedy

Staff

R.B. Aronsen was acting Head of the Section for six weeks. The Section 50 position created for R. Thieme to service the BMR Review Committee was terminated on 31 December 1977. P.A. Smith joined the Section in August for three months whilst R. Thieme was on furlough.

Program

The BMR program for 1978-80 was finalised and distributed in March 1978. Notification of the proposed program in each State had earlier been forwarded to the relevant State Mines Department for concurrence. An abridged 1978 program was produced as a BMR Record and made available to the public through open file centres and the BMR Symposium.

Supervisors' meetings for the 1979-81 program were held during October. For the first time, the final meeting which deals mainly with service activities was held a week after the other meetings to enable manpower and financial costs to be evaluated, and to permit modification of the proposed program to fit the available resources. It was a useful innovation.

Several meetings were held during the year to discuss program matters, notably marine, geochemical, and oil shale proposals.

Development of a system of program formulation to assist in determining priorities for projects was begun. The costing system, which is an essential background for program formulation, was kept under review by C. Watt and modified to improve its accuracy and operation; a draft of a Record documenting the system was prepared.

ASTEC

A draft of the chapter on Research and Development in the Earth Sciences for the ASTEC overview was completed in November. K.M. Kennedy joined a working group convened by Professor B. Hobbs of Monash University to produce the final version of the chapter.

A special Committee headed by Professor Badger, Chairman of ASTEC, was formed to review the role of BMR. The Section prepared several papers, and reviews of program and levels of activity for this Committee.

BMR Review

R. Thieme worked with the BMR Review Committee to bring the findings to a final report in April.

Chinese visit

A delegation of fifteen senior geoscientists from China visited Australia for five weeks during October and November. P.A. Smith organised details of the visit and accompanied the delegation on its visits to State Mines Departments and mining and exploration activities.

Miscellaneous

A computer data base system was developed to enable quick retrieval of information from the large collection of working documents filed by the Section; this has proved to be a useful system and is expanded as new documents are generated.

CARTOGRAPHY SECTION

Chief Cartographer (Production): P.A. Boekenstein

Chief Cartographer (Resources): M.E. Nancarrow

Management and Staffing

The implementation of matrix organisation continued on an experimental basis. It was found, with the deployment of staff at Queanbeyan, to be more expedient and efficient to regard the section as two interdependent subsections: the Mapping Subsection located at Canberra, and the Publications Drafting Subsection located at Queanbeyan. Each subsection is administered (primarily for production purposes) by an Assistant Chief Cartographer: H. Hennig at BMR and R. Inglis at Queanbeyan.

Project management was introduced and is working successfully, particularly in the Publications Drafting Subsection where there is more common ground between the drafting groups than those in the Mapping Subsection. Projects, however, are not restricted to a particular subsection, and deadlines and priorities dictate that on many occasions draftsmen from one subsection will be engaged on projects from the other subsection. The long line of communication between Queanbeyan and Canberra considerably reduces the efficiency of project management and presents numerous administrative problems.

Inter-group staff rotation continued as a means of ensuring greater flexibility and versatility of drafting staff, and more draftsmen have had the opportunity to become involved in computer-assisted cartography.

At 31 October 1978, the staff of the Cartography Section consisted of 70 draftsmen, 1 graphic designer, 1 technical officer, 14 drafting assistants, 3 photographers, 1 assistant (printing), and 3 clerical assistants.

Four draftsmen accompanied geological parties on field surveys: T. Brown, Pine Creek; J. Stirzaker, Mount Isa-Lawn Hill; G. Young, Duchess; P. Jorritsma, McArthur Basin.

M. Nancarrow was seconded on 16 October to participate in the revision of the 1976 brief on the space requirements for the proposed new BMR centre.

Conferences and visits

P.A. Boekenstein and M.E. Nancarrow attended the Chief Draftsmen Conference at Adelaide in April 1978.

L. Kerec represented the section at a visual aids workshop held at Adelaide 26-28 June 1978. A working group was formed to prepare a handbook of visual aids for display.

H. Hennig and A. Parvey attended the 3rd Australian Cartography Conference in Brisbane on 5-7 October 1978. They visited two contract drafting firms while in Brisbane.

E. Feeken visited the four field parties and the BMR Darwin Office between 21 August and 10 September 1978 to supervise field drafting and the preparation of 1:100 000 maps by the two Darwin draftsmen.

W. Gerula visited the SA Mines Department and two Adelaide-based contractors to discuss current and forthcoming airborne survey contracts. F. Simonis visited the SA Mines Department Drawing Office to instruct on pre-survey compilation requirements for the Adelaide Geosyncline airborne survey project.

G. Lamberts visited the Royal Australian Survey Corps at Bendigo from 21 August to 1 September 1978 to study the computer plotter-produced Automap system of topographic map production.

R. Cooper and D. Souter attended the Australian International Engineering Exhibition at Sydney on 14 and 15 September 1978 and visited several distributors of hardware suitable for use in our Computer-Assisted Cartography Group and to assess the latest developments of integrated visual display units.

Production (November 1977 to October 1978)

1. <u>Geological maps</u>	<u>1:100 000</u>	<u>1:250 000</u>	<u>Other scales</u>
Photoscale compilation in progress	14	5	-
Photoscale compilation completed	15	7	-
Preliminary Edition:			
Compilation by BMR, in progress	11	7	8
Compilation by BMR, completed (ready for printing)	2	-	1
Printed	11	4	9
1st or 2nd Edition:			
Fair drawing in progress, BMR:	-	-	8
contract*:	4	2	4
Fair drawing completed, BMR:	-	-	5
contract*:	-	21	-
Printing in progress**	-	8	1
Printing completed**	1	16	20
Reprinted**	-	1	-

Notes:

- * Contract drafting stages: Specifications prepared - 12 maps; contractor recommended - 19 maps; first proof checked - 18 maps; second proof checked - 17 maps.
- ** Printing stages: specifications prepared - 19 maps; printing contracts recommended - 29 maps; colour designs and colour guides - 28 maps; screen masters and dyeproofs checked - 22 maps; machine proofs checked - 18 maps; printed maps checked - 3 maps.

The above statistics include:

- (a) four 1:10 million maps for BMR Earth Science Atlas
- (b) four 1:100 000 maps (Forsayth) of the Geochemical Series, scribed on flatbed plotter

2. <u>Geophysical maps</u>	<u>1:250 000</u>	<u>1:500 000</u>	<u>Other scales</u>
Pre-survey compilation	12	-	-
Flight path recovery	15	-	-
Preliminary releases, magnetic and radiometric	180	-	6
TMI contours (1:1 million series)	-	-	7
Radiometric ratio profiles	65	-	-
Gravity series maps (computer drawn)	18	27	1
Gravity map of Melanesia			1
3. <u>Text figures, diagrams etc. completed</u>			
Records and miscellaneous (includes AMI)			950
Reports			90
BMR Journal			230
Explanatory Notes			65
Bulletins			225
Outside publication			400
Transparent slides for lectures etc.			600

4. Geological and geophysical activities of BMR

Broadsheet Brochures 1 and 2 printed, January 1978

ADMINISTRATIVE SECTION

Administrative Officer: B.M. Williams

Staff

The Administrative Section has experienced an overall loss of 5 staff for the two-year period 1977-78. Despite such a small loss compared to other areas of the Bureau, there are still delays in dealing with administrative matters. This is due mainly to the fact that suitably experienced officers could not be recruited and the intake of base grade staff has had to be trained.

General

G. Scott acted as Administrative Officer during the absence in the latter part of the year of B.M. Williams on sick leave and was also involved in all BMR staff matters. A review of the Staff Subsection has been undertaken by the Organisation Section of Central Office.

During the year the Administrative Section continued to provide office, vehicle, finance, and publication processing services to the rest of BMR.

A new furniture and office machine register was commenced during the year.

One of the more important aspects of the Section's activities during the year was to prepare a statement for submission to Joint Council on camping allowances and conditions. Considerable use was made of the reports and recommendations of the Intradepartmental Committee on Field Conditions.

Finance

The level of commitment funds and cash for 1977-78 was, in real terms, less than those provided in 1976-77. Financial management proved to be a difficult task in 1977-78 and total BMR expenditure in 1977-78 was 0.54% underspent.

Cash for 1978-79 is at the same level as that spent in 1977-78. In real terms this is a further reduction for 1978-79.

Because of the large carry-forwards from 1977-78 of unpaid commitments, there will be a reduced amount of cash available for the 1978-79 program. This means that new commitments, in many cases, will have to be deferred to a date much later than in past years to ensure expenditure is contained within the available cash funds.

Additional estimates were sought and obtained in 1977-78 for BMR Aircraft (\$23 000) and Repairs and Maintenance of Plant and Equipment (\$20 000). An allocation from the Advance to the Minister of Finance also was sought and obtained for overtime (\$1552). Final estimates for 1978-79 and actual expenditure for 1977-78 are listed in Table 1.

A new system of recording previous years' expenditure was introduced, thus making detailed information more accessible.

Works program

Funds for the works program were again reduced for the current year. The furniture and fitting vote, which included items deferred from previous years, was cut from \$446 600 to \$2000. Table 2 lists funds provided in the Works Program.

Construction of smoke doors, an additional fire exit, and other fire safety measures are currently being carried out within the BMR Building. This work stems from a fire risk investigation made by the ACT Fire Brigade.

A new drillers' workshop and heavy vehicle ramp have been constructed at Fyshwick. Other works carried out include bird-proofing of the Rock Store and provision of additional space for use as an inspection area by visitors.

TABLE 1

Expenditure for 1977/78 and Final Estimates for 1978/79

Item	Description	Actual Expenditure 1977/78	Final Estimate 1978/79
432-1-01	Salaries and Allowances	8 329 698	8 300 000
02	Overtime	136 552	142 000
		8 466 250	8 442 000
432-2-01	Travel and Subsistence	414 971	411 000
02	Office Requisites	114 535	123 000
03	Postage, Telephones, Telegrams	228 103	233 000
04	Office Services	32 278	33 000
05	Printing of Maps and publications	374 945	394 000
06	Vehicles	567 104	603 000
07	Aircraft	333 789	262 000
08	General Stores	457 167	495 000
09	Contract Services	719 554	693 000
10	Freight and Cartage	59 104	62 000
11	Repairs and Maintenance	73 925	70 000
12	Computer Services	429 917	560 000
13	Incidental and other	69 735	65 000
		3 875 132	4 004 000
883-1-01	Plant and Equipment	465 761	510 000
		12 807 143	12 956 000

TABLE 2Works Program 1978/79

	<u>Proposal (\$)</u>		<u>Program (\$)</u>	
	<u>BMR</u>	<u>DAS</u>	<u>BMR</u>	<u>DAS</u>
Repairs and Maintenance	33 200	147 700	28 250	(a)
Major New Works	440 000	510 000	Nil	(a)
Minor New Works	32 700	142 160	10 360	(a)
Furniture and Fittings	446 600	-	2 000	-

(a) Separate figures not available from the Department of Administrative Services as they are included in part of their overall works program and priority list.

APPENDIX 1Publications issued during period 1/10/77 to 30/9/78Bulletins

- 166. EXON, N.F. - Geology of the Surat Basin in Queensland.
- 169. SHERATON, J.W. & LABONNE, B.* - Petrology and geochemistry of acid igneous rocks of northeast Queensland.
- 170. COOK, P.J.* & MAYO, W.* - Sedimentology and Holocene history of a tropical estuary (Broad Sound, Queensland).
- 171. POJETA, J.**, GILBERT-TOMLINSON, J. & SHERGOLD, J.H. - Cambrian and Ordovician rostroconch molluscs from northern Australia.
- 174. POJETA, J.** & GILBERT-TOMLINSON, J. - Australian Ordovician pelecypod molluscs.
- 177. HUGHES, R.J.* - The geology and mineral occurrences of Bathurst Island, Melville Island, and Cobourg Peninsula.
- 178. REINSON, G.E. - Hydrology and sediments of a temperate estuary - Mallacoota Inlet, Victoria.
- 179. MUTTER, J.C. - The Queensland Plateau.
- 191. MATHUR, S.P., MOSS, F.J., & BRANSON, J.C. - Seismic and gravity investigations along the geotraverse, Western Australia, 1969.
- 192. BELFORD, D.J. & SHEIBNEROVA, V.** (comp.) - The Crespin volume: essays in honour of Irene Crespin.
- 193. DERRICK, G.M., WILSON, I.H.**, HILL, R.M.*, GLIKSON, A.Y., & MITCHELL, J.E. - Geology of the Mary Kathleen 1:100 000 Sheet area, northwest Queensland.
- 194. HOHNEN, P.D. - Geology of New Ireland, Papua New Guinea.
- 201. DOW, D.B. - A geological synthesis of Papua New Guinea.

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- 173. BURTON, G.M.* - Recharge conditions and the siting of bores in fractured-rock aquifers of the ACT.
- 180. EVERINGHAM, I. - Preliminary catalogue of tsunamis for the New Guinea/Solomon Islands region, 1768-1972.(Microfiche MF14).

* former BMR officer

** non-BMR officer

185. DOWNIE, D.N. - Digital data acquisition system in geophysical survey aircraft VH-BMG. (Microfiche MF8).
187. YOUNG, G.A. & SHELLEY, E.P. - Amadeus Basin airborne magnetic and radiometric survey, Northern Territory, 1969.
188. JOHNSON, R.W. - Distribution and major-element geochemistry of late Cainozoic volcanoes at the southern margin of the Bismarck Sea, Papua New Guinea. (Microfiche MF12).
192. RIPPER, I.D. - Some earthquake focal mechanisms in the New Guinea/Solomon Islands region, 1969-1971. (Microfiche MF11).
195. DeDECKER, P.** & JONES, P.J. - Check list of ostracoda from Australia and Papua New Guinea.
198. FRASER, A.R., DARBY, F.* & VALE, K.R.* - The reconnaissance gravity survey of Australia: a qualitative analysis of results. (Microfiche MF15).
199. EVERINGHAM, I.B. - Seismicity of the New Guinea/Solomon Islands region, 1969. (Microfiche MF27).
202. DRUCE, E.C. & RADKE, B.M. - Geochemistry of the Fairfield Group, Canning Basin. (Microfiche MF24).
208. Geological Branch Summary of Activities 1977.

BMR 77 (some highlights of the work of BMR in 1977)

Australian Mineral Industry Annual Review 1976

Australian Mineral Industry Quarterly

Vol. 30 (1977), Nos 1, 2, 3, 4.

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Vol. 2, No. 4; Vol. 3, Nos. 1, 2, 3.

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Nos. 70, 71, 72, 73.

Petroleum Exploration and Development Titles (Map and Key)

1 January 1977

1 July 1977.

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8. KNIGHT, N.D. (comp.) - Australian antimony deposits.

1:250 000-scale Geological Maps and Explanatory Notes

BROWN, C.M.** - Yule, PNG (SC/55-2)

CROWE, R.W.A.** & MUHLING, P.C. - Lucas, WA (SF/52-2)

DOUTCH, H.F. - Croydon, Qld (SE/54-11)

GOWER, G.F.** - Laverton, WA (SH/51-2)

HODGSON, I.M. - Highlands Rocks, NT (SF/52-7)

HODGSON, I.M. - Tanami, NT (SE/52-15)

JACKSON, M.J. - Lennis, WA (SG/52-13)

JACKSON, M.J. - Waigen, WA (SG/52-14)

KENNEWELL, P.J. - South Lake Woods, NT (SE/53-9)

OFFE, L.A. - Mount Peake, NT (SF/53-5)

OFFE, L.A. & KENNEWELL, P.J. - Mount Solitaire, NT (SF/52-4)

POWELL, B.S.* & SMART, J.* - Jardine River/Orford Bay, Qld
(SC/54-15 and SC/54-16)

ROBINSON, G.P. & JAQUES, A.L. - Karkar Island, PNG (SB/55-2)

STRUSZ, D.L. - Canberra, ACT and NSW (SI/55-16) reprint

TOWNER, R.R. - Crossland, WA (SE/51-16)

WILLMOTT, W.F.** & POWELL, B.S.* - Cape Weymouth, Qld (SD/54-4)

Preliminary geological maps

1:100 000-scale

Alice Springs, NT	Mount Oscar, Qld
Batchelor, NT	Oban, NT
Dajarra, Qld	Quamby, Qld
Gilberton, Qld	Rum Jungle, NT
Kapalga, NT	Marum ophiolite complex, PNG

1:250 000-scale

Camooweal, Qld (1:253 440 - reprint)	Lake Kutubu, PNG
Derby, WA	Mianmin, PNG
Kavieng, PNG	Mount Anderson, WA
Kikori, PNG	Noonkanbah, WA

1:1 000 000-scale

Carpentaria, Karumba, and part Laura Basins, Qld

Officer Basin, WA

Officer Basin (Geomorphology), WA

Stream sediment geochemistry maps

Forsayth, Qld 1:100 000 (5 maps: Cu-Pb-Zn, Cu-Co-Ni,
U-Ce-Th, U-As-Bi, Sn-W-Nb)

1:500 000-scale gravity maps (Bouguer anomalies)

Alligator River, NT	Limbunya, NT
Ashton, WA	Lissadell, WA
Auvergne, WA	Londonderry, WA
Arnhem Bay, NT	Medusa Banks, WA
Blue Mud Bay, NT	Melville Island, NT
Bathurst Island, NT	Milingimbi, NT
Birrindudu, NT	Montague Sound, WA
Cambridge Gulf, WA	Mount Doreen, NT
Camden South, WA	Mount Elizabeth, WA
Cape Scott, NT	Mount Evelyn, NT
Charnley, WA	Mount Marumba, NT
Cobourg Peninsula, NT	Mount Ramsay, WA
Cape Beatrice, NT	Mount Theo, NT
Delamere, NT	Mount Young, NT
Darwin, NT	Pellew, NT
Dixon Range, WA	Pine Creek, NT
Drysdale, WA	Port Keats, NT
Fergusson River, NT	Port Langdon, NT
Gordon Downs, WA (2nd ed.)	Prince Regent, WA
Gove, NT	Roper River, NT
Highland Rocks, NT	The Granites, NT
Hodgson Downs, NT	Truant Island, NT
Junction Bay, NT	Urapunga, NT
Katherine, NT	Victoria River Downs, NT
Lake Mackay, NT	Warburton, Vic
Lansdowne, WA	Waterloo, NT
Larrimah, NT	Wessel Islands, NT
Lennard River, WA	Yampi, WA

APPENDIX 2Records issued on open file during period 1/10/77 to 30/9/78

- 1975/83. CRESPIAN, I.* - Ramblings of a micropalaeontologist.
 1975/149. TAYLOR, F.J.- Nebo coalfield magnetic survey, 1974.
 1976/29. DRAPER, J.J.* - The Devonian rocks of the Toko Syndline,
 western Queensland.
 1976/103. COLLINS, C.D.N. - Seismic investigation of crustal
 structure in SE Australia, March-May 1976; operational report.
 1976/108. PETTIFER, G.R. & POLAK, E.J. (eds.) - The use of surface
 geophysical methods in underground water investigations.
 1977/9. MAJOR, J.A. - Rum Jungle area gravity survey, Northern
 Territory, 1974.
 1977/14. TAYLOR, F.J. & PETTIFER, G.R. - Lae-Markham Valley
 geophysical survey, PNG, 1973.
 1977/15. HORSFALL, C.L.*, HOHNEN, P.D., & PETTIFER, G.R. -
 Geological and geophysical investigations for urban development,
 Gungahlin, ACT, 1975-76.

- 1977/16. PIETERS, P.E. & WYBORN, D. - Geological work in Antarctica, 1975.
- 1977/19. KENNARD, J. & DRAPER, J.* - BMR stratigraphic drilling in the Burke River structural belt, southeast Georgina Basin, 1974.
- 1977/20. ROSSITER, A.G. - A preliminary geological and geochemical investigation of the Una May uranium prospect, Seigal 1:100 000 Sheet area, Northern Territory.
- 1977/23. KERR, D. - Overseas visit to India.
- 1977/24. HUTCHISON, D.S.* - Results of the 1976 orientation stream-sediment geochemical survey in the northeastern Kepala Burung Birdshead, Irian Jaya, Indonesia.
- 1977/26. BRASSIL, F. & ANFILOFF, W. - Galilee Basin seismic survey, Queensland. 1976 operational report - Clermont-Alpha area.
- 1977/27. SCHMIDT, D.L.*, NELSON, A.,** & ANFILOFF, W. - Galilee Basin seismic survey, 1976 operational report - Pentland-Hughenden area.
- 1977/28. WILLIAMS, J.P., HONE, I.G., GILLESPIE, P.J.*, SEDMIK, E.C.E.*, & GARDENER, J.E.F. - Tennant Creek ground geophysical survey, Northern Territory, 1969.
- 1977/29. POLAK, E.J. & RAMSAY, D.C. - Canaway Ridge, Queensland, geophysical survey, 1973.
- 1977/30. BULLOCK, P.W.B. - Tennant Creek gravity and magnetic survey, Northern Territory, 1973.
- 1977/31. EVERINGHMA, I.B., GAULL, B.A., & DENT, V.G. - The east Solomon Sea earthquake of 20 July 1975 and notes on earthquake risk in Bougainville.
- 1977/32. ROBINSON, G.P. & RATNAM, N.** - Explanatory notes on the Manokwari 1:250 000 geological Sheet, Irian Jaya.
- 1977/33. PLUMB, K.A. - McArthur Basin Project.
- 1977/36. RYAN, C.D. (comp.) - Wells and metres drilled for petroleum.
- 1977/37. HILL, P.J. - Waniassa reservoir no. 2 seismic refraction blast-induced vibration.
- 1977/38. WEEKES, J.C.W.* (comp.) - Miscellaneous chemical, petrographic, and mineragraphic investigations carried out in the geological laboratory, January-December 1976.
- 1977/39. CULL, J.P. & SPARKSMAN, G.F. - Measurements of surface heat flow.
- 1977/40. GALLOWAY, R.W.** & KEMP, E.M. - Late Cainozoic environments in Australia.
- 1977/44. OVERSBY, B.S. - Catalogue of field compilation sheets of the Newcastle Range Volcanics and associated rocks in the Mount Surprise, Galloway, and northernmost Georgetown 1:100 000 Sheet area.
- 1977/45. Geological Branch summary of activities, 1977.
- 1977/46. Geophysical Branch summary of activities, 1977.
- 1977/47. Mineral Resources Branch summary of activities, 1977.
- 1977/48. Petroleum Exploration Branch summary of activities, 1977.
- 1977/49. Operations Branch summary of activities, 1977.
- 1977/50. HSU, H.D.* & TILBURY, L.A. - A magnetic interpretation program based on Werner deconvolution.
- 1977/51. HOHNEN, P.D. - The control of groundwater seepage by pumping from a bore at Torres Street, Red Hill, ACT.

- 1977/52. LAMBOURN, S.S.* - An interpretation of the airborne magnetic and radiometric survey of Coompana, Nullarbor, Fowler, and Nuyts (onshore) 1:250 000 Sheet areas, SA, 1972-3.
- 1977/53. STUART-SMITH, P.G. - Shallow stratigraphic drilling in the Kapalga 1:100 000 Sheet area, Alligator Rivers region, NT, 1974-6.
- 1977/54. GOLDSMITH, R.M.* & PETTIFER, G. - Dairy Flat, ACT: report on sand and gravel investigations, 1973-1976.
- 1977/55. ROBSON, D.F.* - Magnetic induced polarisation (MIP) survey, Woodlawn, New South Wales, 1975.
- 1977/57. GOLDSMITH, R.C.M.* & WILSON, E.G. - Stromlo-Higgins bulk supply main, ACT - geological investigations 1975, and review since construction, 1977.
- 1977/58. BRISCOE, G.* & BENNETT, D.G. - Geological and geophysical investigation of reservoir sites in Tuggeranong, ACT, 1976.
- 1977/59. HENDERSON, G.A.M., JACOBSON, G., & TAYLOR, F.J. - Geological and geophysical investigations of sites for major buildings, Canberra City, Parkes, Campbell, ACT, 1974-75.
- 1977/60. SHERATON, J.W. & OFFE, L.A. - Geological work in Antarctica 1976.
- 1977/61. COLWELL, J.B. - Stratigraphic drilling of stranded beach ridges, central western Victoria, 1977.
- 1977/62. FINLAYSON, D.M. - Seismic investigations of crustal structure in southeastern Australia, November 1976 - March 1977 (Madar survey): operational report.
- 1977/64. BRISCOE, G.* & KELLETT, J.R. - Engineering geology of the Queanbeyan urban area NSW.
- 1977/66. HILL, P.J. - Lake Tuggeranong project, geophysical survey of weir sites, ACT, 1977.
- 1978/1. GORTER, J.D.* - Review of Triassic palaeoenvironments in the Canning Basin, Western Australia.
- 1978/2. RIESZ, E.J. - SIMULAT: a computer program for the prospect-by-prospect method of estimating petroleum resources using Monte Carlo simulation.
- 1978/4. RIPPER, I.D. & SHEARD, S.N. - Port Moresby Geophysical Observatory annual report 1975.
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- 1978/8. CROWE, R.W.A.*, TOWNER, R.R., & GIBSON, D.L. - Permian and Mesozoic geology of the Derby and Mount Anderson 1:250 000 Sheet areas, Western Australia.
- 1978/9. NOAKES, L.C. & WARD, J. - Mineral resources of Australia 1978.
- 1978/10. DRAPER, J.J.*, SHERGOLD, J.H., & HEIGHWAY, K.A. - A review of petroleum exploration and prospects in the Georgina Basin.
- 1978/15. DRAPER, J.J.* - Geochemical studies of core material from the Arrinthrunga Formation, Northern Territory.
- 1978/17. ROSSITER, A.G. & SCOTT, P.A. - Stream-sediment geochemistry of the Forsayth 1:100 000 Sheet area, north Queensland.
- 1978/19. GREGSON, P.J., PAULL, E.P., & GAULL, B.A. - The Indonesian earthquake of 19 August 1977: effects in Western Australia.

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- 1978/21. Abstracts of 7th BMR Symposium. Canberra 2-3 May 1978.
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- 1978/28. HENDERSON, G.A.M. - Stratigraphic holes drilled in Canberra 1971 to 1976.
- 1978/29. KELLETT, J.R. - Geological investigation of "topsoil" deposits on Block H423, Booth district, Naas, ACT.
- 1978/31. JACOBSON, G. - Geological evaluation of terrain for urban and regional development in the ACT.
- 1978/34. HARRISON, P.J. & SCHMIDT, D.L.* - Seismic and detailed gravity survey in the Toko Syncline, Georgina Basin, 1977-operational report.
- 1978/37. KURYLOWICZ, L.E. - Petroleum source rock potential from wire-line logs.
- 1978/43. McKAY, B.A. & WHITE J.A.W. - Enhanced recovery of petroleum-applications to Australia.
- 1978/44. OVERSBY, B.S., WITHNALL, I.W.**, BAKER, M.E.** & BAIN, J.H.C. - Geology of the Georgetown 1:100 000 Sheet area (7661), north Queensland: part (a).
- 1978/51. NEEDHAM, R.S. - BMR's role in mineral exploration within the Pine Creek Geosyncline, 1949-1977.
- 1978/58. CULL, J.P. & DENHAM, D. - A case for R & D on geothermal energy in Australia.
- 1978/59. HILL, P.J. - Mawson geophysical observatory, annual report, 1975.
- 1978/62. OGILVY, R.D.* - Field tests with Scintrex DHP-4 downhole EM prospecting system, NSW, 1975.
- 1978/67. BELFORD, D.J. - ESCAP fossil reference collection (Australian repository). Supplement 3.
- 1978/70. SEIDAL, G.E. - Operating manual for the GABHYD model.
- 1978/71. WRONSKI, E.B. - Alligator River area gravity survey, Northern Territory 1972-1973.
- 1978/75. WEEKES, J.C.W.* & FITZSIMMONS, J. - Miscellaneous chemical, petrographic, and mineragraphic investigations carried out in the geological laboratory, January-December 1977.
- 1978/76. WELLMAN, P. - National report on gravity in Australia, July 1974 to June 1978.
- 1978/78. AUSTRALIAN activities in the field of stratigraphic correlation 1975-78.

APPENDIX 3

Data released through Australian Government Printer copy
service during period 1/10/77 to 30/9/78

Photoscale geological compilations1:100 000 scale sheet areas

Aileron, NT (12 sheets at 1:25 000)
 Alice Springs, NT (7 sheets at 1:26 000)
 Burt, NT (16 sheets at 1:25 000)
 Denison, NT (12 sheets at 1:25 000)
 Fergusson Range, NT (7 sheets at 1:25 000)
 Kapalga, NT (4 sheets at 1:50 000)
 Laughlen, NT (16 sheets at 1:25 000)
 Lawn Hill, Qld (16 sheets at 1:25 000)
 Mount Oscar, Qld (4 sheets at 1:50 000)
 Mundogie, NT (16 sheets at 1:25 000)
 Napperby, NT (NE corner) (1 sheet at 1:100 000)
 Riddock, NT (16 sheets at 1:25 000)
 Rum Jungle, NT (1 sheet at 1:25 000)

1:250 000 scale sheet areas

Undoolya, NT (2 sheets at 1:46 000)

Marine Geophysical Survey 1970-73-final track maps

SD50	I54 (Adelaide)
SE49	I56 (Sydney)
SE51 (Broome)	I57
SE49 (Cloates)	J50
SF50 (Hamersley Range)	J51 (Esperance)
SG48	J52
SG49 (Carnarvon)	J53 (Du Couedic)
SH49 (Houtman Abrolhos)	J54 (Hamilton)
SH50 (Perth)	J55 (Melbourne)
SI48	J56 (Bodalla)
SI50 (Albany)	K54 (Stokes)
SI58	K55 (Tasmania)
H52 (Nullarbor Plain)	K56
H56 (Armidale)	L54
I52 (Eyre)	L55
I53 (Port Augusta)	L56

Airborne geophysical mapsA. 1:250 000-scale sheet areas

	Type of data (at 1:250 000 unless otherwise shown)
Queensland	
Cooktown	Total count radiometric profiles Magnetic profiles
Duchess	Magnetic profiles Magnetic contours (6 sheets at 1:100 000)
	Total count radiometric contours Flight lines (6 sheets at 1:100 000)
Hann River	Total count radiometric profiles Magnetic profiles
Rutland Plains	Total count radiometric profiles Magnetic profiles
NSW and ACT	
Bega	Magnetic contours Flight lines
	Magnetic profiles
Broken Hill	Magnetic contours (revised) Total count radiometric contours (revised)
Canberra	Magnetic contours (revised)
Cootamundra	Magnetic contours
Ulladulla	Magnetic profiles Magnetic contours Flight lines
Victoria	
Bairnsdale	Magnetic contours Magnetic profiles Flight lines
Bendigo	Flight lines Magnetic profiles
Western Australia	
Bencubbin	Magnetic profiles Flight lines
Bentley	Magnetic profiles Magnetic contours Flight lines
Browne	Magnetic profiles Magnetic contours Flight lines
Cooper	Magnetic profiles Magnetic contours Flight lines

Western Australia (cont'd)

Dumbleyung	Flight lines Magnetic profiles Magnetic contours Radioaltimeter profiles Total count radiometric contours Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Glenburgh (part)	Flight lines Magnetic profiles
Hyden	Magnetic contours Total count radiometric contours
Lennis	Magnetic profiles Magnetic contours Flight lines
Moora	Magnetic profiles Flight lines
Nabberu	Flight lines Magnetic profiles
Neale	Magnetic contours Flight lines Magnetic profiles
Newdegate	Flight lines Magnetic profiles Magnetic contours Radioaltimeter profiles Total count radiometric contours Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Ninghan	Magnetic profiles Flight lines
Peak Hill	Flight lines Magnetic profiles
Perenjori	Magnetic profiles Flight lines
Robinson Range	Flight lines Magnetic profiles
Scott	Magnetic profiles Flight lines Magnetic contours
Stanley	Flight lines Magnetic profiles
Talbot	Magnetic profiles Magnetic contours Flight lines
Vernon	Magnetic contours Flight lines Magnetic profiles

Type of data (at 1:250 000
unless otherwise shown)

Western Australia (cont'd)

Waigen	Magnetic profiles Magnetic contours Flight lines
Wanna	Magnetic contours Flight lines
Westwood	Magnetic profiles Magnetic contours Flight lines
Yowalga	Magnetic profiles Magnetic contours Flight lines

Northern Territory

Bauhinia Downs	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Calvert Hills	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Cape Scott	Magnetic contours
Darwin	Magnetic contours
Fergusson River	Magnetic contours
Fog Bay	Magnetic contours
Hodgson Downs	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Katherine	Magnetic contours Total count radiometric contours
Lake Mackay	Flight lines Magnetic contours Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Total count radiometric contours Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles

Northern Territory (cont'd)

Mount Doreen	Flight lines Magnetic profiles Magnetic contours Radioaltimeter profiles Total count radiometric profiles Total count radiometric contours Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Mount Evelyn	Magnetic contours Total count radiometric contours
Mount Young	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Pellew	Flight lines Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Pine Creek	Magnetic contours
Robinson River	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Roper River	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Tanumbirini	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles
Urapunga	Flight lines Magnetic profiles Radioaltimeter profiles Total count radiometric profiles Potassium radiometric profiles Uranium radiometric profiles Thorium radiometric profiles

Northern Territory (cont'd)

Wallhallow

Flight lines
Magnetic profiles
Radioaltimeter profiles
Total count radiometric profiles
Potassium radiometric profiles
Uranium radiometric profiles
Thorium radiometric profiles

B. Revised 1:100 000 scale sheet areas

Albany, WA
Alice Springs, NT
Canberra, NSW, ACT & Vic.
Melbourne, Vic. & NSW
Oodnadatta, NT & SA
Petermann Ranges, SA, WA & NT
Roper River, NT

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D.B. McGlynn*

CLERK CLASS 6

P.J. Corrigan
P.J. Flanagan
B. Hardy*

*Acting in that position

CLERK CLASS 5

E. Petrushevski

CLERK CLASS 4

A. Alps
J. Bayliss
P. Black*
W. Coulson
J.G. Gilmore
D. Lamont*
G. Mortimer
B.L. Pedvin
M. Preston-Stanley*
C.D. Ryan
J. Somerville
M. Terefelco
S. Westerhuis

CLERK CLASS 2/3

J. Lane*
J. Kuta*
S. Styles
R. Weber*

CLERICAL ASSISTANT GRADE 4

A.G. Bright
J. Ramsey*
J. Tait

CLERICAL ASSISTANT GRADE 3

M. Ellison
A. Mears*
K. Moloney
A. Wong
L.M. Woods

CLERICAL ASSISTANT GRADE 2

M. Dawes
J. Donnan*
L. Duke
L. Hansen

*Acting in that position

CLERICAL ASSISTANT GRADE 2
(continued)

R. Hemmett
G. Lohse
A.L. Millynn
L. Moore
A.J. Nielsen
S. O'Neill
A. Parker*
T. Tammaro*

CLERICAL ASSISTANT GRADE 1

O. Domitrjak
J. Oldfield
D.M. Parkes
A. Witherdin

ASSISTANT (PRINTING) GRADE 3

R.A. Jokinen

ASSISTANT (PRINTING) GRADE 1

G. Cairns

STENO-SECRETARY GRADE 2

J. Magro

STENO-SECRETARY GRADE 1

F. Beirne
R. Hearn
H. Reilly
J. Richardson
L.J. Walton
A. Westwood*

TYPIST SUPERVISOR

P.A. Filby
L.A. Stafford

TYPIST GRADE 2

J. Brushett
P. Evans
J.F. Kopras
D.J. Leonard
B. Marshall

*Acting in that position

TYPIST GRADE 1

S. Bilton
J. Fry
I.M. Hillier
K. Horsfall
D. Shaw
M. Tyrrell
A. Walker

MOTOR DRIVER

R.L. Gibbs
F. Kane
M. Watson*

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, B.Dip.Min.Eng.,
A.W.A.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

L. Ranford, B.Sc. (Hons), F.G.A.A.,
M.Aus.I.M.M., M.S.E.G.
D. Perkin*, B.A., B.Econ., A.M.Aus.I.M.M.

*Acting in that position

ENGINEER CLASS 3	J.C. Erskine, B.E., M.Aus.I.M.M.
MINERAL ECONOMIST CLASS 3	A.J.B. Driessen*, B.Sc., A.M.Aus.I.M.M. A.J. Gourlay, B.Sc.
MINERAL ECONOMIST CLASS 2	G. Hillier, A.W.A.S.M., A.M.Aus.I.M.M. N.D. Knight*, B.Sc., Dip.Ed. K.R. Patterson, B.Sc.(Hons) C.R. Pratt, B.Sc., A.M.Aus.I.M.M.
GEOLOGIST CLASS 1	C. Mock, B.Sc.

PETROLEUM EXPLORATION BRANCH

ASSISTANT DIRECTOR	E.R. Smith*, B.A., B.Sc.
GEOPHYSICIST CLASS 5	D.J. Forman*, B.Sc.(Hons), Ph.D.
PETROLEUM TECHNOLOGIST CLASS 5	J.A.W. White, B.Sc., A.R.S.M.
GEOLOGIST CLASS 4	B.H. Stinear, B.Sc., A.M.Aus.I.M.M. P.R. Temple*, B.Sc.
GEOPHYSICIST CLASS 4	C.S. Robertson, M.Sc.
PETROLEUM TECHNOLOGIST CLASS 4	B.A. McKay, B.Sc.(Geol.), M.S.P.E. K. Stillwell, B.Sc.
GEOLOGIST CLASS 3	E. Nicholas, B.Sc., M.Sc. A. Mond*, Promovany Geol.
GEOPHYSICIST CLASS 3	K. Lockwood, B.Sc. W.J. McAvoy, B.Sc., B.A. E.J. Riesz*, B.Sc.(Hons)

*Acting in that position

PETROLEUM TECHNOLOGIST CLASS 3	J.M. Henry, A.C.S.M., A.M.Aus.I.M.M., M.S.P.E. P. Duff, F.M.T.C., M.Aus.I.M.M. L. Kurylowicz, B.Sc.
GEOPHYSICIST CLASS 2	J. Rasidi, B.E. Mining
CHEMIST CLASS 2	K.S. Jackson, M.Sc., Ph.D.
PETROLEUM TECHNOLOGIST CLASS 2	S. Ozimic, B.Sc.
GEOLOGIST CLASS 2	V.L. Passmore*, M.Sc. D.L. Gibson*, B.Sc. (Hons)
ROTARY DRILLING SUPERVISOR GRADE 1	J.B. Morgans
CLERICAL ASSISTANT GRADE 5	W. Turner*
TECHNICAL OFFICER GRADE 1	L.K. Rixon
TECHNICAL ASSISTANT GRADE 2	W. Hessler A. Haupt D.B. Pryce
CLERICAL ASSISTANT GRADE 4	A. Daric*
ROTARY DRILLING SUPERVISOR GRADE 2	L.T.J. Hodgins
ROTARY DRILLING SUPERVISOR GRADE 1	B.G. Findlay
SENIOR TECHNICAL OFFICER GRADE 1	I. Donald* Z. Horvath J. Staunton*

*Acting in that position

TECHNICAL OFFICER GRADE 1

R. Bresnehan*

ROTARY DRILLER GRADE 2

E.H. Cherry

A. Zoska

ROTARY DRILLER GRADE 1

K. Reine

K. Huth

L. Keast

E. Lodwick

T. Shanahan

ASSISTANT ROTARY DRILLER

J.L. Henry

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.

W.B. Dallwitz, B.A., M.Sc.

D.B. Dow, M.Sc.

A.R. Jensen*, M.Sc., Ph.D.,

A.M.Aus.I.M.M., Grad.Dip.Admin.

G.E. Wilford, O.B.E., B.Sc., Ph.D.,
M.I.M.M.

GEOLOGIST CLASS 4

D.J. Belford, M.Sc., Ph.D.

D.H. Blake*, B.Sc.(Hons), D.Phil.,
A.M.Aus.I.M.M.

J.M. Dickins, M.Sc., Ph.D.

R.G. Dodson, M.Sc., Ph.D., M.Aus.I.M.M.

F.I.M.M. (Seconded to Office of
National Assessments)

J. Ferguson*, B.Sc., M.Sc., Ph.D.,
D.Sc.

*Acting in that position

GEOLOGIST CLASS 4 (continued)

H.A. Jones, M.A., Ph.D.
W.J. Perry, B.Sc.
W.M.B. Roberts, B.Sc.
K.R. Walker, B.Sc.(Hons), Ph.D.
E.G. Wilson, B.Sc.(Hons), A.A.I.E.

GEOLOGIST CLASS 3

J.H.C. Bain*, B.Sc.
R.V. Burne, B.Sc.(Hons), D.Phil.
G. D'Addario, D.Sc.
P.J. Davies, B.Sc, Ph.D.
G.M. Derrick, B.Sc.(Hons)
E.C. Druce, M.Sc., Ph.D.
N.F. Exon, B.Sc.(Hons), Ph.D.
A.Y. Glikson, 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.(Hons), M.Sc.
D.H. McColl*, B.Sc., F.G.A.A.
R.W. Page, B.Sc.(Hons), Ph.D.
W.D. Palfreyman, B.Sc.(Hons)
P.E. Pieters, D.Geol.
M.D. Plane, B.Sc(Hons), M.A.
K.A. Plumb, B.Sc.(Hons)
C.E. Prichard, B.Sc.
D.C. Purcell, B.Sc.
G.P. Robinson, B.Sc.(Hons), Ph.D.
R.J. Ryburn, M.Sc.
B. Senior, M.Sc.
J. Shergold, B.Sc.(Hons), Ph.D.
C.J. Simpson, B.Sc., A.M.Aus.I.M.M.
S.K. Skwarko, M.Sc., Ph.D.
R.D. Shaw, B.Sc.(Hons), D.I.C., M.Sc.
D.L. Strusz, B.Sc.(Hons), Ph.D.
A.T. Wells, B.Sc.(Hons)

*Acting in that position

CHEMIST CLASS 3

J. Ferguson, B.Sc.(Hons), Ph.D.
A.D. Haldane, B.Sc., A.R.A.C.I.

GEOLOGIST CLASS 2

R.S. Abell, B.Sc.(Hons), M.Sc.
L.P. Black, B.Sc.(Hons), Ph.D.
D. Burger, M.Sc., Ph.D.
I.H. Crick*, B.Sc.(Hons), Dip.Ed.
M.A. Habermehl, M.Sc., Ph.D.
G.A.M. Henderson, B.Sc.
R. Bultitude, M.Sc.
P.D. Hohnen, B.Sc.
P.J. Kennewell, B.Sc.
D.E. MacKenzie, B.Sc.(Hons)
J.F. Marshall*, B.Sc.(Hons)
K. Modrak*, B.Sc.
M.D. Muir*, B.Sc.(Hons), Ph.D.,
Dip. Micropalaeontology
R.S. Needham, B.Sc.(Hons)
R.S. Nicoll, B.Sc., M.A., Ph.D.
B.S. Oversby, M.A., B.Sc., Ph.D.
M. Owen, B.Sc.(Hons), Ph.D.
C.J. Pigram, B.Sc.(Hons)
G. Seidal, D.I.C.
J.W. Sheraton, M.Sc., Ph.D.
A.J. Stewart, M.Sc., Ph.D.
I.P. Sweet, B.Sc.(Hons)
R.J. Tingey, B.Sc.(Hons)
J.G. Tomlinson, B.Sc.(Hons)
R.R. Towner, B.Sc.(Hons)
E.M. Truswell, B.Sc.(Hons), Ph.D.
P. Vandenbroek, B.Sc.
M.R. Walter, B.Sc.(Hons), Ph.D.
R.G. Warren, B.Sc., M.Sc., D.I.C.
A.N. Yeates, B.Sc.(Hons)

*Acting in that position

CHEMIST CLASS 2

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

GEOLOGIST CLASS 1

C.M. Brown, B.Sc.(Hons), M.Sc., D.I.C.
G.C. Chaproniere, M.Sc.
J.B. Colwell, B.Sc.(Hons), M.Sc.
W.R. Evans*, B.Sc.
A.L. Jacques, B.Sc.(Hons)
J.M. Kennard, B.Sc.(Hons)
J. Knutson, B.A.(Hons), Ph.D.
A.P. Langworthy, B.Sc.(Hons)
J.E. Mitchell, B.Sc.(Hons)
B.M. Radke, B.Sc.(Hons)
P.A. Scott, B.Sc.(Hons)
S. Shafik, B.Sc., M.Sc.
P.G. Stuart-Smith, B.Sc.(Hons)
D.A. Wallace, B.Sc.(Hons)
D. Wyborn, B.Sc.(Hons)
L.A. Wyborn, B.Sc.(Hons),
Dip.Ed., Ph.D.
G.C. Young, B.Sc., Ph.D.

CHEMIST CLASS 1

G.R. Ewers, B.Sc.(Hons)
L.A. Offe, B.Sc.(Hons)
A.G. Rossiter, B.Sc.(Hons)

TECHNICAL OFFICER GRADE 2

G.W.R. Barnes, B.Sc.
M.J. Bower
F. Hadzell
K. Heighway, Dip.Appl.Geol.
J.R. Kellett
J.G. Pyke
T. Slezak, Dip.Anal.Chem.
T. Zapasnik

*Acting in that position

TECHNICAL OFFICER GRADE 1

K. Armstrong
H.M. Doyle
D. Fitzsimmons
C. Madden
J.E. Price
G. Sparksman
B.G. West, B.Appl.Sc.
A.T. Wilson

TECHNICAL ASSISTANT GRADE 2

M. Amar
R.W. Brown
P.W. Davis*
D.M. Foulstone
L. Kraciuk
L. Pain
J.D. Reid
A.W. Schuett

TECHNICAL ASSISTANT GRADE 1

K. Ellingsen
J.L. Fitzsimmons
N.C. Hyett

CLERICAL ASSISTANT GRADE 4

L. Kay
J. Morrissey

FIELD ASSISTANT

D.B. Guy
R. McPake

GEOPHYSICAL BRANCH

ASSISTANT DIRECTOR

N.G. Chamberlain, B.A. (Hons),
A.A.I.P., M.Inst.P.

GEOPHYSICIST CLASS 5

M.G. Allen, B.Sc., Grad.A.I.P.
J.C. Dooley, B.A. (Hons), M.Sc.
F.A.I.P., M.Inst.P.

*Acting in that position

GEOPHYSICIST CLASS 5 (continued)

A. Turpie, B.Sc.(Hons), Grad.A.I.P.
G.A. Young, M.Sc., A.M.Aus.I.M.M.

GEOPHYSICIST CLASS 4

B.C. Barlow, B.Sc.(Hons), A.A.I.P.
F.W. Brown*, B.A.Sc., Grad.A.I.P.
D. Denham, B.Sc.(Hons), Ph.D.,
Grad.A.I.P., M.Inst.P.
P.M. McGregor, B.Sc.(Hons)
F.J. Moss, B.Sc.
J. Pinchin*, B.Sc.(Hons)
J.H. Quilty, M.Sc.
K. Seers, B.Sc., A.A.I.P., A.M.I.R.E.E.
D.C. Stuart, B.Sc.
R. Whitworth, B.Sc.(Hons)

GEOPHYSICIST CLASS 3

J. Branson, B.Sc.(Hons), F.G.S.
I.B. Everingham, B.Sc.(Hons), M.Sc.,
Grad.A.I.P., M.Inst.P.
D. Finlayson, M.Sc., A.A.I.P.
A.R. Fraser*, B.Sc.
J.E.F. Gardener, B.Sc., A.M.Aus.I.M.M.
P.J. Gregson, B.Sc.(Hons)
P.L. Harrison*, B.Sc.(Hons)
P. Hillman, A.F.C., B.Sc.
M. Idnurm*, M.Sc., Ph.D.
C.R. Johnston*, B.Sc.
C.O. Leary, B.Sc.
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.
S.P. Mathur, M.Sc., Ph.D.
J.M.H. Mulder, Dip.Geol/Geophys.
E.J. Polak, Dip.Min.Eng., Ph.D.,
M.I.E.Aust.
J.Rees, B.Sc.(Hons)

*Acting in that position

GEOPHYSICIST CLASS 3 (continued)

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.
D.H. Tucker, B.Sc.(Hons), Ph.D.,
A.M.Aus.I.M.M.
P. Wellman, M.Sc., Ph.D.
R. Wells, B.A.
J.B. Willcox, B.Sc.(Hons)

GEOPHYSICIST CLASS 2

W. Anfiloff, B.Sc.(Hons)
J.A. Bauer*, B.App.Sc.
D.G. Bennett*, B.Sc.(Hons)
P.W. Bullock, B.Sc.(Hons), F.G.S.
P.J. Cameron*, B.Sc.(Hons)
J.B. Connelly, B.Sc.
J.P. Cull, B.Sc.(Hons), Ph.D.
A.B. Devenish, B.Sc.
M. Gamlen, B.Sc.(Hons)
P.J. Hill, B.Sc.
A.P. Hogan*, B.Sc.(Hons)
K. Horsfall, B.Sc.
J.A. Major, B.Sc.
A.J. McEwin, B.Sc.(Hons)
M.W. McMullan, B.Sc.
R.F. Moore, B.A.(Geoph.)
A.S. Murray, B.Sc.(Hons), Grad.A.I.P.
J.C. Mutter, B.Sc.
E.P. Paull, B.Sc.(Hons)
J. Petkovic, B.Sc.
D.C. Ramsay, M.Sc., Grad.Dip.App Geoph.
I.D. Ripper, B.Sc.(Hons), M.A.I.P.
N. Sampath, M.Sc., Ph.D., A.M.Aus.I.M.M.
B. Spies, B.Sc., Gr.Dipl.Appl.Geoph.
P.A. Symonds, B.Sc.(Hons)
F.J. Taylor, B.Sc.(Hons)

*Acting in that position

GEOPHYSICIST CLASS 2 (continued)

S. Waterlander, Dip.Eng.
P.G. Wilkes, B.Sc.(Hons), M.Sc, D.I.C..
B. Wyatt, B.Sc.(Hons)
I. Zadoroznyj, B.Sc.(Hons)

GEOPHYSICIST CLASS 1

F. Brassil, B.A., Dip.Geoscience
R. Cobcroft, B.Sc., Grad.Dip.Appl.Geoph.
C.D.N. Collins, B.Sc.(Hons)
P.M. Davies, B.Sc.(Hons)
B.J. Drummond, B.Sc.(Hons)
B.A. Gaull, B.Sc.
J.W. Giddings, B.Sc.(Hons), Ph.D.
P.R. Gidley, B.Sc.(Hons)
I.G. Hone, B.Sc.(Hons)
G.D. Karner, B.Sc.(Hons)
H. McCracken, B.Sc.(Hons)
A. Mutton, B.Sc.(Hons)
M.J. Sexton, B.Sc.(Hons)
S. Sheard, B.Sc.(Hons)
S. Silic, B.Sc.(Hons)
H.W. Stagg, B.App.Sc.(Hons)
L.A. Tilbury, B.Sc.(Hons)
J. Van Son, Dip.Geophys.
K.Wake-Dyster, B.Sc.(Hons)

SENIOR TECHNICAL OFFICER GRADE 2

J.K. Grace*
D. Hartas

SENIOR TECHNICAL OFFICER GRADE 1

W. Burhop
L.T. Winters
A. Zeitlhofer, Dip.B.F.E.T.

TECHNICAL OFFICER GRADE 2

R. Curtis-Nuthall
R. Dulski
J.W. Eurrell

*Acting in that position

TECHNICAL OFFICER GRADE 2
(continued)

D. Gardner*
G.A. Green
W. Greenwood
R.B. Grigg
G.S. Jennings
K. Jurello
A. Kores*
W. Meyer
A.S. Scherl
G. Woad

DRAFTSMAN GRADE 2

R. Gan
G.W. Thom

TECHNICAL OFFICER GRADE 1

V. Carberry
R. De Nardi
W. Gunner*
T. Hegvold
H.R. Hughes
S. Ioannou
B.J. Page
D. Pfister
G.B. Price
S. Prokin*
C.J. Rochford*
G. Russell-Smith*
D.O. Stevens
G.H.Y. Thomas
M.H. Tratt

TECHNICAL ASSISTANT GRADE 2

N.A. Ashmore
E.C. Chudyk*
L.S. D'Arcy
P. Fowler
D.H. Francis

*Acting in that position

TECHNICAL ASSISTANT GRADE 2
(continued)

W. Harkness
G. Lockwood*
E.C. McIntosh
L. Miller
H.G. Reith
J.F. Salib
E. Smilek
R. Westmore
S.J. Wilcox

CLERK CLASS 5

P.J. O'Rourke

CLERICAL ASSISTANT GRADE 3

Y.M. Moiler

COMPUTING ASSISTANT

U. Hammerling

FIELD ASSISTANT

R.D.E. Cherry
L.O. Rickardsson
D. Saunders

MAINTENANCE MECHANIC

D.K. McIntyre

ASSISTANT GRADE 1

T. Creaser

Officers under Contract to Geological Survey of Papua New Guinea
at 31 October 1978

<u>Name</u>	<u>BMR Designation</u>
R.A. Almond	Geophysicist Class 2
G.K. Anderson	Geologist Class 1
R.J.S. Cooke	Geophysicist Class 3
H.L. Davies	Geologist Class 3
V. Dent	Geophysicist Class 1
G.D. Knight	Draftsman Grade 2
G. Pettifer	Geophysicist Class 2
P.M.T. Ryan	Technical Officer Class 2

*Acting in that position

Officers on Study Leave at 31 October 1977

B. Drummond	A.N.U., Canberra
J. Mutter	Columbia University, New York
L.C. Ranford	Public Service Board, Canberra
J. Rasidi	University of Sydney, Sydney
L.K. Rixon	A.N.U., Canberra

Officers on Extended Leave Without Pay

H.F. Douth	ESCAP, Bangkok
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