DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

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SADME MINERAL RESOURCES BRANCH - REVIEW OF OPERATIONS AND DRAFT STATEGIC PLAN.

GEOLOGICAL SURVEY

BY

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SADME MINERAL RESOURCES BRANCH - REVIEW OF OPERATIONS

ABSTRACT

Mineral Resources Branch has a vital role in the appraisal and development of the mineral resources of South Australia. This role should be strengthened to enable the Department to be able to handle the increasing demands from Government, planners and the environmental lobby. This can be achieved better by the creation of an integrated Mineral Division. As well, the present organisation of the Branch should be retained, any move to remove one of the sections would be a retrograde step.

There is a need for all Mineral Resources staff to be skilled in new technology, legislation and public speaking.

Interchange with other branches, Departments and interstate Geological Surveys is recommended.

INTRODUCTION

As part of the process of developing a Departmental Corporate Plan, each administrative unit is required to prepare a Strategic Plan to define missions, goals and objectives and to establish the relevance to society of Departmental activities.

Accordingly on 17 April 1986, L.C. Barnes, C.M. Horn, A.M. Pain (Principal Geologists) and the writer were briefed on requirements by T.R. Watts (Deputy Director General) and C.D. Branch (Director, Resources).

On 28 April 1986, all 20 members of Mineral Resources Branch attended a full day review at Eden Park.

Work has become more complex. No longer are projects a simple assessment of tonnage and grade of a mineral deposit. Now, total resource in a province or district is determined, often on the basis of non-geological boundaries after consideration of geology, land use, planning constraints, environmental impact and mining methods.

Information packages vary from one page letters to multi-volumed reports which are distributed widely not only to geologists and mining companies but to Government, other Departments, local government, planners and engineers.

This expansion of scope has coincided with increasing budgetary restrictions.

The overall effect is that policy and managerial roles have increased at all levels of the Branch compared to 10 years ago.

HISTORY OF GOVERNMENT MINERAL SEARCH TO 1949

The discovery of mineral deposits has been a major factor in providing employment and wealth to South Australia since Kapunda copper mine opened in 1842.

From 1836 to 1856, Government involvement in geological and mining activities was haphazard and indecisive. Both the South Australian Company (a private concern) and the Colonial Office had instructed their officers to undertaken mineral searches in the Colony of South Australia (O'Neil, 1982). On 1 July 1836, the former appointed Johannes Menge as Mine and Quarry Agent and Geologist to

> ' explore the natural productions of the Colony above and below ground and to superintend the working of Quarries of Stone and slate, the boring for water, metal, lead, coal and other Mines at a Salary of £150 per annum for one year and for as much longer as the Company require your services not however exceeding five years.'

He arrived at Kingscote, Kangaroo Island on 12 January 1837. However, it was not until 1 December 1882, that H.Y.L. Brown was appointed the first Government Geologist (GG), the office that evolved in SADME.

Investigation of mineral deposits was undertaken by the GG and/or his assistants (see Appendix I based on Dickinson, 1949; Willington, 1957 and O'Neil, 1982) until the Geological Survey was expanded in 1949 with the creation of the following sections:

Section	Officer in Charge	Title
Engineering Geology & Mineral Resources	K.R. Miles	Senior Geologist
Hydrological	T.A. Barnes	Senior Geologist
Regional Mapping	R.C. Sprigg	Senior Geologist
Fuel	K.G. Mosher	Senior Geologist
Petrology	A.W.G. Whittle	Petrologist
Geophysics	C. Kerr Grant	Senior Geophysicist
Technical Information	W. Brown	T.I. Officer

HISTORY OF MINERAL RESOURCES BRANCH 1949-1987

Since 1957-58, when Mineral Resources separated from Engineering Geology, there has been a regular split and reuniting of Nonmetallic and Metallic groups as detailed in Appendix I which was compiled from Annual Reports.

During late 1960, Mineral Resources embarked on regional base metal exploration including regional geological mapping, geochemical sampling programs and follow-up drilling. In particular, there was a major effort in the North West from 1965 to 1973. Regional studies continued through to 1978 when Metallics merged with Non Metallics and regional geochemical surveys were abandoned.

Geochemistry is now used only on a project basis such as in the Flinders Ranges National Park in 1983-1985 where rock chip, soil and stream sediment were sampled. The exception has been hydrogeochemistry where initial work by Morris (1982a and b) has not been followed up, owing to other commitments and restrictions on AMDEL funds for chemical analyses.

In January 1977 when Non Metallics Division was reformed under Olliver, the vertical division for geologists and field assistants between the two sections was removed. Since then, all staff below Senior level have worked on the full range of Non metallic commodities.

After Youles resigned and Ireland transferred and both were not replaced, Metallics Division merged with Non Metallics and the same situation was continued. The advantage is that all staff below Principal Geologist, who is the specialist for that group of minerals, are involved with the widest possible range of minerals.

ROLE

To ensure that the mineral resources of South Australia are assessed and developed for the benefit of the community. This is achieved by the following tasks:

- investigate mineral deposits and document results.
- provide information and advice to Government and industry on exploration, development and processing thereby encouraging private sector activities.
- evaluate and compile company data on exploration programs and operating quarries and mines.
- maintain databases.
- ensure development plans for mines and quarries are soundly based.
- conduct geoscientific research.
- undertake and promote research into new mineral deposits and waste materials.
- provide specialist services including input into environmental assessments and amendments to the Mining Act.

ORGANISATION

Responsibility for projects is divided into 'sections' under each of the three Principal (Class 4) Geologists based on the Mining Act 1971 as amended.

Metallic Minerals are <u>minerals</u> that are mined for their metal content and include gold, silver, copper, lead, zinc and iron.

Industrial Minerals are minerals that are mined for 'a prescribed purpose' (Regulation 6) based on chemical and/or physical properties and include barite, gypsum, talc, kaolin and wollastonite. Since establishment in late 1973, the Industrial Minerals portfolio has also included gemstones:

- jade, turquoise etc which are minerals under the Act.
- opal - the only precious stone under the Act.

Extractive Minerals are construction materials which are classified as extractive minerals under the Act and include coarse aggregate, sand, clay, fill and natural building stones.

Some minerals have dual purposes such as:

- silica sand - mineral - glass sand
  extractive mineral - construction sand, fill
- white clay - mineral - kaolin for refractories and cement
  extractive mineral - brick and tile making
- limestone - mineral - cement, chemicals, filler
  extractive mineral - aggregate, building stone ashlars.

Classification of a tenement under the Act is based on major use for each deposit. Hence, there is overlap between Principal Geologists for Industrial Minerals and Extractive Minerals.

Allocation of project responsibility depends on other commitments at the time, choice of project geologist and previous knowledge of deposit or region.

Members of the Branch in May 1987 are listed on Table 1.

There are now no Geologists 1. Recruitment of at least two graduates is required to provide the balance. Otherwise Geologists 3 will be handling the straightforward quarry mapping projects instead of the larger more complex investigations.

TABLE 1

MINERAL RESOURCES BRANCH

ORGANISATION CHART, JUNE 1987

Chief Geologist (GE 5)	J.G. Olliver	
Principal Geologist (GE 4)	A.M. Pain	Extractive Minerals
	L.C. Barnes	Industrial Minerals
	C.M. Horn	Metallic Minerals
Senior Geologist (GE 3)	D.J. Flint	
	J.L. Keeling	
	R.B. Major	
	W.S. McCallum	
	B.J. Morris	
	R.S. Robertson	
	D.C. Scott	
Senior Geologist (GE 2)	E.A. Dubowski	
Geologist (GE 1)	nil	
Technical Officer (TO 3)	D.A. Young	
Technical Officer (TO 1)	R.J. South	(part time)
	P.P. Crettenden	
Field Assistants	S.J. Ewen	
	M.W. Flintoft	
	W.P. Fradd	
	A.J. Smith	

ACTIVITIES

Field Investigations

Projects are formulated in response to a request for data and vary from evaluation of an individual deposit to the regional study required for a Supplementary Development Plan. Tasks undertaken involve:

mapping - from 1:50 000 regional scale to 1:100 detail in underground mine or open cut.

sampling - chip, channel, grab from outcrop, mine or pit face and stockpile.

geochemistry - rock, soil, stream sediment and water.

drilling - hand auger and machine auger operated by Branch member.

- control and supervise diamond, rotary and percussion rigs operated by Drilling and Engineering Services Branch based at Thebarton.

Information Packages

Each package is prepared to answer a request mainly external but occasionally internal - varies from one-page letter to multi-volume open file report on a major project.

Several standard packages of tenure, tonnage, grade and references are updated regularly for commodities such as:

- gold mines
- gold tailings
- gypsum
- talc

Data Bases

A wide range of databases are maintained varying from a card index of internal reports to computerised systems as summarised in Table 2.

TABLE 2

MINERAL RESOURCES DATA BASES 12/3/87

Name	Description
CLAY REGISTER	Computer printout of clay type, location, chemical, mineralogical, physical and ceramic properties.
MINERAL EXPLORATION INDEX SERIES	Set of six 1:250 000 scale plans showing extent of previous work for the following: . Mineral occurrences . Geochemistry . Geophysics . Geology . Drilling . Uranium
REPORT BOOK INDEX	Completed reports indexed on cards and arranged by commodity, county, hundred and section.
GEOLOGICAL MONUMENTS REGISTER	Summary sheets with site name, accession number, planning area, 1:250 000 and 1:50 000 map area, relevant references.
GOLD PRODUCTION REGISTER	Cards on gold mines giving historic production records and locality and arranged under goldfield areas.
BUILDING STONES REGISTER	Historic record of known stone types with locality and geological properties.

NEC APC III

GEOCHEM

Graph plotting - rectangular, triangular etc. Data sets:

. jade, Cowell
. overseas jade
. Black Hill norite
. magnesite
. granite
. Adelaide soils (Malcolm Sheard)

SPHERE

Contouring, equal area, lower hemisphere stereographic projections. Data sets:

. Black Hill norite
. Hummock Hill

SIEVE

Cummulative frequency plots with FM automatically calculated. Weighted averages calculated. Data sets:

. Golden Grove sand
. Sugarloaf Hill sand.

DATAFLEX

Databases:

DOCKET - SADME dockets.
KIGYP - KI gypsum shipping records.
GYPFIL - Gypsum analyses.
MG - Magnesite analyses.
MONGOL - Gold battery records - metric conversion, grade and recovery.
PRODUK - Mineral production statistics 1973-77.
QGN - Quarterly Geological Notes - questionnaire on SADME publications.
CSR - Reports on plans of CSR held by SADME. Interim database - Mount Gunson/Stuart Shelf and incomplete.
GSA - Membership
MINES/MINERAL/ - Production, quarry type.
MINRAL

SURVEY	Editor for preparing survey data files for reduction and plotting at GCC.
LOTUS	Spreadsheet for . Production statistics - Gambier Limestone, 1924-1985 - Shellgrit, 1909-1985 . Opalfields equipment counts, costs, value of production . Alma-Victoria - weighted average of drill-hole analytical data.
MULTIMATE	Word processor - index for Adelaide Geosyncline bulletin.

Mineral Development and Research

Mineral Resources Branch require expertise in use of minerals, markets, ore dressing, benefication and use of waste material to be able to advise Government, industry investors and overseas trainees. AMDEL projects are devised and reviewed. Submission for Federal Government support for financial grants are assessed as are new company prospectus.

Legislation

Familiarity with the Mining Act and Regulations is required to provide input into amendments. Previous matters dealt with include:

. Strata title and access claims on Precious Stones Fields
. Retention leases
. Pitjijatjara - clauses related to opal mining.

Appearances in Wardens Court have also increased in the last 10 years as 'expert witnesses' and occasionally in higher courts.

Quarry Development

Development plans submitted by quarry companies are evaluated and, occasionally, an amended version is prepared. The technical and scientific standard of other geologists and engineers is assessed and judged.

Development plans are also designed for other Government bodies eg. Highways Department.

Performance Monitoring

At the end of 1982 and 1983, the Chief and three Principal Geologists reviewed progress of each project with each Branch member. This process proved to be useful but time consuming and was discontinued in 1984.

Projects are now reviewed with those involved as required. For example, for the J150 Building Stone Project, monthly meetings were held during 1985 and less regularly during 1986.

Professional Training

The main method of increasing geological expertise has been to attend conferences, seminars, excursions and courses. In general, senior members have attended to present papers, lead excursions and chair sessions. However, it is desirable that each geologist attend an appropriate conference/course/seminar every 1-3 years. Accordingly, Morris and Dubowski will attend the conference on remote sensing in Adelaide in August and other proposals are in the pipeline.

Despite a successful workshop in Adelaide in 1978, the Government Geologists Conference cancelled further meetings to discuss common problems of urban and environmental geology with interstate colleagues. These were to have been held over 3 days every two years at different cities in Australia. Reintroduction of this workshop is recommended.

Alternatively interchange of geologists of similar status/experience in interstate Geological Surveys for periods of six to twelve months should be considered.

Secondment or interchange of geologists with industry is also worthy of consideration.

Post graduate studies are encouraged but few Mineral Resources staff are interested. However, John Keeling studied and completed his M.Sc at the University of Hull, UK from August 1985 to December 1986.

Transfer of Geologists 1 and 2 between SADME Branches should be reintroduced. This would provide a broader range of experience and a better understanding of the role and function of the Department. After working in three Branches over 10 years as was often the case in the 1960's, promotional opportunities for individuals would be greater than staying in the one Branch.

Education

Minerals Resources Branch has been involved in the following:

- foreign aid programs eg. Chinese, Saudi, Burmese and now Indonesian - all have been major commitments. Yet despite this, Don Flint is the only Mineral Resources geologist to have an overseas trip. In future, at least one geologist should receive a return trip overseas in reward for the Branch's effort during each training program. Alternatively, the visitors could be accompanied to other places on their Australian itinerary.
- overseas visitors - generally one or two days on specialised topics.
- post-graduate studies - each year since 1977, there has been one sponsored student, generally Honours but occasionally M.Sc. The selected project either would have required Departmental work in the future or is a follow-up to previous Departmental investigations. Support has been in the form of aerial photographs, vehicle, occasionally a caravan, and supervision by Departmental geologist normally the appropriate Principal.
- vacation students - until 1987, usually one third year student spend January-February in the Branch. Unless ability is exceptional like Mark Dugmore, they are best utilised as part of a project team rather than working on their own project.
- work experience students - commitment now reduced to a realistic level of one or two days in June-July.

- Numerous talks are presented at regular intervals to:
  - gem and mineral clubs
  - service clubs, Apex, Lions etc.
  - special interest groups - Field Naturalists, Camera clubs.
  - Apart from uranium and nuclear energy by Bob Major, talks to primary and secondary schools are normally avoided.

Non Professional Activity

Mineral Resources Branch have been the prime movers in the Department Social Club and normally have at least three members on the committee. They have been the main reason for the success of the Club as proved by its survival for more than 10 years.

PAST ACHIEVEMENTS

The following major projects since 1975 illustrate that activities extend over the State except for the far North East.

Opalfields - two Government-funded subsidised exploration programs at Andamooka in 1976 and Coober Pedy in 1981 were devised, supervised, completed successfully and results documented to a high professional standard.

Flinders Ranges National Park - following a suggestion from BHP who were not permitted access to the Park for exploration, a two-stage exploration program for lead-zinc was devised, approved by Cabinet and conducted within the National Park from 1983 to 1985. Four reports have been released on the results (Morris, 1985 and 1986; Horn and Morris, 1986 and Roberson, 1984) and two reports on environmental and managerial aspects (Olliver, 1984 and 1986).

Work was completed to a high professional standard. Environmental impact was so minimal that the conservation groups have been unable to find any cause for complaint and have concentrated on the anticipated damage from Stage 3 drilling and subsequent mining.

Eighth Australian Geological Conference

Mineral Resources Branch officers were major contributors in the convening and management of 8AGC at Flinders University in February 1986. This commitment began at close of 7AGC in Sydney in August 1984 and ended in mid 1986.

Saudi Training Program

In 1982 and 1983, two different teams of four Saudi Arabian geoscientists spend thirteen weeks and six weeks respectively in Australia. Mineral Resources geologists were responsible for their welfare and training which required inspections and field mapping projects (Flint, 1983; Scott 1984).

The conflict of beliefs and life styles particularly for the first group was difficult to handle and increased the problems of supervision and added considerable stress to our officers. Nonetheless, both programs were completed successfully and several joint Australian - Saudi reports were issued.

Burmese Training Program

In 1985, 20 Burmese geoscientists, mining engineers and metallurgists were in Australia for eleven weeks. The major acitivity was a two-week field trip to gold mines throughout South Australia and Broken Hill. A detailed field guide was prepared (Horn et al, 1985) and the issues, results and recommendations were compiled for SADME, AMDEL and ADAB (Horn, Morris and Olliver, 1985). The entire effort was acclaimed by AMDEL and ADAB.

Comaum Sand

One of many examples of a successful discovery of a much sought after deposit. The South East region had been regarded as deficient in coarsegrained silica construction sand. Local sand suppliers had complained for many years of the lack of suitable material.

In response to an environmental/mining problem, Pitt's sand pit at Naracoorte was mapped and drilled. Large reserves of coarse sand were outlined but more importantly a model for coarse sand deposition was conceived. Subsequent regional mapping and reconnaissance drilling located a potentially large deposit in Comaum Forest. Follow up drilling delineated reserves of 3.5 million tonnes sufficient to supply the lower South East for 30-40 years (Keeling et al, 1985) and three pits are now operating in the Forest.

Building Stones

There has been an enormous growth in enquiries for building stone conservation, repair, replacement and salt damp as interest increased in South Australian heritage. Fortunately, D.A. Young (Senior Technical Officer) began specialising in building stones in 1974. As his knowledge and expertise have grown so has the demand for his services. Clients include all major building stone quarrying and processing companies in SA and:

- Commonweath Dept. of Housing & Construction
- SA Dept. of Housing & Construction
- Heritage Branch, SA Dept. of Environment & Planning
- Adelaide City Council
- National Trust of SA

He has been accepted to attend the International Course on the Technology of Stone Conservation in Venice, Italy from 28 April to 26 June 1987. The course is run by International Centre for Conservation, Rome (ICCROM) for UNESCO and supported by the Italian government and the city of Venice. This is the seventh of these courses which are held every two years for only 20 attendees. D.A. Young is the first Australian to be accepted for this prestigous course.

Aggregate for Kingscote Airstrip, Kangaroo Island

In 1985, a new basalt quarry was opened to supply material for the redevelopment of the tarmac, terminal building, car park etc. at Kingscote Airport. More than $2 million of Commonwealth funds were being administered by the District Council of Kingscote who let the crushing contract to Custom Screening and Milling.

However, crushed products failed to meet the required specifications despite advice from consulting engineers who altered the crushing circuit and added a hammer mill to fine grind some basalt to produce the missing 'fines'. Problems continued and the project fell behind schedule. As the problem was now believed to be the raw material, Tony Pain (Principal Geologist, Extractive Minerals) was requested to inspect and advise. He found that the raw basalt was ideal for the job and that by removing screens from the crushing circuit and deleting the hammer mill, an excellent product was obtained. A letter was received from D.C. of Kingscote in appreciation for preventing further waste in time and money.

The new facilities were opened on 14 May 1986.

New Methods and Techniques

Tasks previously not undertaken by SADME which required considerable innovation include:

- push-tube drilling and sampling of fine tailings dams at sand washing plants in Metropolitan Adelaide in 1977.
- subsidised exploration for opal at Andamooka in 1976 and Coober Pedy in 1981.
- trial mining for nephrite jade.

RELATIONSHIP WITH OTHER SADME UNITS

Mineral Resources Branch has contact with most other Divisions of SADME, the most important are:

Mineral Development and Economics Branch (MDE)

A close working relationship and liaison exists. Considerable overlap is expected to gradually decline following completion of I.J. Townsend's commitments to Mineral Resources. Many tasks undertaken by Mineral Resources such as:

- opal equipment counts
- tenement history
- compilation of production data

are rightfully MDE tasks.

Mining Division

Registration and Resource Management Branch - mainly generated by

- Tenement Review Committee (TRC) on renewal of leases and new mineral claims.
- planning proposals eg. Supplementary Development Plans.

Inspectorate Branch - TRC items, mine and quarry development plans, opalfields.

There has been considerable improvement in morale of opalfield staff and the Peterborough Battery manager since regular contact began with Mineral Resources Branch in 1975 and 1982 respectively.

However, there is a need for more coordination with Inspectors on field inspections.

Mineral Exploration Branch

There is a problem with confidentiality of EL reports and lack of knowledge of recent company results particularly for Principal Geologist, Metallic Minerals - who has often generated the application for EL. Remedy is that he and Chief Geologist see bimonthly report on exploration activities.

Also, interchange of Warwick Newton (Geologist 3, Mineral Exploration) with Horn or Robertson or other Geologists 3 for 6 months is recommended.

Regional Geology and Biostratigraphy Branches

There is an excellent relationship at officer level with continual counsulation on areas of joint interest. A problem has been identified with Mike Farrand (Petrologist) whose recent reports have become less useful as he tries to be more comprehensive.

Computer Services

Interaction slowly increasing as computer use increases. Relationship is amicable.

Geoscience Information Branch (GIB)

Considerable interaction required by project geologist when report being prepared for publication. The writer has been involved in brochures etc.

Drafting Branch

No problems with plan drafting but relationship with Survey Section is poor; highlighted by personal antagonism between officers. Most projects are not completed to the satisfaction of Mineral Resources Branch often despite detailed briefing. Survey Section make on-the-spot decisions when in the field which conflict with instructions from the project geologists. Often, it is simply a matter of not surveying all features at the site.

Drilling and Engineering Services

Relationships are satisfactory but more information on availability of rigs or reallocation of priorities is required. There is a decided lack of advice supplied to the project geologist when a program is delayed.

BRANCH PROBLEMS

The following problems have prevented the specific targets/objectives in the annual Program Estimates in the 'Yellow-Book' from being achieved/improved.

Unforseen or 'crisis' projects which are not in the five year plan such as:

- Burmese Training Program - first advice from AMDEL was in December 1984. Olliver, Horn, Morris, Townsend, Ewen and Flintoft were involved for most of January-June 1985 with continuing input from the first three until release of the two reports (Horn et al, 1985 and Horn, Morris and Olliver, 1985) at the end of 1985.
- 8AGC - Barnes and Dubowski spent most of November 1985 to February 1986 on organisation and management.

These projects assume top priority thereby forcing deferment of the planned mineral assessment work. The first of possibly four Indonesian training programs started on 30 March 1987 for three months.

Handling of other Branch's tasks

- Production statistics (MDE) - for a commodity review or report on a specific deposit, a breakdown of annual output into end uses is required to relate reserves to anticipated life. This breakdown does not exist in MDE records and so the project geologists does the job. The six monthly report by MDE on mineral production lacks any commentary on changes in output of commodities.
- Tenement history (partly GIB) - no such data exist. Fradd is working systematically through the goldfields of the State; for other minerals, the work is undertaken after completion of field work.
- Docket file (Correspondence) - a computer file is being built as and when dockets pass through the Branch. This should be handled by Correspondence or Computer Services on a Department-wide basis. - This is essential.
- Routine enquiries (GIB) - many simple enquiries on minerals, maps, publications are received that should be handled by GIB.
- Advice on mining, crushing, processing - many enquiries should be handled by MDE/Inspectorate.

Regional Appraisal

There is not enough compilation and review of commodities that may encourage company exploration.

The Lead/Zinc Task Force is currently researching existing data but similar efforts are required for:

- diamonds
- platinum
- rutile/zircon
- kaolin.

Uranium

The role of R.B. Major as Uranium Project Officer (UPO) needs to expand from being essentially only the Uranium Information Officer at present to fulfill his title. The geology and all other data on SA deposits should be assembled and comprehensive data packages prepared. There is too much emphasis on non geological matters, such as Chernobyl, outside South Australia.

Building Stones

The upsurge in stone conservation has diverted D.A. Young from his original role of field investigation of SA building stones. This has been remedied in part by the proposed Jubilee 150 publication and the allocation of field projects to other officers.

The Jubilee 150 publication although at least one year behind schedule is the first phase in a complete rewrite of Bulletin 10 published in 1926. Further routine testing of stones will be required at AMDEL as each field project nears completion.

Computer

Only Flint, Dubowski, Barnes and McCallum are computer-capable. The remainder need to spend considerable time to gain experience to be able to fully utilise computers. At present, the input of basic data is time consuming but efficiency will increase with familarity.

Remote Sensing

There is a need for all to become familiar with the use of imagery and attendance at courses and symposia will be promoted.

Staff Levels

All the above problems, particularly abandonment of projects have been exacerbated by the reduction in staff from 22 in 1981 to 19 in 1987 as below:

	1981	1987
GE5	1	1
GE4	3	3
GE1, 2 & 3	11	8
TO	1	$1\frac{3}{5}$
F/A	6	5

In early 1982, J.T. Valentine (GE2) was replaced by R.J. South (TO1 - 3 days/week).

In 1982, J.F. Drexel (GE2) was seconded to editorial duties in GIB for about one year but after 5 years he is still in GIB and has not been replaced.

In November 1982, A.W. Newton (GE3) was transferred to Mineral Exploration with no reference to Mineral Resources Branch and has not been replaced.

In October 1983, B.W. Atterton (F/A) was transferred to Mining Division and has not been replaced.

In July 1985, I.J. Townsend (GE3) was transferred to MDE and has not been replaced.

Despite several written submissions e.g. 22.12.82 and 28.1.86, there has been no replacement of experienced staff. When only three GE1 vacancies were filled in July 1984 - two went to Oil, Gas and Coal and one to Regional Geology.

The situation worsened in 1986 with the continued unavailability of R.B. Major (GE3) who was full time on uranium matters and study leave for 18 months for J.L. Keeling (GE3). Major should be confirmed as permanent Uranium Project Officer and replaced by a new Geologist 1.

DEPARTMENTAL PROBLEMS

Dissemination of Information

There is a need for greater awareness of events and decisions. More feedback is required and sooner from Minister and Management.

More discussion and interchange of staff movements and projects is required at morning prayers to facilitate greater coordination at officer level.

Annual Report

This publication is acceptable only as a public relations exercise but is deficient in many aspects. Additional data required are:

- complete list of employees and titles.
- complete list of open file reports.
- more on what each Division/Branch/Section has done during the year.
- complete list of all drillholes
- complete list of all envelopes that came on open file.

Annual reports up to 1977-78 were used to compile Appendix I. However, movement of staff and reorganisation of the Department is no longer recorded and the recent history of the Department will be difficult to document in future. Only Senior Staff were named in 1978-79, 1979-80, 1980-81 and in the Centenary Year 1981-82 and 1982-83, there were no staff names whatsoever and no report of work undertaken.

Relevance and Entrepreneurial Flair

Further media exposure is recommended to enhance the Department's image. We should be making statements about matters of concern such as:

- gold and limesand on Kangaroo Island.
- Flinders Ranges National Park.
- release of new 1:250 000 sheet.

Although we were encouraged to use our initiative and to bypass the Minister (Director General to senior staff, 15 January 1986), when the writer appeared on Channel 10 News to discuss exploration in the Flinders Ranges, he was chastised by the Deputy Director General for not getting approval - an obvious conflict of direction.

At the completion of each major internal report, copies should be sent to the Minister with a press release as was done for Calca red granite in June 1987.

Geological Survey Meetings

Up to 1983, attendance at the meeting for two hours on Friday morning once a month was compulsory for all geologists not in the field. This provided a venue for dissemination of news and was attended regularly by most engineers and other professional staff.

Attendance is now no longer required and has resulted in the polarisation of the Geological Survey with very few if any Oil, Gas and Coal staff attending meetings when Resources Division staff are talking.

This could be remedied by ensuring that the alternate 'general interest' meetings have a mix of speakers.

Mineral Index Series Maps

These maps are in demand by exploration companies and are an essential data base that should be maintained. However, that role is not considered to belong to Mineral Resources but rather G.I.B. for open file and Mineral Exploration for confidential data.

Metallogenic Maps

This concept is not considered worth while. Many examples from overseas and interstate are either useless or misleading. Further, they have now been superseded by computer manipulation.

Surveying

P.P. Crettenden and A.J. Smith are competent to operate the Mineral Resources Branch EDM. S.J. Ewen and M.W. Flintoft have completed the Surveying unit in the Geoscience Certificate Course and are now able to handle the instrument. Further use will increase their capability.

As such, Mineral Resources has little, if any, need to use the Survey Section of Drafting Branch in future.

AIMS AND OBJECTIVES OF BRANCH

Aims

- Continue education/promotional aspects through conferences, talks and student training.
- Actively promote interchange of staff with other Geological Surveys in Australia and industry.
- Complete overseas training programs to the high level achieved with the Burmese.
- Continue to encourage attendance at courses, seminars etc.

Objectives

- Computer - ensure all staff are competent.
- EDM - ensure at least half are competent.
- Overseas training - organise and supervise the first Indonesian program March to July 1987.
- Conferences - organise and contribute papers as required.
- Report Books - present high standard is warranted as project geologist(s) are forced to justify conclusions, recommendations and long term ramifications.
- Mineral Resources Review - high level of use both internally and externally - should be retained in short term but will be replaced eventually by computer-based bibliographic system.
- Bimonthly - continue as record of work completed, but should not have lengthly justification of project. Recommend that there be an annual review of Branch activity with DG/DDG/Director Resources and Chief Geologist.

FIVE YEAR PLAN

Aims and objectives of each 'section' are as follows.

Metallic Minerals

Aims

- continue and expand advice to exploration companies.
- continue field investigations with emphasis on gold.
- start field investigations for lead-zinc.
- initiate research into platinum.

Objectives

- complete major review report on goldfields in Nackara Arc.
- complete historical review of major goldfields.
- complete literature review of lead/zinc in SA.

Industrial Minerals

Aims

- continue advice to government and industry on gemstones and industrial minerals.
- rewrite Bulletin on limestone/dolomite/magnesite.
- maintain awareness of high technology uses for minerals.
- develop liaison with State Development.

Objectives

- Jade
  - complete field work at Cowell and finalise report.
  - complete first world review of reserves and production.
- Opal
  - Mintabie - complete field work and report
  - rewrite handbook.
- Diamonds - initiate review in SA.
- Gypsum - complete review of Kangaroo Island and Eyre Peninsula.
- Carbonate - complete South East and Rapid Bay and start Yorke Peninsula.

Extractive Minerals

Aims

- continue and expand advice to government and industry.
- ensure that major new country quarries are documented.
- ensure that input into SDPs and other planning proposals is geologically sound.
- ensure that adequate supplies of construction materials for Metropolitan Adelaide are defined and set aside.
- rewrite Bulletin 10 - Natural building Stones of SA.
- continue advice on use, conservation and replacement of building stone.
- provide support for SA companies tendering for major construction projects.

Objectives

- complete evaluation of sand and clay at Golden Grove.
- complete field work for sand and clay at Freeling.
- complete reappraisal of One Tree Hill clay.
- complete Jubilee 150 publication on building stones by late 1987.
- complete field work and text for chapters on granite and slate for Bulletin 10.

SUMMARY

Strengths -

Mineral Resources Branch is seen as a group with a high team spirit who are able to provide a highly professional service, who are innovative and flexible, able to cope with crisis as evidenced by continual involvement in overseas training programs. Matters, events and personalities are discussed openly and critically.

Weaknesses -

Many objectives are not reached and some projects are not finalised and some are abandoned thereby wasting considerable time and effort. Officers have too many projects at the same time - mainly due to the acceptance by management of crisis projects such as overseas training.

Incorrect use of students as project geologists which requires other staff to complete the work; in future, students will assist an experienced geologist.

Future -

Field investigations must continue - as the key to understanding the controls of mineralisation and hence provide the basis for continued competent advice.

Staff

Work load for Mineral Resources Branch continues to increase with:

- four Indonesian training programs expected over the next three years. The first involves Olliver, Barnes, Flint, Keeling, Dubowski, Crettenden, Flintoft and Smith almost full time and several others part-time from mid March to early July 1987.
- the possibility of an unwarranted second subsidised program at Coober Pedy.
- increasing input required into planning issues and environmental problems such as lime sand on Kangaroo Island.
- the need to become proficient in new technology.

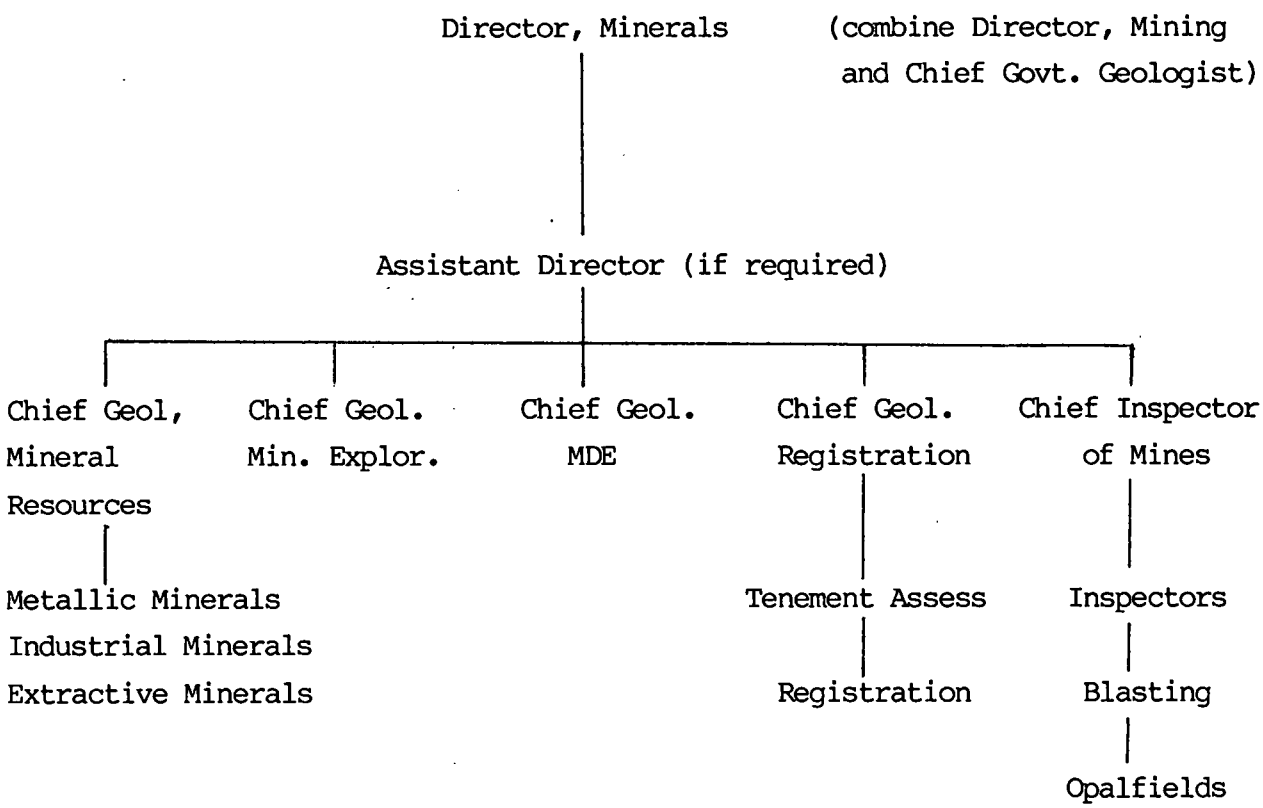
Major projects such as Building Stones Jubilee 150 and the lead-zinc review will continue to fall further behind schedule and we shall no longer have the ability to respond to 'crisis' unless realistic staff levels are maintained.

RECOMMENDATIONS

Organisation

The current three sections of Mineral Resources Branch should be maintained. The removal of, say Metallic Minerals, would be counter productive. The Branch should be headed by an experienced mineral geologist preferably with industry experience.

Establishment of an integrated Mineral Division similar to Oil, Gas and Coal Division is recommended with the following structure. A similar proposal was submitted to the review of the Geological Survey in 1983.



The remaining units would report to Director, Resources

- Groundwater and Engineering
- Regional Geology
- Biostratigraphy
- Geoscience Information
- Drafting
- Computer Services

Others

- Ensure field investigations continue.
- Recruit at least two Geologist 1.
- Increase AMDEL allocation for routine analysis.
- Reintroduce urban and environmental geology workshop every two years.
- Interchange geologists with interstate Surveys.
- Transfer Geologists 1 between Branches.
- Interchange with Geologist 3 in Mineral Exploration Branch.
- Balance each overseas training program with Mineral Resources geologists either receiving exchange trip to Indonesia, Burma etc. or accompanying visitors to other operations in Australia.
- More feedback from Management.
- Return Annual Report to 1977-78 format.
- Annual review of projects with Management.

J.G. OLLIVER
CHIEF GEOLOGIST
MINERAL RESOURCES

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APPENDIX I

SUMMARY OF GEOLOGICAL APPOINTMENTS 1882-1986

1882 H.Y.L. Brown appointed Government Geologist (Govt. Geol). H.P. Woodward (Assistant Geologist).

1887 Woodward resigned.

1906 Basedown appointed Assistant Geologist.

1911 Basedow resigned.

1912 L.K. Ward and R.L. Jack appointed Assistant Government Geologists (Ass Govt. Geol.).
H.Y.L. Brown retired.
L.K. Ward appointed Govt. Geol.

1919 R.L. Jack appointed Deputy Government Geologist (Dep. Govt. Geol.)

1930 Jack resigned.

1931 E.R. Segnit appointed ASs. Govt. Geol.

1940 S.B. Dickinson appointed Ass. Govt. Geol.

1942 Dickinson appointed Dep. Govt. Geol.
Segnit transferred to E&WS Dept.

1943 E. Broadhurst appointed Ass. Govt. Geol.

1944 Ward retired and Dickinson appointed Govt. Geol.
K.R. Miles appointed Ass. Govt. Geol.

1945 R.C. Sprigg appointed Ass. Govt. Geol.
K.R. Miles promoted to Senior Ass. Govt. Geol.
L.W. Parkin appointed Ass. Govt. Geol.

1946 T.A. Barnes appointed Ass. Govt. Geol.
Maud McBriar appointed Temporary Technical Assistant.
Broadhurst resigned.

1947 A.W.G. Whittle appointed Temporary Geological Assistant.
D.R. Bowes appointed Temp. Ass. Geol. in Sept. left in Nov.
J.E. Ridgway appointed Ass. Govt. Geol.
Authority given to establish Geophysics Section.

1948 K.R. Miles promoted to Senior Geologist (Sen. Geol.)
T.A. Barnes promoted to Sen. Geol.

By year end, Miles was in charge of mineral investigations, Barnes groundwater and W.G. Fenner geophysics.

Dickinson (Govt. Geol.), Miles, Ridgway, Sprigg, Parkin and two new Ass. Geol. D. King and R.K. Johns were investigating minerals.

1949 Engineering Geology and Mineral Resources Section established with K.R. Miles as Sen. Geol.

1951 Fuel renamed Coal and Uranium with both Parkin and Sprigg as Sen. Geols.

1953 Geological Survey Branch was established and included two sections.
Engineering Geology and Mineral Resources - Miles
Uranium - Parkin

1954 Geological Survey Branch was reorganised and L.W. Parkin was appointed the first Chief Geologist (Ch. Geol.) with 7 sections some newly created including:
. Engineering Geology & MIneral Resources - Miles
. Uranium and Fuel
. Geochemistry

1955 Engineering Geology and Mineral Resources - G.F. Whitten (Sen. Geol.) with 2 Geologists and 4 Ass. Geologists.

Uranium - E.S. O'Driscoll (Sen. Geol.) with two Geologists Seconded from US AEC.

Geochemical Prospecting - A.A. Gibson (Sen. Geol.).

Special Investigations - D. King & R.K. Johns (Geologists).

1956-57 Soils Geology - A.A. Gibson (Sen. Geol. and two geologists (included geochemistry).

1957-58 Director of Mines - T.A. Barnes
Deputy Director of Mines - L.W. Parkin
Geological Survey Branch - E.S. O'Driscoll (Ch. Geol.)
Mineral Resources Section - R.K. Johns (Sen. Geol.)
Iron Exploration Section - G.F. Whitten (Sen. Geol.)
Uranium and Fuel Section - W. Johnson (Sen. Geol.)
Soils Geology Section - A.A. Gibson (Sen. Geol.)

1958-59 Soils Geology Section has omitted work on geochemistry.

1959-60 Geochemistry Section recreated with B.P. Thomson (Sen. Geol.) and two geologists.

1960-61 Uranium and Fuel Section abolished.

Mineral Resources split into two
. Non-Ferrous Metals - W. Johnson (Sen. Geol.)
. Non metallics - R.K. Johns (Sen. Geol.)

Regional Mapping and Geochemistry combined to form Regional Surveys with Thomson (Sen. Geol.).

1963-64 Reorganisation with K.R. Miles (Chief Geol. Geol. Survey Branch). Geochemical Prospecting split off with Gibson (Sen. Geol.).

1964-65 Divisions were formed.

Division	Section	Senior
Exploration Services	Geophysics	
	Geochemical exploration	Gibson
Mineral Resources	Metallics	Nixon
	Non Metallics	Johns

Iron Exploration was absorbed by Metallics Section.

1965-66 Establishment of Supervising Geologists in charge of Divisions.

Division	Supervising	Section	Senior
Mineral Resources	Johns	Metallics	Nixon/Miller
		Non Metallics	Hiern
Exploration Services	Whitten	Geochem.	Gibson/Leeson

1969-70 Mineral Exploration Division was created to administer company exploration.

Division	Supervising	Section	Senior
Mineral Resources	Hiern	Metallics	
		Non Metallics	
Mineral Exploration	Johns	-	-
Exploration Services	Whitten	Geochem.	Leeson/Faulks

1971-27 L.W. Parkin (D of M) retired in December 1971 and K.R. rules (Acting D of M) died in March 1972 which left G.F. Whitter (Chief Geol.) as Acting Director of Mines with the following.

Division	Supervising	Section	Senior
Mineral Resources	Hiern	Metallic Minerals	J. Gordon-Smith
		Non Metallics	J.B. Firman (to March 1972)
Exploration	Johns	-	-
Exploration Services	Grant (from Jan. 1972)	Geochem. Expl.	I.G. Faulks

1972-73 Environment and Resources Division established under:
B.P. Webb (D of M)
G.F. Whitten (DD of M)
R.K. Johns (Chief Geologist)

Division	Supervising	Section	Senior
Environ. and Res.	Hiern	Non metallics	J.G. Olliver
Mineral Exploration	Johns I.P. Youles (from Feb. 1973)	Metallics	Gordon-Smith
Exploration Services	Grant	Geochem.	Faulks
		Geophysics	

1973-74 B.P. Webb, D of M
R.K. Johns, Acting DD of M
W.R.P. Boucaut, Acting Chief Geol.

In mid year, Divisions were rearranged and Environment and Resources Division expanded.

Division	Supervising	Section	Senior
Environ. and Res.	Hiern	Industrial Mins.	Olliver
		Extractive Mins	C.P. Barnes
Metallic Res.	Youles	Metallic Mins.	J. Gordon-Smith (to Nov. 73) W.B. Robinson (from May 74)
		Geochem Expl.	I.G. Faulks
Mineral Exploration	Grant	-	-

1977 Environmental management and Hiern transferred to Mining Branch leaving the following organisation.

Division	Supervising	Section	Senior
Non metallic Resources	Olliver	Ind. Minerals	L.C. Barnes
		Ext. Minerals	A.M. Pain
Met. Resources	Youles	Geochem.	Faulks
		Met. Minerals	T.J. Ireland
Min. Explor.	Grant		

1978 Mineral Resources reformed as Division (now Branch) on resignation of Youles and transfer of Ireland.

Division	Supervising	Section	Senior
Mineral Resources	Olliver	Ind. Minerals	Barnes
		Ext. Minerals	Pain
		Met. Minerals	Faulks
Mineral Exploration	Grant	-	Ireland

1986 Organisation until Olliver's resignation on 3.7.87.

Branch	Chief	Section	Principal
Mineral Resources	Olliver	Industrial Mins.	Barnes
		Extractive Mins	Pain
		Metallic Mins	Horn
Mineral Exploration	Faulks	-	A.W. Newton

APPENDIX II

COMMITTEE MEMBERSHIP

JGO	-	SADME	Tenement Review (others fill in) Library Users (Chairman)
		GSA	Geological Monuments
		PSA	Geoscientist Classification (resigned 1986)
LCB	-	GSA	8AGC - Secretary completed mid 1986.
DCS	-	SADME	MIQ
CMH	-	SADME	Social Club - Secretary 1986, 1987.
RBM	-	GOVT.	Uranium Advisory Committee - Secretary.
		SADME	Safety and Health
		OTHER	Field Geology Club - 1986 President
BJM	-	SADME	Social Club.
EAD	-	GSA	SA Division - Honorary Secretary, 1986, 1987.
DAY	-	PSA	Technical Grades Classification. Technical Grades
		SADME	Jubilee 150
		OTHER	Burnside Historic Mines Working Party.
PPC	-	SADME	Social Club many years to 1986.
MWF	-	SADME	Social Club many years to 1986.
SJE	-	SADME	Social Club
WPF	-	SADME	Jubilee 150