

1969/139

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

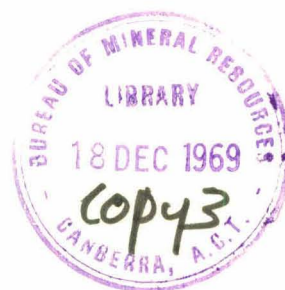
BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record No. 1969 / 139

054026

RESTRICTED

Mineral Resources Branch
Summary of Activities
1969



The information contained in this report has been obtained by the Department of National Development as part of the policy of the Commonwealth Government to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus or statement without the permission in writing of the Director, Bureau of Mineral Resources, Geology & Geophysics.



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HEADQUARTERS

The staffing position remained quite satisfactory throughout the year, although little progress eventuated during the year in regard to the expansion of the Mineral Economics and Mining Engineering Sections. The year began and finished with two professional vacancies in the Branch - those of a Petroleum Technologist and one Chemist, both positions in the Petroleum Technology Laboratory; sub-professional positions in the Laboratory were filled during the year and one Chemist lost and one gained. The Mineral Economics Section lost one Mineral Economist during the year, but gained another and finished at full strength.

Plans for re-organisation of the Mineral Economics and Mining Engineering Sections were further reviewed during the period, in anticipation of official action, and the pattern of work in the existing Sections was reviewed and re-organised in the light of current commitments in the programme for 1970. A Mineral Industry Index, designed in 1968, was initiated and has already proved its value, particularly for the Mineral Economics and Mining Engineering Sections. As in 1968, increasing burden on the Mineral Economics Section in particular, required some re-allocation of work between Sections and additional work load on the Assistant Director, who was actively involved in the writing of feature articles for two of the four quarterlies; however, the quarterlies were published fairly well on time although the annual for 1967 appeared at the end of March instead of early February due entirely to staff difficulties encountered by the printer. Innovation and improvements in these publications in 1969 included the publishing of five major chapters of the 1968 Annual as preprints at the end of September, and the pre-printing of part one of the Annual in November. Photographs have been introduced for the first time in the Annual for 1968 which should be published in early February 1970.

Important matters dealt with during the year included discussions on statistical collections for the Mineral Industry, particularly in regard to the series of ex-mine values, representation of a number of Interdepartmental Committees, such as those dealing with phosphate rock, mineral processing, mining legislation in the Northern Territory, and the McArthur River Project, and special projects in the field of mineral processing, dealing with titanium, salt and zircon in particular, received attention as time and staff were available. The Branch was involved in continuing discussions of matters arising from the United Nations Committee on the Peaceful Uses of the Seabed and the Assistant Director continued as the Secretary of the Technical Committee on Oceanography and the Interdepartmental Committee on Oceanography, and as a Representative on the Committee set up to advise the Department of External Affairs on International Aspects of Oceanography.

During the year the Assistant Director paid special attention to developments in the fields of tin and nickel and made field trips to important centres of development and exploration in Tasmania and Western Australia. The purpose and conduct of field inspections by members of the Branch were reviewed.

Advice to External Affairs in current aid projects continued throughout the year and related mainly to the East Pakistan Mineral Sand Project and to the series of similar projects mounted through the ECAFE Committee dealing with the Joint Prospecting for Mineral Resources in Asian Offshore Areas. In this regard the distribution of a manual of Beach Sand Exploration published by External Affairs has been very well received in all quarters and is being republished to provide wider distribution. The Assistant Director joined the Australian Delegation of the meeting of the ECAFE Committee on Industrial and Natural Resources in Bangkok in February 1969 and thus was able to keep up to date with the several interests the Bureau has in ECAFE fields.

A number of lectures on various facets of the Mineral Industry in Australia were delivered throughout the year including lectures on mineral resources to Industrial Mobilization groups in Perth, Sydney and Canberra; papers written or contributed to, during the year, included Mineral Processing in Australia, Phosphate Rock in Australia, Mineral Resources of Australia 1969, Mineral Economics in Australia, Earth Sciences Offshore in Australia and Documentation and Analysis of the Mineral Industry in North America, United Kingdom and France.

MINING ENGINEERING SECTION

G.F. Mead Engineer Class 5
R.W.L. King Engineer Class 3

During the year Mr. G.F. Mead visited all major gold mines in Australia and obtained information for a review of the industry.

A revised application by Sentinel Mining Company Inc., to export iron ore from Nimingarra was processed. A summary of Sentinel's activities in Western Australia was also prepared in connection with Sentinel's proposal to excavate a harbour at Cape Keraudren by means of a nuclear fission explosion.

Two tin dredges on the Atherton Tableland were visited to obtain information on safety measures on dredges for a draft section of the model safety code. Other tin mining operations at Rossarden, Storey's Creek and Marble Bar were also visited for general information.

The two iron ore operations in the Northern Territory (Frances Creek and Mt. Bundey) were visited and a brief summary of information made.

Four meetings of the Wire Rope Research Committee and one meeting of a legislative subcommittee were held all in Sydney except one in Newcastle.

Two meetings of the S.A.A. Subcommittee on Iron Ore Sampling were held in Melbourne. As well, a large number of ISOTC/102 documents on iron ore standards were processed in some respect.

No meeting of the S.A.A. Committee on Coal and Coke was held but a number of S.A.A. proposals and drafts were examined and, in some cases, voted on.

Several discussions with the Department of the Interior and/or National Development Secretariat were held on the Bill to amend the prospecting authority provisions of the N.T. Mining Ordinance.

A paper on State and Territory policy on mineral exploration was prepared for the Manila Seminar on Mining Legislation and Administration.

Early in the year, R.W.L. King's Record on tailings dumps in Victoria and South Australia appeared as B.M.R. Records 1968/120 and the Record of his visit to the United States and Canada as 1968/99.

The major activity of the year was a review of the use of rubber-tyred diesel equipment in underground metalliferous mines. Visits were made to Cleveland Tin N.L., Renison Ltd., Mt. Lyell Mining and Railway Co. Ltd., Gold Mines of Kalgoorlie Ltd., Western Mining Corporation Ltd. Kambalda, New Broken Hill Consolidated Ltd., Cobar Mines Pty. Ltd. and Mt. Isa Mines Ltd., during the year. The first draft of the manuscript was completed by the end of September.

The clay project at the Australian Mineral Development Laboratories continued during the year and additional data was added to that copy of the Clay Register held within the Section.

A number of meetings of the Laboratory Safety Committee were held during the year including a complete inspection of the building in March, following which a number of recommendations were made for action by the Operations Branch.

R.W.L. King continued to represent the Branch on the Library Committee and acted as alternate of J.M. Henry on the Data Storage and Retrieval Committee. In September he was appointed to convene a committee to keep under review commitments to AMDEL in relation to making the best use of the Bureau's share of the Commonwealth guarantee.

An index of periodical articles for joint use by this Section and Mineral Economics was established in co-operation with J.B. Allen in April, 1969.

Discussions were held in Canberra and Lucas Heights with Officers of the Department and Branch and of the AAEC to put in hand a study of the possibilities for zirconium metal production in Australia. Further work may be required by this Section, in the later stages of the project.

R.W.L. King also took part in discussions with Northern Division, the Department of the Interior and Mt. Isa Mines Ltd., regarding the development of the McArthur River lead-zinc deposit. These discussions took place on a number of occasions during the year. Early in December a visit was made to Mt. Isa and McArthur River and a report prepared on metallurgical test work carried out by, or on behalf of, that company.

During November, 1968, R.W.L. King attended the Special Meeting of the Australasian Institute of Mining and Metallurgy in Canberra. In July he addressed the North West Queensland Branch of the Institute at Mt. Isa on the subject of his visit to the United States and Canada in 1968. He also attended the Annual Conference of the Institute in Sydney in August.

On 25th August, he visited Melbourne to give the address on the Mineral Industry to the Victorian Industrial Mobilization Course. He also spoke to a P.S.B. graduate trainee group on ore reserves and resources.

He prepared a paper entitled "A Review of Commonwealth Incentives and Encouragement for the Australian Mineral Industry" for the ECAFE Seminar on Mining Legislation and Administration held in Manila 16th-23rd October. The paper was subsequently issued as B.M.R. Record 1969/107.

A wide range of miscellaneous enquiries and requests for information on aspects of the mineral industry were also dealt with during the year.

MINERAL ECONOMICS SECTIONStaff

Seven positions are established for professional officers in the Mineral Economics Section; all positions were occupied as at 1st January 1969. With the resignation of a Class 3 officer in May and the consequent promotion of a Class 2 officer from within the Section, the vacant Class 2 position was subsequently filled with the incumbent taking up duty toward the end of the year. The two former positions of Mineral Economist Class 1 were re-classified in April to Mineral Economist Class 2, so that the establishment at the end of the year was as follows:

Mineral Economist Class 5	(1)
Mineral Economist Class 4	(1)
Mineral Economist Class 3	(2)
Mineral Economist Class 2	(3)

The following personnel changes took place during the year:

Dr. J.B. Allen, Mineral Economist Class 3, resigned as from 14th May;

Mr. D.A. de Smet, Clerical Assistant Grade 2, commenced duty on 20th January, transferred from Section on 9th September;

Mrs. J. Morrissey, Clerical Assistant Grade 2, commenced duty on 9th September.

The broad function of the Mineral Economics Section is to maintain a continuing review of all aspects of Australian mineral resources with the object of advising upon their utilization and of assisting in the formulation of Government policy relating to their development. As the study of mineral commodities requires a consideration of international as well as domestic factors, such aspects as their extraction and processing, transportation, utilization and marketing must be treated in the context of world requirements.

Following the second meeting, on 15th July, 1968, of the Inter-departmental Committee set up to investigate mineral processing in Australia, it was decided that more detailed papers on tin, titanium and salt processing should be prepared. B.M.R. Records 1968/112 and 1968/138 (by J. Ward) and 1969/44 (by Z. Kalix) were produced on these topics and a general article on "Mineral Processing in Australia" by L.C. Noakes, J. Ward and Z. Kalix was published in the Australian Mineral Industry Quarterly Review. The purpose of this article was to indicate the approximate current level of mineral processing in Australia with special reference to major mineral exports, as a basis for comment on present performance and future prospects.

Members of the Section continued to be occupied with international commodity considerations. In June Dr. Z. Kalix presented evidence for Tariff Board enquiries on sulphur and sulphuric acid and on refractories in Melbourne and Sydney, respectively; and at a further enquiry by the Board on sulphur and sulphuric acid held in Melbourne on 20th November.

Mr. J. Ward was engaged in the business of interdepartmental committees on tin, tungsten, titanium and mineral processing. On 3rd March, he attended a meeting in Canberra of the Australian Tin Industry Advisory Council. In May and July he attended inter-departmental meetings between the Departments of Trade and Industry and National Development, in connection with the negotiation of the Fourth International Tin Agreement, and prepared forward estimates on domestic production and consumption for the Committee. Following the preparation of a brief covering the domestic and overseas position regarding tin, both current and future, Mr. Ward attended a meeting in Sydney on 20th August between the Departments of Trade and Industry, Treasury and National Development. In September, he was present at a meeting between Departments of Trade and Industry and National Development, concerning the UNCTAD Tungsten Committee Meeting held from 16th to 24th October; Mr. Ward prepared a section of the brief relating to the current and future position of tungsten.

Mr. W.G.B. Phillips attended the 13th Session of the International Lead and Zinc Study Group, held in Geneva in October. He assisted in the preparation of the brief for the Australian delegation, and later prepared a report on the meeting for the Secretary (National Development).

As well as assessing the information contained in literature on world mineral resources, including that from various unpublished sources, current information on domestic developments is obtained by maintaining close contacts with the Australian mining industry and by visiting areas of particular interest. This information is collated, and provides the basis of the Australian Mineral Industry Annual and Quarterly Reviews.

Dr. Kalix had discussions throughout the year with Commonwealth and State Government departments, C.S.I.R.O., other authorities and private companies on phosphate, sulphur, fertilizer materials, ceramics and various other industrial minerals. In April-May a commodity study tour of mineral development in South Australia included attendance at the official opening of the Port Pirie plant of Rare Earth Corporation Pty. Ltd., inspection of barite mining and treatment operations of South Australia Barytes Ltd., zinc silicote deposits of E.Z. Industries Ltd., salt works and refinery of Ocean Salt Pty. Ltd. and the Ardrossan dolomite operations of the Broken Hill Proprietary Co. Ltd. In July-August Dr. Kalix made an inspection tour of manganese mining on Groote Eylandt (N.T.) and of iron ore, salt and talc developments in Western Australia. The operations visited in Western Australia included iron ore mining at Mount Goldsworthy and Mount Tom Price, and the Hamersley Iron pellet plant; operations of the Leslie Salt Co. at Port Hedland, Dampier Salt Ltd., the Lake McLeod plant of Texada Mines and the Shark

Bay Salt Co., and open-cut talc mining and treatment operations at Three Springs. A visit was made to Kwinana on 31st July with representatives of the Department of Industrial Development and the Applied Mineralogy Division of C.S.I.R.O.

Mr. Ward was in Tasmania during the period 17th-30th April; he visited mining and treatment operations at Aberfoyle, Savage River, Read-Rosebery, Mount Cleveland and Renison and visited titanium pigment plant at Burnie. He also inspected scheelite, tin and mineral sand mining developments on King Island. With Dr. Kalix, he attended the official opening of the Port Pirie plant of Rare Earth Corporation Pty. Ltd. on 2nd May. From 9th to 13th June, Mr. Ward was in Brisbane and northern New South Wales for discussions with Queensland Mines Department on future tin mining, and with the Australian Tin Producers' Association on the future position with regard to tin, and to inspect recent developments in the mineral sands industry. From 29th June to 6th July, he was in Western Australia for discussions with the Director of the State Geological Survey, inspection of new developments in mineral sand operations, titanium dioxide pigment production and tin and tantalite mining in the south-western part of the State. On 3rd September Mr. Ward and Mr. R.W.L. King had discussions in Sydney with officers of the A.A.E.C. at Lucas Heights concerning a feasibility study of the production of zirconium sponge in Australia. In November, Mr. Ward visited Brisbane and beach sand mining operations in Queensland and introduced Mr. Mahommed Aslam Khan, Director, Nuclear Minerals, Pakistan, to mineral sands operations in southern Queensland and northern New South Wales. The opportunity was taken to have preliminary discussions with representatives of relevant companies concerning details of the feasibility study being undertaken on production of zirconium sponge in Australia.

Mr. Phillips was engaged throughout the year on matters relating to the International Lead and Zinc Study Group, including preparation of briefs, compilation of statistics and circulation of questionnaires to industry. A major part of Mr. Phillips' work in the Section is concerned with the application of econometric techniques to the problems of the mineral industry. Fortran programmes for the calculation of regression coefficients for the simple and general linear model were written. These programmes were assembled with the objective of maximum flexibility, so that they can be easily modified to deal with the problems peculiar to economic data. Exponential growth rates were computed for a number of time series, and attempts are being made to calculate some of the parameters of the market for refined zinc. In the long term it is hoped to construct a simultaneous equation model to reflect supply, demand and stock adjustment relationships. In June, Mr. Phillips visited lead-zinc-silver mining and treatment operations of the four major companies operating at Broken Hill, and the smelting and refining facilities of Broken Hill Associated Smelters Ltd. at Port Pirie.

Mr. A.J. Gourlay attended a seminar on the Australian aluminium industry organized by the Aluminium Development Council in Canberra on 13th March. In April-May, he accompanied Dr. Kalix on the above-mentioned commodity study tour of mining, treatment and prospecting

operations in the northern Flinders Range area of South Australia. Discussions were had in Adelaide with companies and Mines Department concerning developments in copper and in non-metallic minerals in the State. In June and July various aspects of the current and future supply and demand position in the domestic aluminium and copper industries were discussed with industry representatives in Melbourne and Sydney. Mr. Gourlay visited the Australian Atomic Energy Commission in Sydney, in February and July, concerning information for inclusion in an article "Prospects for Uranium in Australia", published in A.M.I. Quarterly Review, Vol. 21, No.3, and details of Australia's uranium reserves and nuclear reactor fuel requirements.

Miss E. Clayton visited the Broken Hill Proprietary Co. Ltd. and Commonwealth Steel Co. at Newcastle, and the Australian Iron and Steel Pty. Ltd. at Port Kembla, during the period 13th-16th March. She accompanied Dr. Kalix on the abovementioned commodity study tour of localities in Northern Territory and Western Australia in connection with iron ore, manganese and tantalite mining and prospecting developments. While in Perth and Adelaide, Miss Clayton visited the State Mines Departments and Australian Mineral Development Laboratories (AMDEL).

Mr. R.Z. de Ferranti was in Sydney and Armidale, N.S.W., during the period 4th-6th March. He visited the New England Antimony Mines at Magwood, near Armidale, and while in Sydney had discussions with Joint Coal Board and the Statistical Officer, Department of Mines. In May-June he visited open cut coal mining operations at Moura and Blackwater, central Queensland, the Rockhampton and Greenvale nickel deposits, Queensland Mines Department and Queensland Coal Board. In July, he inspected coal mining operations in the Newcastle-Hunter River area of New South Wales.

In addition to an increasing commitment over recent years for the provision of data for international commodity studies, a growing interest in developments in the mining industry has resulted in a marked increase in the number of enquiries from government and private sources. Mineral commodities of particular interest in this regard have been alumina, bauxite, black coal, copper, iron ore, manganese, nickel, phosphate, tin, titanium and uranium.

Visitors to the Section during the year included representatives of local and overseas companies and of governmental and other authorities. In particular, visitors included representatives of Du Pont Industries, International Minerals and Chemicals Corporation (United States), Cominco (Canada), Ashland Oil and Refining Co. (United States), Uruguay Embassy, Oregon Metallurgical Corporation (U.S.A.), Conwest (Canada), and H.A. Watson & Co (U.K.), as well as representatives of numerous Australian mining, manufacturing and other companies.

The Australian Mineral Industry 1968 Review was prepared and four issues of the Quarterly Review - Vol. 21, Nos. 3 and 4; Vol. 22, Nos. 1 and 2 - were published. Articles appeared in the Quarterly Reviews on the following topics:

- "Prospects for Uranium in Australia" - A.J. Gourlay
- "Prospects for Australian Zinc" - J.B. Allen
- "Mineral Processing in Australia" - L.C. Noakes, J. Ward,
Z. Kalix
- "The Consumption of Zinc" - W.G.B. Phillips

Five chapters of major interest in the A.M.I. Annual Review were published as pre-prints for the first time in 1969. Chapters of the 1968 Review released in this form during the year were "Aluminium", "Lead", "Zinc", "Tin" and "Titanium". It is proposed to extend this list to other major minerals for the next issue of the Review.

PETROLEUM TECHNOLOGY SECTION

1. STAFF

(i) Occupied Positions

- 1 of Chief Petroleum Technologist (Class V)
 - 1 of Supervising Petroleum Technologist (Class IV)
 - 2 of Petroleum Technologist (Class III)
 - 2 of Petroleum Technologist (Class II) (Position No.66
has been vacant from September, 1968)
 - 1 of Chemist (Class II)
 - 1 of Engineer (Class III)
 - 1 of Boring Supervisor (Position No.71 - vacant from 27 June,
1969 - see (iii) Staff Changes below)
 - 2 of Driller Grade 2
 - 5 of Driller Grade 1
 - 4 of Drill Assistant
 - 1 of Technical Officer Grade 1
 - 1 of Technical Assistant Grade 2
 - 1 of Clerk (Class V)
 - 1 of Clerical Assistant Grade 2
- } Seconded from the Operations
Branch

(ii) Unoccupied Positions

Position No.66 of Petroleum Technologist, Class II, has been unoccupied since September 1968, when its former occupier, Mr. B.A. McKay was appointed to Position No.482 (Petroleum Technologist Class III). Action is now in progress to have this position filled.

Position No. 683 of Technical Officer Grade I was vacant at 31 October, 1969 but has since been filled.

(iii) Staff Changes

Mr. J.M. Brennan resigned from the position of Boring Supervisor on 27 June, 1969.

Mr. L. Hodgins, Boring Supervisor - Petroleum Exploration Branch, has been loaned to the Section on a part time basis to fill the vacancy resulting from the resignation of Mr. J.M. Brennan.

Dr. T.G. Powell joined the Section on 24 October, 1969 in the position of Chemist Class II.

2. PETROLEUM LEGISLATION

During the year (1.11.68 to 31.10.69), the Chief Petroleum Technologist and/or the Acting Chief Petroleum Technologist attended fourteen Oil Advisory Committee meetings, which they convened and recorded in their capacity of Secretary/Convener.

Another series of meetings and discussions which the Chief Petroleum Technologist assisted when required by Mr. J.M. Henry (Petroleum Technologist Class III or acting Class IV) attended were concerned with the framing of the offshore petroleum legislation in particular with the Regulations under the Petroleum (Submerged Lands) Act 1967. These meetings are summarised as follows:

- 3 and 4 December 1968 - (C.P.T.) Meeting of offshore regulations drafting Committee in Sydney
- 6 and 7 January 1969 - (C.P.T.) Meeting of offshore regulation drafting Committee in Melbourne
- 13 January 1969 - (C.P.T.) as above in Canberra
- 27 February 1969 - (C.P.T.) Meeting of joint Government/industry Committee concerning offshore regulations with respect to reports etc. in Canberra
- 17 to 19 March 1969 - (C.P.T.) Meeting of offshore regulation drafting committee in Melbourne.
- 23 and 25 April 1969 - (C.P.T. & J.M.H.) Meeting of Government members of the drilling and production sub-committees in Canberra
- May 1969 - (C.P.T.) Meeting of the Committee on "Oil Pollution in the Marine Environment" in Canberra
- 31 July 1969 - (J.M.H.) Meeting of the Government/industry Committee on "Oil Pollution in the Marine Environment" in Sydney
- 6 August 1969 - (J.M.H.) Meeting of Government/industry offshore drilling regulations sub-committee in Sydney
- 13 August 1969 - (J.M.H.) Meeting of Government members of the full offshore regulations drafting committee in Sydney

The status of the offshore Regulations is that a final draft is being prepared for submission to the Federal and State Parliamentary Draftsmen.

Many other short meetings were attended during the year to discuss with Departmental officers various policy matters concerning petroleum and associated matters.

3. TECHNICAL AND SCIENTIFIC VISITS, COURSES, CONFERENCES, FIELD VISITS, ETC.

Mr. H.S. Taylor-Rogers, Chief Petroleum Technologist, acted as

Assistant Director, Mineral Resources during the absence of Mr. L.C. Noakes on the following dates: 1-8 November, 1968, 17 February - 3 March 1969.

From 5 June, 1969 to 10 November, 1969 Mr. Taylor-Rogers was on leave without pay on assignment to ECAFE Secretariat in Bangkok in connection with the 4th ECAFE Symposium on Petroleum held in Canberra from 27 October to 10 November, 1969. Prior to his departure Mr. Taylor-Rogers undertook numerous visits to capital cities and field areas in connection with the arrangements for the Symposium and field trips associated therewith.

Higher Duties During the absence of Mr. H.S. Taylor-Rogers from 5 June to 10 November, 1969 Mr. M.C. Konecki acted as Chief Petroleum Technologist; Mr. J.M. Henry acted as Petroleum Technologist Class IV vice Mr. Konecki and Mr. K. Blair acted as Petroleum Technologist Class III vice Mr. Henry.

Mr. M.C. Konecki attended:-

- | | |
|--------------------|--|
| 24 April 1969 | - Meeting of class V and IV professional officers (Supervisors, etc.) |
| 5 and 28 May, 1969 | - Meeting as above |
| 27 June, 1969 | - Meeting as above |
| 11-14 August, 1969 | - Training seminar on supervision and employee relations, etc. organised by the Senior Training Officer of the Department |
| 3 October, 1969 | - Meeting of Class V and IV professional officers (supervisors) |
| 22 October, 1969 | - Attended the 1970 Supervisor Programme Meeting |
| 27 October- | |
| 10 November, 1969 | - Attended the 4th ECAFE Symposium on Petroleum in Canberra. On 27 October presented the paper "Review of Developments in the Australian Petroleum Industry Since the 3rd ECAFE Petroleum Symposium" prepared by M.C. Konecki, J.M. Henry and K. Blair |

Mr. J.M. Henry attended:-

- | | |
|----------------------|---|
| 21-23 November, 1968 | - The Australasian Institute of Mining and Metallurgy symposium on petroleum held in Canberra |
| 21 January, 1969 | - Meeting in Sydney with officers of the Department of Supply (S & T) and the manufacturers concerning new 600 gallon water tankers |
| 26 February, 1969 | - A meeting organised by the Department of Trade for discussion with representatives of a trade mission from Rumania. |
| 23-26 March, 1969 | - The annual meeting of the Australian Petroleum Exploration Association in Adelaide |

- 5 June, 1969 - Meeting with officers of the Department of Supply and Hastings Deering held in Sydney concerning the remounting of the mobile B-40-L rigs
- 20, 24 and 27 June, 1969 - Meeting of Class V and IV professional officers (supervisors)
- 14 July, 1969 - Meeting as above
- 11, 12, 14, & 15 August, 1969 - Training seminar on supervision and employee relations etc. organised by the Senior Training Officer of the Department
- 22, 23, 27, 28 October, 27 October, 1969 - 1970 B.M.R. Programme meeting for Supervisors
- 15 April, 9th May, 3 & 9 June, 8 & 23 July and 10 October - 4th ECAFE Symposium on Petroleum in Canberra.
- Attended meetings of the B.M.R. Data Storage and Retrieval Committee

Mr. B.A. McKay

- 1 June, 1969 - Visited the drilling operations at Coonemia No.1 near Woollongong N.S.W., as party leader and instructor for Messrs. V. Leban and Z. Horvath from the laboratory staff

Mr. K. Blair

- 27-31 October, 1969 - Attended selected sessions of the 4th ECAFE Symposium on Petroleum

Mr. A.T. Churchill

- 9, 10 December 1968 - Visited Stores and Transport Fleet Workshops; Hastings Deering Services Pty. Ltd., Fox Manufacturing Co. Ltd. and other suppliers in Sydney in connection with the overhaul, servicing, modification or remounting or fabrication of drilling and associated equipment.
- 19, 20 March, 5 August 1969
- 3-5 December, 1968 - Visited B.M.R. Drill Party No. 2 in the Broken Hill area, N.S.W.
- 12-15 August, 1969 - Attended a training seminar on supervision and employee relations organised by the Senior Training Officer of the Department
- 26 August to 6 September, 1969 - Visited Drill Party No.2 in Western Australia, Drill Party No.2 in the Ngalia Basin and Drill Party No. 3 in N.W. Queensland

A.T. Churchill (cont)

17-24 September visited Alice Springs and Drill Party No.1 (Ngalia Basin) following an accident in which two drillers were injured in a fire in the mess tent at the B.M.R. No.1 Seismic Party Camp.

Mr. J.M. Brennan

6 November, 1968 Returned from the U.S.A. after attending the School of Drilling Technology at Odessa, Texas and visiting equipment suppliers and manufacturers of plant and equipment used in B.M.R. drilling operations

9-12 December, 1968 visited Alice Springs to arrange and supervise the overhaul in Alice Springs of the drilling units from Drill Party No.1

12-28 March, 1969 supervised the overhaul of drilling plant in Alice Springs

9-20 June, 1969 visited Drill Party No.3 - the Theodore area, Queensland and supervised drilling operations in field training of drilling staff

4. REPORTS, STATISTICS, ARTICLES, ETC.

The Section prepared for publication and distribution to following:

- (i) Petroleum Exploration and Development Titles Map and Key (half-yearly, 30 June and 31 December)
- (ii) The Petroleum Newsletter - quarterly
- (iii) Rig Activity - fortnightly
- (iv) Wells and Footage Drilled - monthly and quarterly
- (v) Breakdown of Petroleum Exploration Activity and Expenditure - annually
- (vi) List of Petroleum Exploration Companies and Addresses - half yearly
- (vii) List of Petroleum Exploration Contractors, Service Companies and Consultants in Australia - revised as required usually half yearly
- (viii) Statistics on petroleum exploration, exploitation and production in Australia for various publications, e.g. World Oil, Oil and Gas Journal, Australian Mineral Industry Review, Australia in Facts and Figures, various year books and pamphlets, etc.

With the introduction of the Petroleum (Submerged Lands) Act 1967 a considerable amount of work is now required in the receipt, checking and vetting, acknowledgement and storage of statutory and other reports received under the abovementioned Act.

Special projects in connection with the calculation of petroleum reserves in Australia, utilisation of petroleum resources, etc. have been undertaken or started. Officers of the Section spent a considerable amount of time in the preparation of the draft Regulations under the Petroleum (Submerged Lands) Act 1967.

In addition, the following reports etc. were issued or prepared during the year:

B.M.R. Record 1969/50	B.A. McKay	"Observation No.1, Special Core Analysis Tests on samples from the basal Cretaceous Birdrong Formation"
B.M.R. Record 1969/60	Pet. Tech. Section (K. Blair, W.R.W. Dunn)	"Wells and Footage Drilled for Petroleum Exploration and Development in Australia and the Territory of Papua and New Guinea"
B.M.R. Record 1969/118	B.A. McKay	"Gage Roads No.1, Special Core Analysis Tests on Core Samples from the Gage Roads and Yarragadee Formation"
B.M.R. Record 1969/128	B.A. McKay	"Lacrosse No.1, Special Core Analysis Tests on a Permian Reservoir Sandstone from Lacrosse No.1 well"
B.M.R. Record 1969/132	M.C. Konecki J.M. Henry K. Blair	"Review of Developments in the Australian Petroleum Industry since the 3rd ECAFE Petroleum Symposium"

5. PETROLEUM TECHNOLOGY LABORATORY

(i) Core Analysis:

The core analysis of core samples submitted mainly from drilling operations approved under the Petroleum Search Subsidy Act continued throughout the year. The characteristics determined consisted of effective porosity, absolute permeability, dry bulk density, apparent grain density and interstitial water content. In addition to this, relative permeability, mercury capillary pressure and imbibition studies were made on samples from Dampier No.1, Observation Island No.1.

The total number of samples on which core analysis was undertaken during the year was 1662 or 578 more than in 1968.

In connection with the core analysis work mentioned above, it is of particular interest to record that in the routine examination of cores from Lacrosse No.1 the cores from the interval 5718' to 5746' were visibly oil-saturated. A small volume of oil extracted from a piece

of core at about 5729' had a gravity of $15^{\circ}\text{A.P.I.} \pm 1^{\circ}$, and contained 14% by weight of asphaltic materials; it was also determined that the oil belongs to the naphtenic chemical group of crude oils. As such, according to information available, it is the first occurrence of naphtenic oil in Australia, the other Australian crude so far discovered is of paraffinic base.

(ii) Formation Fluid Analysis:

Standard testing of formation waters recovered in tests in subsidised drilling operations was carried out. These tests include salinity by titration, resistivity by "dip cell" and pH by hovibond comparater. In all, 39 fluid samples were tested.

Analyses were completed on 40 samples of natural gas during the year. In addition, 5 oil samples were analysed.

(iii) Drilling Mud Investigations

A.P.I. tests were carried out on a sample of 200 mesh "volclay" Bentonite submitted by the Northern Territory Administration and a report on the results was prepared; the sample was found to exceed the requirements of the tender specifications.

In addition, tests were carried out on samples of bentonites and barytes submitted by B.M.R. geologists and by supplier organizations.

The usage of drilling mud materials and additives in 1968 is being evaluated for the purpose of updating B.M.R. Record 1968/64.

(iv) Other research projects comprised:

- (a) A sample of seepage oil from Tonga is being analysed at the request of the title holder.
- (b) A new $4\frac{1}{2}$ " diameter whole-core permeameter is being constructed with the assistance of the B.M.R. workshop.
- (c) A "steering" committee consisting of officers from the Section, the Geological and Petroleum Exploration Branches and the Baas-Becking Laboratory has been set-up to organise and direct a source rock investigation project.

6. (i) Drilling Engineering

Armstrong-Holland Pty. Ltd. completed modifications to the compressors fitted to the three Mobile B40L Drills. Since modification the compressor units have given satisfactory service.

The three Mobile B40L units were remounted on AEC Militant vehicles by Hastings-Deering Service Pty. Ltd. Several engineering problems had to be overcome during the transfer of the drills to new vehicles which were resolved by Section staff. One of the hydraulic pumps failed after the units had been delivered; modifications were made to the design of the mounting and method of attachment of these pumps to their drive shafts and two of the drill units were modified in the field. The three drills are giving satisfactory service and are very versatile machines. While they do not have the depth capacity of the Mayhew Drills, the rate of penetration is equivalent and they are better for coring, running bore casing, angle drilling, auger drilling and diamond drilling.

During 1968 considerable repair work had to be carried out on the compressor drives on the Mayhew drills. This year the compressors were remounted, reducing the angle of drive. This work was carried out by the Stores and Transport Branch of the Department of Supply, Sydney and the Department of Works, Alice Springs under instruction from the Drilling Superintendent and Boring Supervisor. The type of drive sprocket was also changed and the units are now working satisfactorily.

Contracts were arranged with Moys Construction Ltd. for the fabrication and fitting of three 1000 gallon water tanks to Leyland Comet vehicles and two 600 gallon water tanks to Bedford vehicles. Mr. Henry designed the tank units; supervision of the contract was carried out by Mr. Churchill and officers of the Department of Supply.

One Gardner-Denver WKH 1002 compressor was completely overhauled under contract by James Kirby Pty. Ltd., Sydney.

(ii) Drilling Staff

Mr. J.M. Brennan, Boring Supervisor, resigned effective June 26th.

Mr. J. Keunen, Driller Grade I, resigned effective 9.4.69.

Mr. T. Shanahan, Drill Assistant, was reemployed as Driller Grade I effective 1.7.69.

Mr. K. McKie, Drill Assistant, resigned effective 24/12/68.

Mr. A. Goska, Driller Grade I, returned from long service furlough 12/2/69.

Two vacancies for Drill Assistant were unfilled during the Field

Season. Two Field Hands working with the Drill Parties have been recommended for these positions.

Mr. B.G. Findlay, Driller Grade II, suffered a back injury while offloading supplies on 21.10.69 and has entered hospital.

Mr. L. Keast, Driller Grade I, is undertaking the duties of Driller Grade II during Mr. Findlay's absence.

Mr. E. Cherry, Driller Grade II, and Mr. E. Lodwick, Driller Grade I, suffered first and second degree burns after a gas explosion in the Seismic Camp on 12/9/69. Both men were taken to hospital in Alice Springs and have now recovered.

After the explosion, Mr. Cherry observed that the valve of the gas bottle was open. Disregarding his own safety he put his arm through the flames and turned off the valve.

Mr. Shanahan, Driller Grade I, was temporarily transferred from the Western Australian Drill Party while these men were in hospital.

(iii) Drilling Workshops and Stores

Mr. K. Suehle, Field Hand Grade II, arranged for the supply of equipment required by the Drilling Parties and the maintenance of a back up supply of equipment in Stores. He inspected supplies received and liaised with suppliers of equipment and followed up progress on work in hand.

(iv) Drilling

A statistical summary of drilling activity during the year is attached.

Drill Parties were raised to undertake shot hole drilling operations in support of the Seismic Section of the Geophysical Branch in the following areas: Victoria - Mildura, New South Wales - Broken Hill and Braidwood, Northern Territory - Gosses Bluff and Ngalia Basin, Western Australia - Frazer Range, Widgiemulltha, Boorabbin and Doodlakine.

During the year 4562 seismic shot holes were drilled with a total footage of 408,413 feet.

Other Drill Parties were formed for the drilling of observation bores in the A.C.T. and New South Wales for the Geological Engineering Section and for drilling stratigraphic holes for the Sedimentary Mapping Section of the Geological Branch. Five observation bores were drilled with a total footage of 463 feet. Thirty-two stratigraphic holes were also drilled with a total footage of 8568 feet; 2157 feet of core were cut during the year with an average recovery of 89%.

The total footage drilled and cored of 419142 feet and the number of holes drilled, 4599, is the highest recorded. As a comparison, the corresponding figures for 1968 which were also the highest to that period were 314,595 feet and 2,532 holes. Much credit is due to the Drill Crews concerned; other factors contributing to this high footage were the modifications and improvements carried out on the drilling equipment. There was a considerable reduction in the number of Stratigraphic holes drilled for the Geological Branch, from 102 holes drilled in 1968 to 32 holes drilled during 1969. However, the average amount of hole drilled per hole increased from 133 feet to 205 feet and the total cored footage increased from 748 feet to 2157 feet. The total footage of completed holes was 11,188 compared with 6,379 feet for 1968 giving an average depth of 349 feet during 1969, compared with an average depth of 148 feet in 1968.

Because of other commitments, the Section was unable to drill the holes programmed for the study of evaporite sections in the Northern Territory or the test hole at Kowen Forest to 1000 feet. These projects have been tentatively programmed for 1970.

Contract Drilling

During the year the Section prepared tender schedules for two drilling operations requiring the services of drilling contractors due either to prior commitments for the Section's own drilling units or because of the depth of hole required was beyond the range of the Section's units.

These contracts were:

- (i) shallow stratigraphic drilling and coring in the Ngalia Basin, N.T.
- (ii) shallow drilling in the Victoria River Area, N.T.

The Ngalia Basin contract drilling was started in mid-July and was completed in October - a total of 8 holes were drilled and cored.

The Victoria River area drilling contract was started early in October and after drilling two holes, Delamere No.1 to 505 feet and Top Springs No.2 to 250 feet; the contract was suspended until early 1970 due to the wet season.

B.M.R. DRILLING OPERATIONS 1/11/68 - 31/10/68
(PETROLEUM TECHNOLOGY SECTION)

<u>TYPE OF OPERATION</u>	<u>AREA</u>	<u>LOCATION</u>	<u>PERIOD</u>		<u>DRILLED Feet</u>	<u>No. of holes</u>	<u>DRILLING</u>		<u>DEPTH Av.</u>	<u>CORING</u>	
			<u>From</u>	<u>To</u>			<u>Hours</u>	<u>Rate Ft./Hr.</u>		<u>Feet</u>	<u>Hours</u>
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
DRILLING											
Seismic N.T.	Ngalia Basin	Mt. Allen	1/11/68	20/11/68	12445	111	113½	112	110		
Shot Holes		Waite Ck.	23/8/69	30/8/69	11505	104	86	135	111		
Oil Search		Gum Creek	31/8/69	30/10/69	36370	324	243	141	112		
					60320	539	442½				
SEISMIC N.T.	Amadeus Basin	Gosses Bluff & Owen Springs	1/4/69	22/8/69	119097	1313	948½	126	91	19	1½
SHOT HOLES											
Misc. Structural											
Seismic Vic.	Murray Basin	Mildura	1/11/68	6/11/68	3630	31	41½	87	117		
Shot holes	Adelaide	Broken Hill	11/11/68	13/12/68	42169	397	362	116	106		
	Vic. Geosyncl.										
Regional	Tasman	Tidbinbilla	6/2/69	21/3/69	2724	71	73½	37	38		
Structural	Geosyncl.										
	A.C.T.	Braidwood	24/3/69	8/5/69	18126	462	239½	76	39		
	W.A.	Frazer Range	11/6/69	5/8/69	38351	449	395½	97	85		
	Precambrian	Widgiemultha	6/8/69	30/8/69	52918	488	260	204	108		
	Shield	Boorabbin	1/9/69	7/10/69	42195	475	309½	136	89		
		Doodlakine	9/10/69	31/10/69	28983	337	246½	117	86		
					229096	2710	1928			19	1½

<u>TYPE OF OPERATION</u>	<u>AREA</u>	<u>LOCATION</u>	<u>PERIOD</u>		<u>DRILLED Feet</u>	<u>No. of Holes</u>	<u>DRILLING</u>		<u>DEPTH Av.</u>	<u>CORING</u>	
			<u>From</u>	<u>To</u>			<u>Hours</u>	<u>Rate Ft/Hr.</u>		<u>Feet</u>	<u>Hours</u>
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
OBSERVATION	A.C.T. & Environs	Canberra No.2A	3/2/69	14/2/69	30	1	$\frac{1}{2}$	60		195	29
BORES		Kowen No.3	19/2/69	27/2/69	142	1	24	6		4	1
STRATIGRAPHIC		Ulladulla No.1	5/3/69	27/3/69	76	1	$4\frac{1}{2}$	17		280	$71\frac{1}{2}$
ENGINEERING &		Ulladulla No.2	28/3/69	10/4/69	95	1	$3\frac{1}{2}$	27		75	9
HYDROLOGY		Kowen No.4	14/5/69	21/5/69	120	1	24	6		5	1
					463	5	$56\frac{1}{2}$			559	$111\frac{1}{2}$
STRATIGRAPHIC	Eromanga	Inglewood	26/20/68	31/10/68	260	1	8	32		20	$2\frac{1}{2}$
QLD.											
OIL SEARCH QLD	and Surat Basins	Milmeran	1/11/68	5/11/68	385	1	$5\frac{1}{2}$	70		20	2
SEDIMENTARY		Warwick	6/11/68	14/11/68	320	2	11	29	160	23	4
MAPPING QLD.											
NSW	Morton Basin	Casino	15/11/68	29/11/68	667	4	$28\frac{1}{2}$	23	167	$55\frac{1}{2}$	$8\frac{1}{2}$
QLD.	Southern	Baralaba	3/6/69	10/6/69	606	2	19	32	303	$60\frac{1}{2}$	10
	Surat Hasin	Theodore	11/6/69	25/6/69	1319	4	$30\frac{1}{2}$	43	330	$169\frac{1}{2}$	8
		Redcliffe	1/7/69	26/7/69	1319	7	49	27	188	241	14
	Southern	Dobbyn	26/7/69	26/8/69	843	2	35	24	421	147	13
	Carpentaria Basin	Cloncurry	27/8/69	6/9/69	478	2	17	28	239	$57\frac{1}{2}$	$7\frac{1}{2}$
		Richmond	8/9/69	29/9/69	421	1	20	21		78	$7\frac{1}{2}$
	Western	Homeboin	29/9/69	16/10/69	1100	3	26	42	367	79	$7\frac{1}{2}$
	Surat Basin	St. George	17/10/69	27/10/69	630	2	$14\frac{1}{2}$	43	315	30	$1\frac{1}{2}$
		Dirranbandi	28/10/69	31/10/69	220	1	$4\frac{1}{2}$	49		20	$2\frac{1}{2}$
					8568	32	268			1001	88

TOTAL ALL SURVEYS

417544

4599

$3643\frac{1}{2}$

1579

196

CORE RECOVERY AVERAGE 89%