

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS

RECORDS:

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MINERAL RESOURCES BRANCH

Summary of Activities, 1965



PETROLEUM TECHNOLOGY SECTION

MINING ENGINEERING SECTION

MINERAL ECONOMICS SECTION

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PETROLEUM TECHNOLOGY SECTION

1. The Section's personnel during 1965 consisted of :-

Occupied Positions:

- 1 Chief Petroleum Technologist (Class 5)
- 1 Supervising Petroleum Technologist (Class 4)
- 2 Petroleum Technologists Class 3
- 2 Petroleum Technologists Class 2
- 1 Chemist Class 1
- 1 Drilling Superintendent - vacant during most of the year
until filled by the appointment
of Mr. A. Churchill on 30th August, 1965
- 1 Boring Supervisor
- 2 Drillers Grade 2
- 4 Drillers Grade 1
- 3 Drill Assistants
- 1 Technical Assistant Grade 2
- 1 Clerk

Unoccupied Positions:

- 1 Drill Assistant. This position has been vacant throughout the year. The position has been filled in the field by using a field assistant in this capacity.

2. Petroleum Ordinances of the Territories:-

During the year the Section dealt with various technical and scientific matters in connection with the administration of petroleum ordinances of the Northern Territory and the Territory of Papua and New Guinea. Chief Petroleum Technologist is a member of the Oil Advisory Committee appointed under these Ordinances. He has been acting as a Convenor/Secretary of the Committee since 19th October, 1962.

3. Petroleum Ordinances of the Commonwealth:

During December, 1964, Chief Petroleum Technologist attended a meeting of State Under Secretaries for Mines concerned with the preparation of draft legislation to cover off-shore petroleum exploration activities.

From 31st March to 2nd April, Chief Petroleum Technologist attended a conference of Commonwealth and State Attorneys General concerning off-shore legislation.

Chief Petroleum Technologist attended two further meetings of State Under Secretaries of Mines and Mining Engineers on off-shore legislation, one in Melbourne from 4th to 7th May and one in Brisbane from 30th May to 4th June.

4. Petroleum Policy:

Various draft minutes were prepared on Ministerial and Parliamentary questions, many of them with some petroleum policy component.

5. Petroleum Engineering:

- (a) Drilling: 1st November, 1964 to 31st October, 1965.

During November 1964 No. 1 Party completed drilling operations for the 1964 season on 26th November in the Cockroach area of Manners Creek Station N.T. The rigs were then moved to Stores and Transport, Melbourne for vehicle and rig overhaul and No. 1 Party returned to the Cockroach area on 15th April, 1965 to resume operations where they operated until 5th September, 1965 moving to Gordon Creek in the Bathurst area N.T. on 6th September, 1965. The field party season concluded on 31st October.

For the period mentioned above we have drilled 106,625 feet averaging 63 feet per hour using 160 bits, the formations drilled have been hard and slow to drill. By way of comparison, the same party in 1964 drilled 214,395 feet averaging 109 feet per hour using 90 bits and it can be seen that our bit cost per ft. has been trebled and our operations cost per ft. considerably increased.

During this field party's season it was necessary to provide men, materials and a Mayhew rig to work at Shotpoint 247 at Marion Downs on the flowing well. In order to fulfil our shot hole commitments it was necessary to work shifts with the rigs. The rigs have stood up very well to this extra work and there has been little shut down time.

Four times this year Mr. Findlay, Driller Grade 2 has been to the Marion Downs site and from 9th August, 1965 to 2nd September, 1965 three men with a Mayhew rig and tanker were away from the party on this work which was supervised by Mr. E. Beever, Boring supervisor.

Mr. Beever managed to bridge the well crater and find the bore hole into which he managed to drive casing to 185'. The original flow of 250,000 gallons per day has been reduced to 36,000 gallons per day. The original flow was salty and was coming from two aquifers. The salt water flow has stopped, all the water flow is now coming up inside the casing and being piped away from the crater by a 3" flow line. There is no flow from the five subsidiary wells four of which were plugged. One left open for observation purposes.

The work was suspended to allow the area to dry out and observe the flow rate which has remained steady. At the present time Mr. Beever has left to supervise further operations in plugging this well. He will be assisted by B. Findlay, E. Cherry using a Mayhew rig. A. Zoska with the Carey rig is proceeding to Tambo, Qld. for Geological Scout drilling E. Lodwick with a Mayhew is going to join No. 2 Party at Gosford.

No. 2 Party started its field season 22nd April, 1965 and operated in the Hamilton and Mt. Gambier districts until 30th August, 1965 when they moved to Gosford, N.S.W.

Until 30th August, 1965 they drilled 46,871 feet averaging 61 feet per hour using 79 bits.

This party operated one Mayhew and two Carey rigs until the early part of September when a new Mayhew was put into service and a Carey returned to Canberra pending a decision on its use for Geological work after a Grey rig has worked in Tambo, Qld.

Drilling in the Gosford area is still proceeding. The area has proved exceptionally abrasive and bit wear has been heavy. Our experience has also been encountered by other contractors presently working the adjacent areas. A more suitable type of bit has been found and ordered but will not be available this season.

Due to anticipated hard drilling conditions tenders were called for contract drilling. The contract being awarded to W.L. Sides & Son Pty. Ltd. using a Failing CPO 1 rig.

The contractors drilled 19,215 feet in the Hamilton area from 5th May, 1965 to 20th June, 1965. From 21st June, 1965 to 1st September, 1965 they drilled 21,140 feet in the Mt. Gambier area and from 8th September, 1965 to 22nd October, 1965 they drilled 9,670 feet in the Gosford district. The contract was concluded satisfactorily and a fair comparison can be made of our equipment and operations and the contractors working under identical conditions.

On the 31st July two drillers K. Suehle and A. Murphy were seriously injured when the mast of the drilling rig struck overhead high tension cables whilst being raised during an overhaul operation.

Since this accident the drilling sub-section has had to operate under strength. We have however, been able to keep to our commitments for shot hole drilling and keep our rigs operating. Difficulties are being experienced in recruiting staff from the field and vacancies may be advertised presently.

The Drilling Superintendent with E. Beaver visited Gosford to see staff and the equipment. Also visiting Gardner-Denver Sydney to check on Mayhew spares and Gardner-Denver compressor spares. The Drilling Superintendent visited Setres and Transport, Sydney to arrange for vehicle overhaul in Sydney.

The drilling personnel of the Petroleum Technology Section completed the transfer from Melbourne to Canberra on 25th May, 1965.

B.M.R. No. 12 - Cockroach, which was spudded on 15th August, 1964 was deepened from 3,350 feet (31st October, 1964) to 4,000 feet which depth was reached on 17th November, 1964. The well was drilled under contract by W.L. Sides & Son Pty. Ltd. using a Failing "2500" Holemaster rig. Drilling time was 63 days. The total footage cored was 144 f and of this 97'11 $\frac{1}{2}$ " or 68.02% was recovered. Apart from some difficulties early in the hole due to deviation there were no major mechanical difficulties in drilling the hole. No indications of hydrocarbons were recorded. Electric, Microlog, Sonic and Radioactivity logs were run by Schlumberger Seaco Inc. from the shoe of the surface casing to final depth. Messrs. J.M. Henry, Petroleum Technologist Class 3 and M.D. Bell, Petroleum Technologist Class 2 provided the engineering services during visits to the site.

(b) Laboratory: 1st November, 1964 to 31st October, 1965

Continuous routine core analysis continued and consisted of some or all of the following tests.

Fluid saturation, core water salinity, Acid solubility, permeability porosity and densities.

The above tests were carried out on side wall cores, plugs cut from cores, whole cores or outcrop samples.

For the twelve months 1,532 individual core and outcrop pieces were examined, this is 120 more than examined during the previous 12 months.

New work introduced consisted of the study of the effect on permeability of various liquids (fresh water, brine, oil) through plugs taken from various oil reservoir sands.

Future work will consist of all the above plus Capillary Pressure and Core Size Distribution determinations. The new apparatus for these measurements will be operating shortly.

The most important increase in operations recently was in the bentonite field. This commenced with the presentation of a paper on Australian bentonites and at about the same time the interest shown by B.M.P. in obtaining local bentonites suitable for use in pelletizing iron ore.

Recently B.M.R. geologists forwarded 18 samples from locations in Queensland one of which exhibited good properties with regard to drilling mud and possibly to pelletization. Details of this discovery may be found in B.M.R. publication 1965/171.

Bentonites tested during the previous twelve months were from the Yarraman/Rosedale areas Qld. (Tennant Minerals) and from the Permian, Black Alley shale north of Roma, Qld. Bentonite from Mozambique used in foundry sands in Australia was also tested with respect to its usefulness in drilling muds.

The Yarraman bentonites proved to be unsuitable for drilling muds and further investigations into the possibility of beneficiation of these clays on their suitability for use in other industries was taken over by the C.S.I.R.O.

A pH meter and a high temperature - high pressure filter press have recently been received and these will be utilised in further investigations of Australian bentonites.

The receipt of a Fann resistivity meter built specifically for the measurement of the resistivities of formation water, mud, mud cake and mud filtrate has facilitated the more accurate determination of these values.

Miscellaneous testing such as sand, sieve analysis and the determination of the effectiveness of various acids on water well scales and accumulations were made periodically.

J. Kemp a chemistry student was employed in the Petroleum Technology laboratory from 26th November, 1964 to 20th January, 1965.

The move from the old Acton laboratory to the new laboratories in the B.M.R. building was completed on 25th September, 1965.

Gases:

Analysis of 78 gas samples was accomplished. Duplicate analysis was made on some of the samples. Efforts to discover commercial quantities of helium in natural gases, have been unsuccessful; the highest proportion of this elementary gas, so far observed, is 0.1%.

Condensates:

Seven low to medium pressure condensates were analysed, under some difficulty, by gas/liquid, liquid/solid chromatography and spectrophotometry.

Oils:

Routine tests and analyses were made on four crude oil, one of which contained very high amount of organic sediments. The sediments were partially characterized.

Semi-detailed characterization and analysis was made on three suspected oil-seep samples and on one fuel oil.

Enquiries were made and specifications for quotations and orders were prepared and deliveries negotiated for a number of instruments, total purchasing price of which was over £10,000. Some of these instruments and accessories have already been delivered.

Suitable control instruments and apparatus were selected or designed for use with the recently received Spinning Band Fractional Distillation Unit.

Feasibility study has been made into the ease construction of apparatus for determination of "SP potentials" of aqueous formation fluids.

(c) Reports, Articles, Statistics, etc.

The Section collects, collates and prepares for publication and distribution the following:

- (i) Petroleum Tenement Map and Key - twice yearly
- (ii) The Petroleum Newsletter - quarterly
- (iii) Rig Activity - fortnightly
- (iv) Wells and Footage Drilled - quarterly and monthly
- (v) Breakdown of exploration activity and expenditure - annually
- (vi) List of Petroleum Exploration Companies (addresses) - twice yearly
- (vii) List of Drilling Contractors, Service Companies and Consultants - as required, usually quarterly

- (viii) Articles on petroleum exploration in Australia for various publications in Australia and overseas, "Australian Mineral Industry Review" - (quarterly and annual), "Australia in Facts and Figures", News and Information Bureau, Encyclopaedia Britannica year book, etc.

(d) Conferences, meetings, Courses etc.:

In addition to the various conferences listed under Petroleum Ordinance of the Commonwealth the following conferences, meeting and courses were attended by officers of the Section:

Chief Petroleum Technologist - H.S. Taylor-Rogers

23rd February, 1965 attended a meeting with Delhi Australian Petroleum Ltd. in Adelaide to discuss the gas reserves in the Gidgealpa field.

11th March, 1965 attended the Tariff Board Enquiry on Australian Crude Oil Prices.

22nd to 26th March, 1965 attended 8th Commonwealth Mining and Metallurgical Congress - Sessions 24 to 42.

8th November, 1965 left Canberra to attend 3rd E.C.A.F.E. Symposium on petroleum in Tokyo.

Supervising Petroleum Technologist - M.C. Konecki

29th November to 15th December attended the E.C.A.F.E. Natural Gas Seminar in Teheran.

31st March, 1965 visited Melbourne University to lecture students of the Department of Industrial Science on oil exploration drilling, testing and reservoir engineering.

Petroleum Technologist Class - P. Duff

18th December, 1964 visited C.S.I.R.O. Melbourne for discussions with Dr. Goskin on bentonites.

Petroleum Technologist Class 2 - D. McKay

1st to 5th March, 1965 attended the A.P.E.A. annual conference in Adelaide to present two papers, one entitled "Fluid Permeability Studies of some Australian Reservoir Sands" on his own behalf and another "Testing of some Australia Bentonites" by P. Duff.

Chemist Class 1 - J. Puchol

Attended the exhibition of laboratory equipment and methods prepared by the Defence Standards Laboratory in Melbourne.

(e) Visitors, Interviews, etc.

From the 1st November, 1964 to 31st October, 1965 some 140 visitors representing local and overseas companies interested in or participating in petroleum exploration were interviewed by officers of the Section. It is estimated that some 160 to 175 professional man-hours were involved in the visits and discussions.

(f) Visits to Field Operations:

Officers of the Section made the following visits to field operations:

A. Churchill, Drilling Superintendent
B.M.R. No. 2 Seismic Party, Gosford N.S.W. & Gardner-Denver (Aust)
Pty. Ltd. - 13th to 15th September, 1965

E.G. Beaver, Boring Supervisor
 Marion Downs - shot point 247, flowing well to try
 and kill same - 9th August to 2nd September, 1965.

MINING ENGINEERING SECTION

Metals Search

Tailings Survey

Received results of analysis of Queensland samples and circulated those to interested parties entitled to priority.

Sampled New South Wales and Queensland Beach Sand Dry Plants tailings, including a review of vanadium content of east coast ilmenites.

Sampled Western Australian goldfields tailings dumps.

Completed writing most of Queensland Record, started Western Australia and Beach Sands.

Metallurgical Research into Tin Ore Deposits - North Queensland.

Laboratory work under contract by Mineral Industries Research and Testing Services of University of Queensland has been completed and four progress and one final report received. No unusual or unexpected discoveries were made though the exercise was probably a useful one.

Jervois Sulphates

To establish whether a profitable operation can be established at Jervois, A.M.D.L. has been engaged to carry out research and development of the heap leaching process. Laboratory test work has been completed and pilot scale work at Jervois should take place at any time now.

Hatches Creek Tungsten Ore

This project is still in progress. Laboratory scale work to determine optimum conditions of flotation and magnetic and high tension separation is being carried out. The object is to demonstrate the practicability of producing separate marketable concentrates from Hatches Creek.

Production of Refined Bismuth from Tennant Creek

The final report on this project was received at the beginning of the year. The electro-refining process as developed was regarded as being suitable for only large scale operation under well controlled conditions.

Up-grading of Manganese Ore

During the year results of fast neutron activation tests carried out in the U.S.A. were reported. More complete information on details of the tests carried out have been sought and a final report evaluating the possibilities of the process is awaited.

Office and miscellaneous

a. The following reports were prepared:

1. On applications to export iron ore from Savage River, Koelanooke Hills, Mt. Tom Price (goethite ore), Mt. Bundey, Frances Creek and Deepdale.
2. On an application to export manganese ore from Horseshoe.

3. On applications by A.I. Consolidated Gold N.L. and Moonlight Wiluna Gold Ltd. for registration as producers under the Gold Mines Development Assistance Act.
 4. On the development programmes of the following gold mines, i.e., Lake View and Star Ltd., Hill 50 Gold Mine N.L., and Golden Plateau N.L.
 5. On proposals to amend the Gold Mining Industry Assistance Act.
 6. On proposals for rehabilitation of the gold-mining industry.
 7. On the testing operations of the Gove Mining and Industrial Corporation P.L.
 8. On the bauxite reserves in S.M.L. No. 1 at Gove under restrictive conditions proposed by Alusuisse.
 9. In collaboration with Treasury, on an estimate of receipts by States from mineral royalties in 1965 to 1969.
- b. An article on iron ore in Australia for the Encyclopedia Britannica Book of the year 1965 was prepared.
- c. Other work Representation on the Wire Rope Research Committee, liaison between AMDEL and Commonwealth Departments and authorities.

MINERAL ECONOMICS SECTION

The Mineral Economics Section was acutely short of professional officers during the first quarter of 1965 and although the staff position had improved by April one professional position remained vacant to November. As a result it was not possible for the Section to accomplish its programme for the year in certain respects. Difficulties arising from the Staff position were accentuated by additional work associated with rapid developments affecting the industry in Australia, and by an expanding requirement in providing data, directly or indirectly, for international commodity studies. In these circumstances it was not possible to undertake any regional studies or basic investigations, no work was done on Summary Reports, and field work on commodity studies and contacts with industry were necessarily restricted. The production of publications and statistics was facilitated however by the employment of non-professional staff for routine compilation, editing, and proofreading, relieving professional officers of the bulk of this work, although technical editing was still done by senior professional staff.

Staffing. Seven professional positions are established in the Mineral Economics Section. Three vacancies existed at 1st January 1965, and one has continued throughout the year. Of the two remaining vacant positions, both Mineral Economist Class 1, one was filled by an appointee from industry in February, and the other in March by the appointment of an officer from another Branch. A position as Mineral Economist Class 2 will become vacant at the end of the year leaving a total staff of 5 Mineral Economists (i.e., two vacant positions), one Technical Officer and one base grade clerk; the latter two are not on the Section's establishment. The re-organisation proposal approved in principle by the Public Service Board in March 1964 has met with no success since.

Inter-Branch and Inter-Departmental Assistance. A continuing liaison was maintained with other Branches on most aspects of the mineral industry during the year. The range of advice provided was broadened and extended to assist operations of the Northern Division and the expanding activities of the Secretariat. The Section continued to prepare periodic estimates of export income and to advise Departments and industry on minerals export trends and prospects generally.

International commodity considerations occupied a considerable amount of the time of senior officers of the Section. Mr. Livingstone, Dr. Kalix and Mr. Ward were variously engaged in the business of inter-Departmental committees dealing with mining royalties, copper, rutile, the Third International Tin Agreement, the United Nations Tungsten Committee, the International Lead Zinc Study Group, the Sulphuric Acid and Pyrite Bounty Acts, and various questions involving export control of minerals.

The Section examined and commented on papers and submissions prepared in connection with GATT, ECAFE and overseas aid.

In connection with these and other matters, discussions were held with industry, other Branches of the Bureau, Department of Trade and State Mines Departments. The provision of advice also involved analyses of the probable future position regarding production and consumption of the various commodities under consideration, including assessment of domestic and international developments and price and marketing trends.

The Section advised the Department of Defence Joint Intelligence Branch throughout the year on the selection and grading of key points. Liaison was also maintained with the Materials Branch of the Department of Supply on production and consumption of mineral raw materials, and with Department of Trade Manufacturing Industries Division, on numerous questions of mineral and metal utilization.

Ad Hoc Enquiries. There was a marked increase in enquiries from industry the public and overseas during the first half of the year as a consequence of the prominence given to mineral developments particularly those affecting iron ore, aluminium, coal, copper, tin, manganese, phosphate and superphosphate, salt, gypsum, asbestos and sulphur. Visitors to the office included delegates from overseas companies attending the Eighth Commonwealth Mining and Metallurgical Congress, representatives of Japanese, American and British industry, and representatives of local mining and industrial companies.

Commodity Studies. Field work on commodity studies was restricted by the lack of professional staff and the pressure of other work on the remaining officers. All officers undertook visits of inspection of mining and industrial plants and held discussions with company officials and officers of State Mines Departments, but the number of visits undertaken must be regarded as no more than the minimum desirable.

This programme was concerned with industrial minerals, beach sands, gold, aluminium, tin, copper, and iron ore. Information gained was necessary to the work of the Section but did not contribute beyond this to the programmes of commodity and regional studies and could not of course be incorporated in fundamental studies.

Publications. During the year the Australian Mineral Industry 1964 Review was prepared. The Review contains information up to June 1965, and publication is expected in December. Three issues of the Quarterly Review - Vol 17 Nos. 3 and 4 and Vol 18 No. 1 - were published and Vol 18 No. 2 will be in preparation in November. By mid-year work was completed for the statistical volume in the series on the Mineral Resources of Australia - Bulletin No. 81 "Australian Mineral Industry - Production and Trade 1842 - 1964". No Summary Reports were prepared during the year; those on copper, limestone, and minor non-metals are still outstanding. The Section also checked articles and press statements by the Minister and for News and

Information Bureau as well as assisting in the actual preparation of some of these.

Attendance at Technical Conferences. Dr. Kalix attended technical sessions of the Eighth Mining and Metallurgical Congress and visited places of mining interest in Queensland with the Congress in March. Mr. Ross attended a 3-day course on programme evaluation and review techniques held in Canberra in May.