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NOTES ON PETROLEUM EXPLORATION IN AUSTRALIA
TO SEPTEMBER 1964

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Notes on Petroleum Exploration in Australia
to September 1964*

Introduction:

The information contained in these notes has been compiled from data prepared by the Bureau of Mineral Resources in replying to numerous requests for information on the various aspects of petroleum exploration in Australia.

The notes have been prepared to give a very general picture of the progress of exploration and the results achieved to September, 1964.

A map showing the position of locations referred to in the text is included at the back of the text.

* Expenditure figures to 31st December 1963

The year 1964 saw the entry of Australia into the ranks of the oil producing countries. On 25th March, 1964 the Queensland State Minister for Mines, Mr. Evans, unveiled a plaque to mark the beginning of commercial oil production from the Moonie field, and full scale pumping of the oil through the 187 mile, 10 inch pipeline to Brisbane officially commenced. Oil from Moonie is currently being processed in Sydney pending the completion of refineries at Brisbane.

The Moonie success has touched off the most intensive search for further fields the country has known. Australian, American, British, Canadian and French organisations, operating either alone or as joint operators, are participating in exploration in all sedimentary areas that hold oil prospects. At 30th June, 1964 there were 108 companies, syndicates or individuals holding petroleum tenements (permits, licences or leases) in Australia with some extending into, or wholly in, off-shore areas.

To 31st December 1963 a total of £124,590,000 had been spent on oil exploration. Of this total £100,908,000 had been spent by private enterprise with about 63% representing overseas investment. The remainder was expenditure by Governments including State Departments of Mines. Since drilling for oil started in Australia in the late 1800's until the end of 1963, 765 wells have been drilled. Of these, 128 were drilled in 1963. It is interesting to note that in 1964, to the end of September, 157 wells had reached their final depth. The annual footage drilled in recent years has also shown in marked increase; in 1961 it was 128,830 ft.; 1962 - 408,511 ft.; 1963 - 662,707 ft.; and to the end of September 1964 the footage drilled was 790,000 ft.

In Australia, all petroleum on or below the ground is, and shall be deemed always to have been, the property of the Crown. Full control of petroleum exploration and development rights are vested in the Government or Administration of each State or Territory. Companies wishing to undertake oil exploration must first obtain a petroleum tenement (authority, permit, licence or lease) from the Government concerned.

Australian oil exploration tenements and the conditions of tenure vary somewhat from State to State but generally follow the Queensland pattern. Tenements are in three basic forms :

Permit (Authority or Licence) : covering surface surveys
and in some cases, drilling.

Licence : covering exploratory drilling

Lease : for commercial production.

The history of oil exploration in Australia has been one of high hopes followed by disappointment and this in turn followed by a period of renewed activity. However, since 1958 oil exploration has maintained an ever increasing tempo thanks to the many encouraging discoveries.

The earliest drilling for oil took place in the Coorong area (map ref. 24) of South Australia in 1892.

At Roma (map ref. 3) in 1900 gas was discovered while deepening a water bore. Further holes were drilled without much success. In 1906 gas from the original well was fed into a reticulation system to light the streets of the town. After 10 days the flow stopped suddenly and the lighting scheme was abandoned.

Interest switched in the 1920's to the Lakes Entrance (map ref. 23) district of Eastern Victoria. Between World Wars I and II, more than 140 wells were drilled. From 1930 to July 1941 about 40 of the wells yielded a total of 107,129 gallons of poor quality oil, produced mainly by pumping and bailing but without achieving commercial success. World War II put a stop to operations.

In 1953 the sphere of interest moved to the north west of Western Australia where, following extensive geological and geophysical exploration, a joint Australian-American company, West Australian Petroleum Pty.Ltd., discovered oil at the rate of 500 barrels per day in the first well drilled, Rough Range No. 1 (map ref. 13). Further drilling in the area showed the reservoir to be very small and not capable of commercial production. Nevertheless, the Rough Range discovery must rank as a major discovery as it convinced many people that oil reserves were to be found in Australia. It provided a much needed stimulus to oil exploration.

Since the Rough Range discovery West Australian Petroleum Pty.Ltd., W.A.P.E.T., has continued the search for oil in Western Australia. It has spent over £22 million and only recently has been rewarded by the discovery of gas at Yardarino No. 1 (map. ref. 20), its 94th well, and oil at Barrow Island No. 1 (map ref. 21), its 95th well.

In Papua-New Guinea the search has been going on since 1912. £37.5 million* has been spent of which almost £32 million has been spent by the B.P., Vacuum (Mobil), Oil Search Ltd. group.

At the group's well Puri No. 1 (map ref. 14) on the 3rd November, 1958 a drill stem test gave a flow rate of 3 million cubic feet per day gas with condensate at 70 barrels per day. The following day the well produced oil and condensate at rates in excess of 1000 barrels per day. However, after two days water made its appearance in increasing quantities with a corresponding decline in the oil production. Two deviated holes, drilled from the original well, failed to find any further production.

In Papua, notable gas discoveries with open flow potentials in excess of 100 million cubic feet per day have been made at Ewata, Kuru, Barikewa, and Iehi (map ref. 15, 16, 17 and 18 respectively). However, the rough terrain and the remoteness of the area have so far precluded the utilization of these reserves.

The revival initiated by the Rough Range discovery led to renewed interest in the Roma area of Queensland. In 1954 a well, A.A.O. No. 4, Hospital Hill (map ref. 3) drilled by Associated Australian Oilfields N.L., now one of the Associated Group (Associated Australian Oilfields N.L., Associated Freney Oil Fields N.L., The Papuan Apinaipi Petroleum Co.Ltd., Associated Continental Petroleum Ltd., H.C. Sleigh Exploration and Interstate Ltd.) gas was discovered and flowed at the rate of 870,000 cubic feet per day.

Six years later, in 1960 the Associated Group had further significant success in the Roma area; Timbury Hills No. 2 and Pickanjinie No. 1 (map ref.3) flowed gas at 1.5 and 6.5 million cubic feet per day respectively.

In 1961 came the first major oil discovery in Queensland. At Cabawin No. 1 (map ref. 2) near Tara, drilled by Union Oil Development Ltd., (the Australian Subsidiary of Union Oil of California), in association with Kern County Land Co. of California and Australian Oil and Gas Corp. Ltd., produced oil at between 60 to 100 barrels per day. Late in 1961 on 3rd December oil was again discovered at Moonie No. 1 (map ref. 1), also drilled by the Union-Kern-A.O.G. group. This discovery led to the commercial development of Australia's first oil field at Moonie with 15 producing wells with production rates ranging from 360 to 1,700 barrels per day of 44° to 50° A.P.I. gravity oil. So far 17 wells have been drilled at Moonie.

* to December 1963

In Queensland, the Associated Group of companies has established gas fields at Richmond, Bony Creek and Pickanjinie (map ref. No. 3) near Roma and at Rolleston (map ref. 8) about 150 miles north of Roma and in wells at Glentullock No. 1 (map ref. 6) and Westgrove Nos. 2 and 3 (map ref. 7). Oil has been found at the Group's wells at Sunnybank No. 1 (map ref. 5), Richmond Nos. 1, 5 and 10. A gas field has also been discovered at Snake Creek (map ref. 3), by Amalgamated Petroleum N.L. in its "farmout" from the Associated Group in the Cambarngo area.

Recently oil discoveries in Alton Nos. 1, 2 and 3 (map ref. 22) drilled by the Union-Kern-A.O.G. group have^{v2} indicated another potential oil field about 50 miles south-west of the Moonie field. At Conloi No. 1 (map ref. 5), also drilled by the Union-Kern-A.O.G. group, oil has been produced at 400 barrels per day by pumping.

Queensland has been the centre of most of the discoveries but since early 1964 the area of discoveries has spread to the Northern Territory, South Australia and Western Australia.

In South Australia, Delhi Australian Petroleum Ltd., (the Australian subsidiary of the Delhi-Taylor Corp. of the U.S.A.) in association with an Australian Company, Santos Ltd., has been successful in establishing considerable reserves of gas in the Gidgealpa area (map. ref. 19) in the north east of the State. This group started its drilling programme at Innamincka No. 1 in 1959 but it was not until Gidgealpa No. 2 drilled in 1963/1964 that any significant discovery was made. Since the discovery of gas in Gidgealpa No. 2, gas has also been found in Nos. 3, 4 and 5 and a gas field with commercial potential is assumed. Feasibility and market research studies have been carried out and a gas pipe line to Adelaide with side lines to other markets is forecast.

In the Northern Territory, the Amadeus Basin has been the centre of exploration activity. At the Alice No. 1 (ref. map 11) well drilled in 1963 by Exoil N.L. for the Exoil, Austram, Farmout, Magellan group, found traces of oil in cores but testing failed to establish any flow. However, in February 1964 at Mereenie No. 1 (map ref. 12) about 140 miles south-west of Alice Springs, Exoil N.L. for the Exoil, Austram, Farmout and United Canso group discovered gas with a flow rate in excess of 11 million cubic feet per day. Unfortunately Mereenie No. 1 had to be abandoned due to mechanical difficulties. East Mereenie No. 1, 4 miles south-east of Mereenie No. 1

flowed at 30 million cubic feet per day with considerable amounts of condensate. The East Mereenie success has been continued in East Mereenie No. 2, 6 miles south east of No. 1, where gas flows in excess of 5 million cubic feet per day with some oil has also been reported. Drilling was still in progress at No. 2 at Mid October, 1964.

In Western Australia, 10 years after its initial success at Rough Range, West Australian Petroleum Pty.Ltd. has found gas at its Yardarino No. 1 (map ref. 20) about 8 miles east of Dongara, and tests indicated flow rates of from 13 to 15 million cubic feet per day. At Barrow Island No. 1 (map ref. 21) drilled on Barrow Island, 60 miles north-east of Onslow, oil of 38^d A.P.I. gravity has been produced at rates up to 985 barrels per day from the interval 6750' to 6783'. Three intervals higher up the hole produced gas at from 7 to 11 million cubic feet per day. At Barrow Island No. 2 which is still drilling, tests have indicated flow rates of 337 barrels of oil with 1.1 million cubic feet of gas per day. At Bonaparte No. 2 (map ref. 25) drilled by Alliance Oil Development N.L. in the extreme north east of the State discovered gas which tested at the rate of 1 $\frac{1}{2}$ million cubic feet per day.

Minor gas shows have been found in New South Wales in the Camden area where Camden No. 7 (map ref. 10) drilled by Australian Oil & Gas Corp. Ltd., tested at 1 million cubic feet of gas per day. This gas was mainly methane probably associated with the coal measures.

In Victoria gas and some oil shows have been found in the Port Campbell area (map ref. 9) of the Otway Basin. However, production testing has not resulted in any flows with commercial possibilities.

To encourage the search for oil in Australia and the Territory of Papua-New Guinea, the Australian Federal Government makes generous taxation provisions to oil exploration companies and investors in those companies. No differentiation is made between Australian, wholly overseas or jointly-owned companies.

The Federal Government has, since 1957, subsidised approved types of oil search activities as a further incentive for petroleum exploration by companies or individuals. The original Petroleum Search Subsidy Act which became law in 1957, covered only stratigraphic drilling. The 1959-1961 amendments to the Act increased its scope to cover stratigraphic drilling, off-structure drilling, detailed structure drilling, bore-hole surveys and

geophysical exploration employing magnetic, seismic, gravimetric or "other physical methods of obtaining information in connection with the search for petroleum in Australia." The original Act provided for a 50% subsidy on all operations other than off-structure drilling for which the subsidy was 66.2/3%. However, in the 1962-1963 Budget the rates of subsidy were reduced although the total allocation for subsidy purposes was greatly increased. This reduction in subsidy was to give the many applicants a share of the funds available. The Government then paid up to 30% of the cost on approved projects for all geophysical surveys and rotary drilling apart from off-structure drilling for which subsidy did not exceed 40%.

The Petroleum Search Subsidy Act 1959-1961 was amended in June 1964 to become the Petroleum Search Subsidy Act 1959-1964; the new Act widens the scope of "test drilling" by amending the definition to remove the requirement that a structure must be established. It also amends the definitions to combine the "stratigraphic drilling" and "off-structure drilling" of the former Act into one category of "stratigraphic drilling" which will be subsidised at relatively higher rates than "test drilling". It also extends the scheme basically along the existing lines until June, 1968; also provision is made for the introduction of off-shore operations under the Act.

Before an agreement for payment of subsidy can be negotiated, the proposed operation must be approved by the Federal Minister for National Development. If an applicant is not a resident of Australia, the Minister may decline to consider an application unless a competent resident of Australia has been appointed to act on behalf of the applicant.

In the case of drilling operations, the subsidy is repayable under certain conditions. These are :

- (i) when a well encounters quantities of hydrocarbons which in the opinion of the Minister are of commercial significance.
- (ii) In the case of a "test drilling" operation, if a subsequent test well, drilled ^{by} the same operator, on the same structure makes a commercial discovery within five years from the date of the original test drilling.

Through the Bureau of Mineral Resources, which is, of course, concerned with the full range of Australia's mineral development, quite apart for oil, the Australian Government co-operates extensively with State Government Geological Surveys, Departments of Mines and oil companies taking

part in the search for petroleum.

The Australian Government in 1960 sponsored an assessment of the oil potential of Australia by L'Institut Francais du Petrole (I.F.P.). Under a further agreement with the Government, the I.F.P. mission has remained to follow up its assessment with detailed studies of selected areas and special avenues of geophysical, petrological and photo-geological interest.

This comprehensive approach has never been attempted before in Australia, a country which has nearly 2 million square miles of sedimentary basins, the type of formation where most of the world's oil has been found. Bearing in mind the recent discoveries and the sound methods now being employed, it is to be hoped that in the not too distant future Australia may approach self sufficiency in its petroleum requirements.

