COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1972/116

PETROLEUM EXPLORATION BRANCH

SUMMARY OF ACTIVITIES

1972

(Period from 1 November, 1971 to 31 October, 1972)

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CONTENTS

SUBSURFACE SECTION

SEDIMENTARY BASINS STUDY GROUP

Staff recruitment improved over the year so that all but two positions (out of 20) are actually filled. Four bibliographies were published. The Sydney Basin review was completed during the year and the record was assembled. The Canning Basin study continued.

Summaries of oil search activities for 1968 and 1969 have been distributed as records. The group commenced compilation of a stocktake of sedimentary basins.

The Core and Cuttings Laboratory received cores and cuttings. I.K. Kraitsowits completed a draft report on the semantic system of data processing. Implementation of a well data storage and retrieval system will have to wait the results of an assessment of the overall BMR data processing requirements.

Sydney Basin

The review was completed during the year and the record was assembled.

The Sydney Basin is a 380km-long subdivision of the Tasman Geosyncline of eastern Australia containing Permian and Triassic sedimentary rocks up to 5000m thick. The sedimentary rocks were deposited in the arc-rear belt of the New England Geosyncline and overlap unconformably onto rocks of the Lachlan Geosyncline in the south. The Permian sediments consist of marine and non-marine siltstone, sandstone, shale, and coal deposited during fluctuating transgressions and regressions of the sea. Clacigene contributions occur in the lower part of the sequence and volcanogene contributions are common throughout.

The Hunter-Bowen orogenic movements, which perhaps coincided with climatic changes, terminated the great coal swamps late in the Permian. Delta deposits make up the Triassic Narrabeen and Wianamatta Groups. The intervening Hawkesbury Sandstone was deposited in tidal flats and offshore bars.

It is postulated that the present steep continental slope marks a general line of rifting in the late Mesozoic which cut obliquely across the New England Geosyncline trend and that opening of the eastern area of the Sydney Basin to the developing Tasman Sea may have been assisted by sea floor spreading.

Gaseous hydrocarbons have been found in small quantities in the Sydney Basin, but the potential reservoir rocks, where penetrated by wells, have been too impermeable to give significant production. For the same reason there are limited supplies only of underground water.

Canning Basin

Columnar sections showing basin-wide lithological correlations were revised and a time correlation chart was prepared. A summary of rock units within the basin was drafted.

Using a graph of area covered by sediment versus time, and considering this together with preliminary environments of deposition, a basin-wide subdivisio of the sequence into intervals was made. The interval boundaries are partly picked on the onshore and offshore seismic sections.

A diagram summarizing tectonic provinces within the Canning Basin has been drawn up using information from final reports of subsidized operations.

Australia and Papua New Guinea

A set of maps showing past and current drilling operations was maintained, together with an index based on the 1:250,000 Sheet area. Subsidized and unsubsidized wells are distinguished and the current status of each well indicated.

All wells and a large number of measured sections in the Carnarvon Basin have been plotted on a base map.

Summaries of oil search activities for 1968 and 1969 have been issued as Records and a summary for 1970 has been approved for final typing. A similar Record for 1971 is in preparation.

Card indexing of drilling and geophysical operations continued. Two new card index systems were instituted, one for recent references on sedimentary basins, and the other for references with special relevance to basin study work.

The group began compilation of an Australia-wide basin stocktake according to the guidelines laid down by the sedimentary supervisors sub-committee of 29 September 1971.

CORE AND CUTTINGS LABORATORY

Bureau personnel made 304 visits and representatives of 53 companies made 132 visits to the laboratory. The facilities offered in the laboratory for testing and examination of samples were used for 176 man days by company personnel and for 284 man days by Bureau personnel.

The Differential Thermal Analysis equipment was used in a kerogen identification project for the Petroleum Technology Laboratory and is currently being used in a carbonate study for the Baas Becking Laboratory.

Core boxes, sample submission forms, core bags, and pre-labelled cutting bags were forwarded to 16 BMR field parties. Operators of subsidized drilling operations were supplied with sample submission forms and 50,360 cutting bags.

10,516 core samples, 39,287 cutting samples, and 64 samples from drill stem tests were received from 218 drilling operations. 13,947 core samples (7525 feet of core) and 42,179 cutting samples (representing 407,492 feet of drilling) were registered, stored, and documented.

691 thin sections were prepared and the total number in store (5343) were registered. 3054 cuttings samples were washed.

Publications 1971/1972

MAYNE, S.J., 1972 - Bibliography of the Clarence-Moreton Basin of New South Wales and Queensland. Bur. Miner. Resour. Aust. Rep. 151

NICHOLAS, E., 1972 - Bibliography of the Bonaparte Gulf Basin, W.A. and N.T. Bur. Miner. Resour. Aust. Rep. 156.

RAINE, M.J., 1972 - Bibliography of the Canning Basin, Western Australia. Bur. Miner. Resour. Aust. Rep. 155.

RAINE, M.J., and SMITH, K.G., 1972 - Bibliography of the Perth Basin, Western Australia. Bur. Miner. Resour. Aust. Rep. 157.

Publications in press

FORMAN, D.J., and SHAW, R.D. - Deformation of the crust and mantle in central Australia. Bur. Miner. Resour. Aust. Bull. 144.

MAYNE, S.J., and RAINE, M.J., - Bibliography of the Sydney Basin. Bur. Miner. Resour. Aust. Rep. 158.

REYNOLDS, M.A. - A review of the Otway Basin. Bur. Miner. Resour. Aust. Rep. 134.

Records (unpublished)

MAYNE, S.J., NICHOLAS, EVELYN, and BIGG-WITHER, A.L., 1972 - Geology of the Sydney Basin - a review. Bur. Miner. Resour. Aust. Rec. 1972/76.

OZIMIC, S., 1971 - Well completion report, Wollongong (BMR) Nos 1, 2 and 2A wells, Sydney Basin, N.S.W. Bur. Miner. Resour. Aust. Rec. 1971/51.

SMITH, K.G., NICHOLAS, EVELYN, and RAINE, MARLENE J., 1969 - Summary of oil search activities in Australia and Papua New Guinea during 1968. Bur. Miner. Resour. Aust. Rec. 1969/153

SMITH, K.G., NICHOLAS, EVELYN, and RAINE, MARLENE, J., 1970 - Summary of oil search activities in Australia and Papua New Guinea during 1969. Bur. Miner. Resour. Aust. Rec. 1970/37.

Records (in preparation)

KRAITSOWITS, I.K., - Semantic data processing. Record for internal distribution only.

NICHOLAS, EVELYN - Summary of oil search activities in Australia and Papua New Guinea during 1970. Bur. Miner. Resour. Aust. Rec. 1971/46.

NICHOLAS, EVELYN - Summary of oil search activities in Australia and Papua New Guinea during 1971. Bur. Miner. Resour. Aust. Rec.

SUBSIDY SECTION

The processingof applications and the examination and assessment of final reports and cost statements continued.

Applications

During the year 1 November 1971 to 31 October 1972, the Subsidy Section received 97 applications for approval of operations under the Petroleum Search Subsidy Act 1959-1969. These consisted of 46 for exploration drilling operations, 48 for seismic surveys (including 2 for seismic and gravity surveys, 3 for seismic and magnetic surveys, and 1 for a seismic, gravity and magnetic survey), 2 for gravity surveys (including 1 for a gravity and magnetic survey), and 1 for an aeromagnetic survey.

Twenty-six applications were also received for approval of extensions to the programme of approved operations; 9 of these were for extensions to the approved target depths of wells and 3 were for production testing, and 14 were for extensions to the approved programmes of seismic and gravity surveys.

Approvals

The Minister approved 92 applications under the Petroleum Search Subsidy Act 1959-1969 during the year ended 31 October 1972. Thirty-nine of these were for exploration drilling operations and 53 were for geophysical surveys (see Plates 1 and 2). One application for approval of a drilling operation was withdrawn, 4 applications were refused, 1 was deferred, and the Minister had not given a decision on 6 applications. One geophysical application was withdrawn, one was refused and 3 applications for approval were pending at 31.10.72. In addition, 25 extensions to approved programmes were approved, 9 to drilling operations (including 2 for production testing), and 16 to geophysical surveys. As a result of these approvals, the amount of $9,429,161 was committed by way of subsidies under the Petroleum Search Subsidy Act during the 12 months ended 31 October 1972.

The approved geophysical operations consisted of 50 seismic surveys (including 2 seismic and gravity surveys, 4 seismic and magnetic surveys, 1 seismic, gravity and magnetic survey, and 15 marine surveys), one gravity survey, and 2 aeromagnetic surveys. Thirteen of the approved drilling operations were for offshore wells.

Expenditure

In the 12 months to 31 October 1972, a total of $8,365,427 was paid by the Commonwealth in subsidies to petroleum exploration companies under the Petroleum Search Subsidy Act 1959-1969. A breakdown of this expenditure by States and type of operation is given in Table I.

TABLE I

Expenditure under the Petroleum Search Subsidy Act 1959-1969

1 November 1971 - 31 October 1972

	Drilling Operations		Geophysical Operations		
	Onshore	Offshore	Onshore	Offshore	Total
Queensland	87,862	-	99,866	96	187,824
New South Wales	42,320	-	5,372	30,221	77,913
Victoria	28,800	-	443,610	-	472,410
Tasmania	-	185,597	9,900	16,086	211,583
South Australia	289,646	-	316,812	20,744	627,202
Western Australia	894,531	1,510,329	1,610,872	269,853	4,285,585
Northern Territory	-	85,336	140,864	56,737	282,937
Papua New Guinea	912,126	-	1,250,361	57,486	2,219,973
Total	2,255,285	1,781,262	3,877,657	451,223	8,365,427

The expenditure under the Petroleum Search Subsidy Act during the financial year ended 30 June 1972 was $7,571,800. Of this amount, $5,605,407 was paid for onshore operations and $1,966,393 for offshore operations.

At 31 October 1972, the total expenditure by the Commonwealth in petroleum search subsidies was $117,931,423 and the total commitment was $125,246,300.

Areas excluded from Subsidy

The previous practice under the PSSA whereby operations within certain defined areas around discovery wells and producing fields were excluded from subsidy was reviewed during the year and in March 1972, the Minister announced that subsidy would be paid on approved operations in these areas in future. Prior to this announcement, no additional areas had been excluded from subsidy.

Visits to Subsidised Operations

During the year ended 31 October 1972, officers of the Subsidy Section inspected 26 drilling operations, including 9 offshore wells, and 7 geophysical operations.

Features of Subsidised Exploration

The subsidy programme for the period under review showed a considerable increase in the number of drilling operations over that for the previous 12 months (39 compared with 25); the increase was in onshore areas (26 compared with 13) which was due in part to the removal of areas excluded from subsidy. The number of offshore drilling operations increased from 12 in the previous year to 13 in the current period; 10 of these operations were in waters adjacent to Western Australia.

Significant shows of hydrocarbons were recorded from 3 onshore wells and 4 offshore wells which were subsidised. Brolga No. 1, Brumby No. 1 and Burke No. 1, drilled in the Cooper Basin, South Australia, by Delhi International Oil Corporation, tested gas at rates up to 3.26 MMcf/d, 7.0 MMcf/d, and 10.4 MMcf/d respectively. Three of the offshore wells, all gas/condensate discoveries, were drilled by B.O.C. of Australia Limited in the Dampier Sub-basin in the southern part of the Northwest Shelf. Goodwyn No. 1, located on a culmination between North Rankin No. 1 and Rankin No. 1 wells, proved additional gas/condensate reserves in the Upper Triassic; on test, the well flowed gas at a rate of

11.4 MMcf/d plus 47 bbl/MMcf of condensate. Angel Nos 1 and 2 wells were drilled on the Madeleine-Dampier Trend; each well produced gas/condensate from an Upper Jurassic sandstone interval. On test, Angel No. 1 flowed gas at rates up to 13.2 MMcf/d and condensate at about 50 bbl/MMcf. Angel No. 2, 5 miles northeast of No. 1 well, tested gas at rates up to 12.1 MMcf/d with a gas/condensate ratio similar to No. 1 Well. The fourth offshore well, Cobia No. 1, drilled by Esso Exploration and Production Australia, Inc., in the Gippsland Basin, reported oil shows and is considered a potential oil producer. Many of the subsidised wells, both onshore and offshore, made significant contributions to our knowledge of Australian stratigraphy.

Compared with the previous year, the number of subsidised seismic surveys both onshore and offshore increased during the 12 months ended 31 October 1972 (50 against 38). Thirty-five of these approvals were for land surveys and 15 were for marine operations (27 and 11 respectively in the previous year). Most of the geophysical activity was again in the Northwest Shelf area, the onshore Canning Basin, the onshore Otway Basin, and in Papua New Guinea, but there were also a number of surveys in the Cooper and Perth Basins. The largest marine seismic surveys completed during the year were B.O.C.'s Monte Bello-Turtle survey of 1704 miles and the Browse Basin survey of 1464 miles; both these surveys were off the northwestern coast of Australia.

There were no significant developments in geophysical techniques employed during the year. However, extensive land seismic surveys in Western Papua using modern equipment and methods achieved a notable improvement in the quality of land seismic results for that region. A new Australian-built seismic survey ship, Geophysical Service International's 890-ton "Eugene McDermott 2" was launched in November 1971, and carried out its first survey in the Browse Basin for B.O.C. in February-March, 1972.

Use of Subsidy Reports

During the past year there has been a steady increase in the number of visitors and Bureau officers using subsidy reports and requesting information generally on petroleum exploration in Australia, with the main interest being shown in the Northwest Shelf and onshore and offshore Papua New Guinea.

Publications

Six reports on nine subsidised operations are in press. Two other reports previously submitted for publication have been withdrawn for revision.

AUSTRALIA AND PAPUA NEW GUINEA

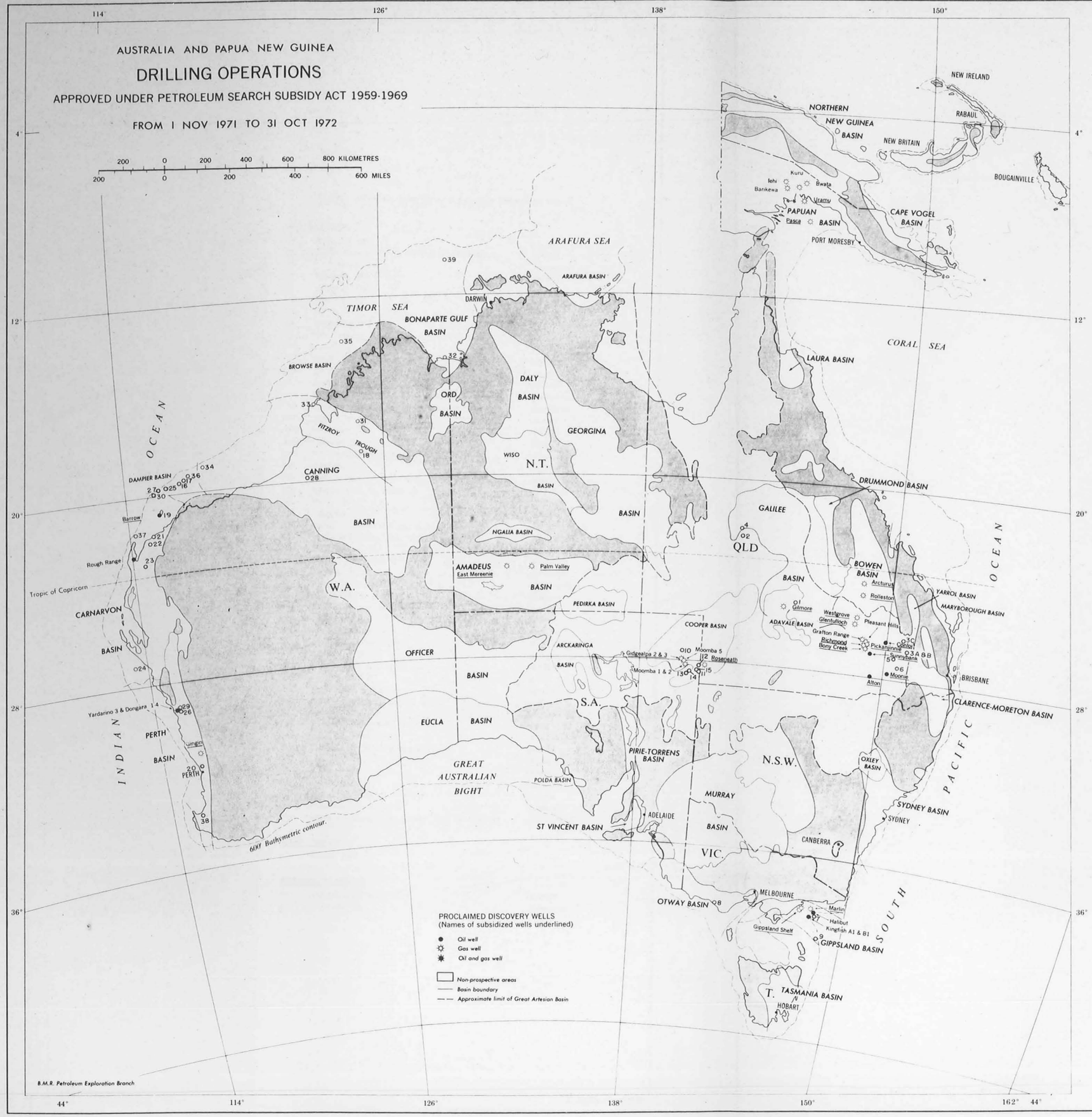
DRILLING OPERATIONS

APPROVED UNDER PETROLEUM SEARCH SUBSIDY ACT 1959-1969

FROM 1 NOV 1971 TO 31 OCT 1972

200 0 200 400 600 800 KILOMETRES

200 0 200 400 600 MILES



PROCLAIMED DISCOVERY WELLS
(Names of subsidized wells underlined)

- Oil well
- Gas well
- Oil and gas well

Non-prospective areas
Basin boundary
Approximate limit of Great Artesian Basin

B.M.R. Petroleum Exploration Branch

Note: Unless otherwise stated, well location refers to No. 1 well.

* Offshore operations under terms of Petroleum (Submerged Lands) Act 1967 - 1968.

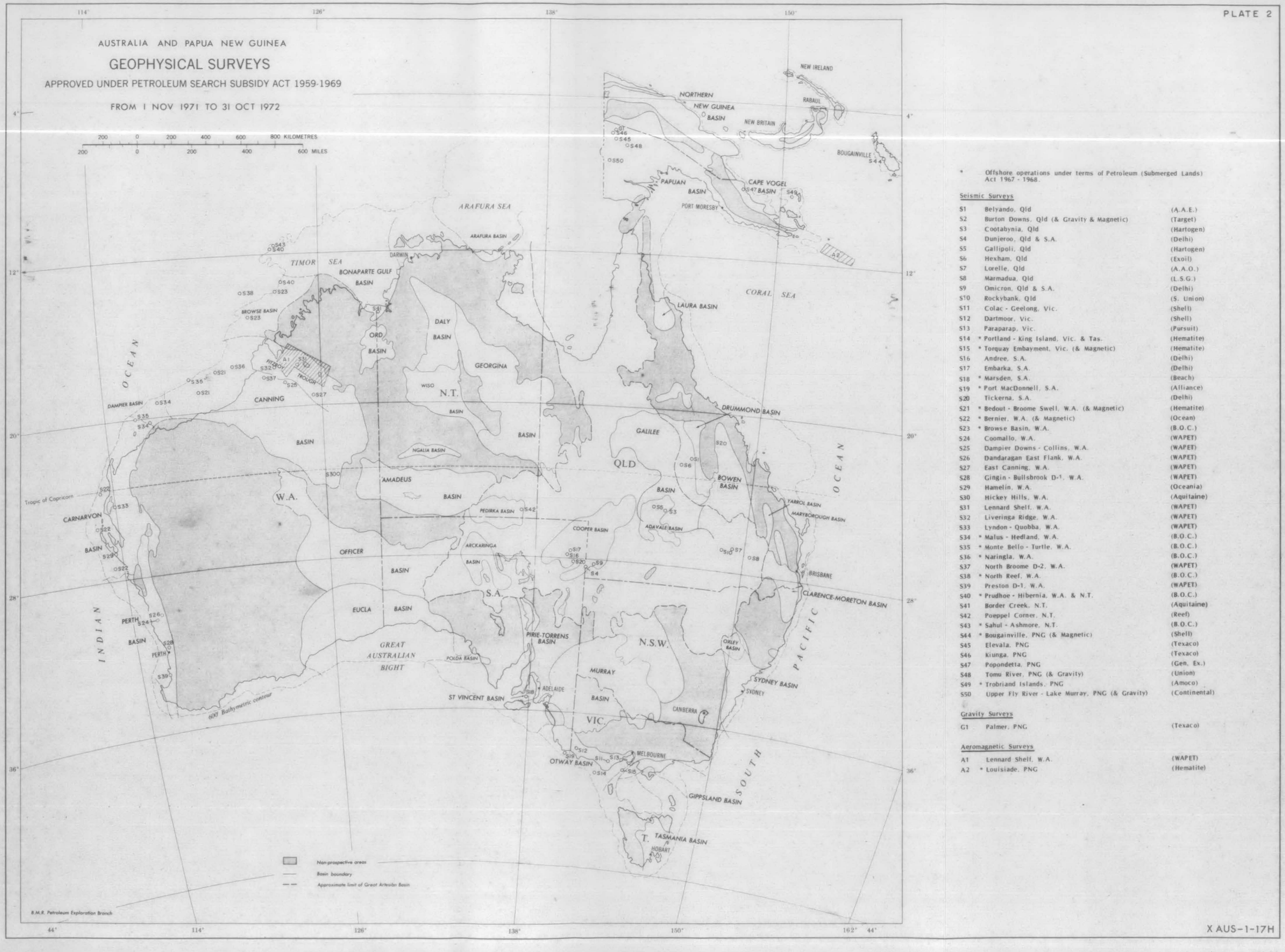
1	Alva, Qld	(Hartogen)
2	Goleburra, Qld	(Hematite)
3	Jandowae Project, Qld	(Target)
	A. Jandowae South	
	B. Jandowae West	
	C. Stockyard Creek	
4	Lovelle Downs, Qld	(Hematite)
5	Rockwood, Qld	(L.S.G.)
6	Sawpit Gully, Qld	(L.S.G.)
7	* Cobia, Vic.	(Esso)
8	Rowans, Vic.	(Shell)
9	* Sailfish, Tas.	(N.S.W.O.G.)
10	Brolga, S.A.	(Delhi)
11	Brumby, S.A.	(Delhi)
12	Burke, S.A.	(Delhi)
13	Murteree A, S.A.	(Delhi)
14	Murteree C, S.A.	(Delhi)
15	Toolachee East, S.A.	(Delhi)
16	* Angel No. 1, W.A.	(B.O.C.)
17	* Angel No. 2, W.A.	(B.O.C.)
18	Barbwire, W.A.	(WAPET)
19	Barrow Deep, W.A.	(WAPET)
20	Bullsbrook, W.A.	(WAPET)
21	Cane River, W.A.	(Hematite)
22	Cunaloo, W.A.	(WAPET)
23	East Marrilla, W.A.	(WAPET)
24	* Edel, W.A.	(Ocean)
25	* Goodwyn, W.A.	(B.O.C.)
26	Heaton, W.A.	(Abrolhos)
27	* Malus, W.A.	(B.O.C.)
28	Munro, W.A.	(WAPET)
29	Narlingue, W.A.	(Abrolhos)
30	* North Tryal Rocks, W.A.	(WAPET)
31	Palm Spring, W.A.	(WAPET)
32	Pelican Island, W.A.	(Arco)
33	Pender, W.A.	(WAPET)
34	* Picard, W.A.	(B.O.C.)
35	* Rob Roy, W.A.	(B.O.C.)
36	* Sable, W.A.	(B.O.C.)
37	* West Muiron, W.A.	(WAPET)
38	Wonnerup, W.A.	(Union)
39	* Heron, N.T.	(Arco)

AUSTRALIA AND PAPUA NEW GUINEA

GEOPHYSICAL SURVEYS

APPROVED UNDER PETROLEUM SEARCH SUBSIDY ACT 1959-1969

FROM 1 NOV 1971 TO 31 OCT 1972



* Offshore operations under terms of Petroleum (Submerged Lands) Act 1967 - 1968.

Seismic Surveys

S1	Belyando, Qld	(A.A.E.)
S2	Burton Downs, Qld (& Gravity & Magnetic)	(Target)
S3	Cootabynia, Qld	(Hartogen)
S4	Dunjeroo, Qld & S.A.	(Delhi)
S5	Gallipoli, Qld	(Hartogen)
S6	Hexham, Qld	(Exoil)
S7	Lorelle, Qld	(A.A.O.)
S8	Marmadua, Qld	(L.S.G.)
S9	Omicron, Qld & S.A.	(Delhi)
S10	Rockybank, Qld	(S. Union)
S11	Colac - Geelong, Vic.	(Shell)
S12	Dartmoor, Vic.	(Shell)
S13	Paraparap, Vic.	(Pursuit)
S14	* Portland - King Island, Vic. & Tas.	(Hematite)
S15	* Torquay Embayment, Vic. (& Magnetic)	(Hematite)
S16	Andree, S.A.	(Delhi)
S17	Embarka, S.A.	(Delhi)
S18	* Marsden, S.A.	(Beach)
S19	* Port MacDonnell, S.A.	(Alliance)
S20	Tickerna, S.A.	(Delhi)
S21	* Bedout - Broome Swell, W.A. (& Magnetic)	(Hematite)
S22	* Bernier, W.A. (& Magnetic)	(Ocean)
S23	* Browse Basin, W.A.	(B.O.C.)
S24	Coomallo, W.A.	(WAPET)
S25	Dampier Downs - Collins, W.A.	(WAPET)
S26	Dandaragan East Flank, W.A.	(WAPET)
S27	East Canning, W.A.	(WAPET)
S28	Gingin - Bullsbrook D-1, W.A.	(WAPET)
S29	Hamelin, W.A.	(Oceania)
S30	Hickey Hills, W.A.	(Aquitaine)
S31	Lennard Shelf, W.A.	(WAPET)
S32	Liveringa Ridge, W.A.	(WAPET)
S33	Lyndon - Quobba, W.A.	(WAPET)
S34	* Malus - Hedland, W.A.	(B.O.C.)
S35	* Monte Bello - Turtle, W.A.	(B.O.C.)
S36	* Naringla, W.A.	(B.O.C.)
S37	North Broome D-2, W.A.	(WAPET)
S38	* North Reef, W.A.	(B.O.C.)
S39	Preston D-1, W.A.	(WAPET)
S40	* Prudhoe - Hibernia, W.A. & N.T.	(B.O.C.)
S41	Border Creek, N.T.	(Aquitaine)
S42	Poeppel Corner, N.T.	(Reef)
S43	* Sahul - Ashmore, N.T.	(B.O.C.)
S44	* Bougainville, PNG (& Magnetic)	(Shell)
S45	Elevala, PNG	(Texaco)
S46	Kiunga, PNG	(Texaco)
S47	Popondetta, PNG	(Gen. Ex.)
S48	Tomu River, PNG (& Gravity)	(Union)
S49	* Trobriand Islands, PNG	(Amoco)
S50	Upper Fly River - Lake Murray, PNG (& Gravity)	(Continental)

Gravity Surveys

G1	Palmer, PNG	(Texaco)

Aeromagnetic Surveys

A1	Lennard Shelf, W.A.	(WAPET)
A2	* Louisiade, PNG	(Hematite)