DEPARTMENT OF MINERALS AND ENERGY

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1975/20

LONG-TERM PROGRAM PROPOSALS FOR LAND SEISMIC INVESTIGATIONS BY BMR

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SUMMARY

In the past, the Bureau of Mineral Resources (BMR) has carried out reconnaissance seismic surveys in most of the Australian sedimentary basins and thereby provided leads for detailed prospecting for petroleum by private industry. As most of the reconnaissance coverage has now been completed, BMR's future land seismic program should be oriented towards somewhat more detailed, but still fundamental, investigations to obtain reliable information in the deeper parts of the basins and in areas of poor record quality.

To determine areas where further seismic surveys by BMR could fill gaps in geological knowledge, a preliminary review was made of the existing geological information and the results from BMR and government-subsidized seismic surveys in all sedimentary basins. The review indicates that the greatest need for detailed surveys is in eastern Australia, mainly in the area covered by the Great Artesian Basin sediments where the underlying basin margins are generally obscure and the deeper basins, though prospective, have not been adequately mapped. The need in the western part of Australia seems to be of lower priority since the private companies are still carrying out active exploration in the more prospective areas. Seismic surveys are also required for reconnaissance in the few unexplored basins and for investigating the basic structure and tectonics of the continent.

On the basis of recent reviews and current geological mapping projects, it is recommended that in the period 1975-80 detailed seismic surveys be carried out to investigate the deeper sediments in: the Laura Basin; the western, southwestern, and eastern margins of the Galilee Basin; the northern extensions of the Adavale and Cooper Basins; and between the Canning and Officer Basins. Reconnaissance surveys should be carried out in the Georgina and Wiso Basins. Additional recommendations for future programs will be made after detailed reviews of the existing information in the other basin areas.

It is suggested that BMR should operate one seismic field party for eight months every year mainly for detailed and experimental investigations, and should use the services of a contract crew for routine surveys. For this program to be effective, it will be necessary to upgrade the capabilities of the seismic group by acquiring facilities for digital recording and processing. Furthermore, it will be necessary to recruit or train personnel for carrying out the specialized tasks of operating and maintaining digital equipment, of processing the field data, and of integrating interpretations of geological and geophysical information.

INTRODUCTION

The Bureau of Mineral Resources (BMR) has carried out seismic surveys since the late 1940s and has pioneered the use of the seismic method in reconnaissance surveys in most Australian sedimentary basins. It was particularly active during the 1960s, when it fielded two seismic parties concurrently over a number of years and hired contractors using special equipment and techniques for two major surveys (CGG, 1974b; SSL, 1965). Petroleum exploration companies were also particularly active during the 1960s, when they carried out a large number of seismic surveys, most of which were subsidized by the Government under the Petroleum Search Subsidy Acts 1957-58, 1959-67. In some instances company surveys followed leads by BMR work. BMR seismic parties have also made detailed surveys to delineate particular structures, and experimental surveys in attempts to improve the quality of previous seismic results (see Table 1 for examples).

In the 1970s, the level of seismic investigations on land in Australia by both BMR and private industry has decreased, despite the worldwide energy crisis and the previous successes in finding oil and gas in a number of basins. The decline in BMR land seismic investigations has been caused by a number of factors. These include: the increase in marine geophysical survey activity, particularly the 'Continental Margin Survey' (CGG, 1974a), which required secondments of staff from the land seismic survey activities; loss of experienced seismic staff to industry and to other areas of BMR; and the lack of firm, well supported seismic program proposals.

Previous seismic programs

In the past a considerable number of seismic program proposals have originated within BMR's seismic group, where geophysicists have researched the need for seismic surveys. These have often been planned on an ad hoc basis to assist in mapping projects or to improve the quality of seismic results in particular areas by using new equipment and techniques. Some proposals have been received from Mines Departments in the States, from semi-governmental authorities, and from industry to investigate particular problems relating to geological structures or seismic results obtained previously. Special investigations have also been undertaken, e.g. the joint BMR/USGS studies of the Gosses Bluff Astrobleme (Brown, 1973) and the Upper Mantle Project involving a deep crustal seismic survey on the 'Geotraverse' (Mathur, Moss, & Branson, in prep.).

A large number of seismic surveys have been proposed by the Geological Branch to assist in mapping projects and particular studies in some sedimentary basins. These proposals resulted in surveys in the Amadeus, Canning, Carnarvon, Carpentaria, Murray, Ngalia, Perth, Otway, Sydney, and other basins. Unfortunately, it has not always been possible to work very closely

with geological co-workers on these projects up to the reporting stage. This was particularly so up to 1966 when the Geological Branch was based in Canberra and the Geophysical Branch in Melbourne. More recently, the degree of direct co-operation has increased significantly as both geologists and geophysicists have been involved in joint studies of several basins, e.g. Ngalia and Eromanga Basins. A list of all BMR surveys, objectives, and results is given in Table 1.

An effort was made some time ago to rationalize proposals for seismic projects by arranging for the geophysicists and geologists involved in formulating the BMR sedimentary basins program to submit recommendations for seismic work. These proposals are listed in Table 2. Despite the large number of recommendations made it has been difficult to formulate a firm program for seismic field activities from these items. Some seismic projects proposed appear to be mainly of academic interest, with little if any possibility of economic spin-off, and some surveys are very difficult to justify against other priorities in the Seismic, Gravity and Marine Section. In some instances it is difficult to see how seismic surveys can assist in solving the problems. Nevertheless, some proposals have considerable merit and are considered to be sufficient to justify seismic surveys over eight-month field seasons for the next few years. These proposals are examined further in formulating future seismic survey programs.

Future seismic programs

There is a clear need to study the requirements for seismic surveys on an Australia-wide basis and to put forward firm recommendations for surveys so that priorities can be established. Proposals for seismic programs must be closely related to BMR's general long-term program, particularly in studies relating to basic geological mapping projects and more detailed sedimentary basin studies directed towards assisting in petroleum search.

Because most basins have been explored by companies and BMR, there is less need now for major reconnaissance seismic surveys in sedimentary basins. There are a few exceptions, such as the Wiso Basin, where reconnaissance surveys are still required to provide information on the structures of particular basins, and others where seismic information is required to assist in the interpretation of regional geophysical information including reconnaissance gravity data.

The seismic method is now capable, because of improved recording and processing techniques, of providing better resolution of geological structures at considerable depths than that obtained in earlier reconnaissance surveys. It is also capable

of providing information to assist in stratigraphic and lithologic studies, not only structural information as was usual in the past. Future surveys should therefore aim at providing such information in deep and underlying basins.

PROPOSED LONG-TERM SEISMIC PROGRAM

As in the past, the objective of the BMR seismic program should include two basic types of studies: (1) fundamental investigations of sedimentary basin areas to assist in petroleum search, and (2) investigation of special geological and geophysical problems. Both kinds of studies require the integration of geological and geophysical programs within the Bureau and where possible with those of the States Mines Departments. In addition, the program should include research and development projects, especially to adapt new techniques and instruments and to refine existing methods for meeting the BMR survey objectives.

Investigation of sedimentary basin areas

In order to assess the work that has been done and will be required in these areas, a brief review of the existing geological and geophysical information in all major sedimentary basins in Australia was made. The information for this preliminary review was obtained from a number of sources including:

- Summary of sedimentary basins in Australia and Papua New Guinea, 1973 (Bur. Miner. Resour. Aust. Rec. 1973/98)
- BMR Pictorial Index of Activities (1973)
- BMR seismic survey reports
- Petroleum Search Subsidy Acts reports
- Discussions with geologists and geophysicists in BMR and in some State Mines Departments.

The main objective of the review was to determine the deficiencies in geological knowledge of the areas where further seismic surveys can assist in providing the required information and to determine the nature of seismic techniques required for such surveys.

The results of the review for each basin are presented in a standard format (Appendix 1) devised for the purpose of summarizing the basic information and conclusions under relevant headings. The past seismic exploration activity in each basin has been described in terms of:

- the density of surveys in the area; poor for 1-3 surveys, fair for 3-5 surveys, and good for more than 5 surveys per 10 000 km^2;
- the nature of techniques used; light for single, moderate for 2-fold to 6-fold, and heavy for more than 6-fold reflection coverage; and
- the quality for reflections obtained; poor, fair, and good.

The last two items of the format define broadly for each basin the nature of problems remaining to be solved and the nature of seismic surveys required to assist in their solution. For quick reference, this information is listed in Table 3. Generally the reconnaissance surveys would require light to moderate, and the detailed work moderate to heavy seismic techniques. The areas and the nature of the required investigations are also outlined in Plate 1. These proposals are aimed to provide basic information for the basin areas and to encourage or revitalize interest for detailed petroleum exploration by the private companies. Such projects would require close cooperation and joint planning with the Geological Branch.

The priorities for these projects would depend on the progress of the geological mapping and the petroleum prospectivity of the basins. A clear need exists for detailed seismic surveys in the area covered by the post-Jurassic Great Artesian Basin sediments, i.e. in the Adavale, Cooper, Galilee, Pedirka, and Georgina Basins, where the basin margins are obscure and the deeper sediments are not adequately mapped. Reconnaissance surveys in the Canning, Wiso, and Georgina Basins would have a high priority as geological mapping there is in progress. Areas where geological mapping is in progress or planned for 1975-76 are shown in Plate 2.

Special investigations

The investigation of special geological and geophysical problems will mostly but not always be related to the search for petroleum. They can be broadly grouped into:

Geophysical problems: Experimental surveys to devise improved seismic techniques to obtain better information than presently available from below masking layers in basin areas, such as: basalt-covered areas in the Otway Basin; limestone-covered areas in the Perth Basin; coal measures in the Sydney and Galilee Basins; sand-covered areas in the Officer Basin. Such areas are marked E in Plate 1.

Geological structural problems: (1) Investigation of deep crustal and upper mantle structure for an understanding of the tectonic environment and evolutionary history of the sedimen-

tary and metamorphic rock areas, such as the proposal for deep seismic sounding in central Australia (Mathur, 1974). (2) Investigation of special structures, such as impact craters (e.g., Wolf Creek) and other unusual features.

Some of these areas are marked S in Plate 1.

Research and development

Projects of a research and development nature should also be included in the program of the Seismic Group. The objectives would be mainly to adapt new instruments and techniques already in use elsewhere with modifications where necessary to meet the requirements of the BMR investigations. These programs would require the familiarization and training of BMR seismic personnel in the latest developments in equipment and techniques. Such projects may include:

- developments in recording and processing equipment, testing of the equipment on hand for control on desired specifications, determination of the actual response of the various components in different combination and field conditions;
- developments of new sources;
- methods of extracting more stratigraphic information from the reflection/refraction data, e.g., bright spots, reflections from oil/gas and water/gas interfaces; and
- developments in the use of non-conventional S or Rayleigh waves to obtain more information about the sedimentary section.

IMPLEMENTATION OF THE PROGRAM

In the types of survey outlined above, such as the obtaining of more reliable and detailed information at basin margins, the improvement of data in difficult areas, and methods of extracting more stratigraphic information from the seismic data, it will be necessary to obtain the best data quality possible by employing the best equipment available, using modern facilities for digital data processing and interpretation, and providing adequately trained personnel to carry out the program.

Further studies and analyses will be made on the advantages and disadvantages of the BMR teams carrying out their own surveys as opposed to having all surveys done under contract, but for the purposes of this report it is proposed that BMR should operate one field party of its own for periods of up to 8 months

in a year and use the services of a contract field crew when necessary. The BMR party should undertake those surveys which require major experimentation for finding the optimum recording and processing techniques for the particular problem at hand. Normal routine operations, including specialized but standard techniques, can be contracted to geophysical contractors.

For BMR to make a significant contribution towards the search for petroleum in Australia, the technical capabilities of the Seismic Group would need to be upgraded to match those of the petroleum industry in general. It will be necessary to meet the following requirements for equipment and personnel.

Equipment requirements

For the accurate recording of seismic signals for the purpose of digital data enhancement as discussed above, it is necessary that BMR acquire a seismic digital recording system, such as the Texas Instruments DFS IV System, which has been in field use by the seismic industry for the last five years.

Later it will probably be necessary to use a controlled non-explosive source of seismic energy, such as Dinoseis, Vibroseis, or Thumper. These have proven to be not only economical in comparison to explosives but also to provide more flexibility in operations, to produce seismic results of better quality in many cases, and to cause less environmental damage.

The present analogue recording equipment can still be used in reconnaissance surveys, in the more simple areas, and as an adjunct to the digital recording equipment.

BMR has in recent years made use of contract digital processing facilities to take advantage of seismic data processing techniques which are available only with the use of digital computers. Consequent on acquiring digital recording equipment, it will be necessary to have a means of processing the data digitally. This could be accomplished in any of the following ways:

- all processing to be done by a geophysical contractor;
- acquisition of a digital data processing system, such as TIMAP or COMMAND;
- Hire/purchase of a package of data processing programs and use of Cyber 76, HP 2100, and HP 2116B computers to carry out the processing.

If all processing were done digitally then the present analogue playback system could be used to display processed sections. A digital-to-analogue converter would be required to

produce analogue tapes for the playback unit from the processed digital tapes.

Further studies, recommendations, and submissions will be made on future equipment requirements and mode of operations.

Personnel requirements

Future seismic projects will require new and more sophisticated skills in the various aspects of seismic exploration, and the Seismic Group must include personnel qualified and trained for the special tasks such as:

1. Geophysicist/Geologist - geophysicist with a good understanding of geology and structure for interpretation, review, and assessment of seismic as well as gravity and magnetic data;

2. Geophysicist/Electronics Engineer - geophysicist with a good understanding of seismic equipment, digital systems, equipment procedures, etc.;

3. Geophysicist/Programmer - geophysicist with an intimate knowledge of seismic programs and computer procedures for digital processing of data;

4. Technical Officers - to be trained in the operation and maintenance of digital equipment;

5. Party Manager - to relieve Geophysicist/Party Leader of routine management of field party; a special position requiring suitable experience and background to make an effective Camp Manager.

For the existing staff to achieve readily the new skills required and to have existing skills enhanced, it will be necessary to get assistance in their training. This can be done by sending officers on courses, but probably better by engaging specialists to provide training at BMR. For (1) above, the training can be best achieved by continuing integrated projects and studies with the geologists, and for (2) and (3) by engaging specialists to provide internal courses, instruction manuals, etc.

CONCLUSIONS

From the preliminary review of the seismic coverage throughout Australia a need for further seismic surveys is indicated in most sedimentary basins. These surveys will provide: ties between existing surveys and to basin margins for integrated interpretation and mapping on a regional basis; more reliable information on the deeper sediments; and, in some cases, reliable basic information using improved techniques presently available.

There are obvious needs for seismic surveys in eastern Australia, mainly in the area covered by the post-Jurassic Great Artesian Basin sediments. Here are a number of basins where the margins are generally obscured and the deeper basins, although prospective, have not been adequately mapped. The need for further surveys in western Australia may be of lower priority as private companies are still carrying out active exploration programs in most of the more prospective areas; nevertheless these will require further consideration in detailed long-term seismic program formulation.

On the basis of the detailed reviews and the geological mapping projects, recently completed or currently under way, the following areas are tentatively recommended for investigation by seismic surveys in the near future (1975-77):

- Carpentaria area: Laura Basin where a review (Pinchin, 1973) indicates the possibility of a thick prospective Permo-Carboniferous section;
- Galilee Basin:
  a) Western margin near Hughenden where a steep margin to a Lower Permian to Upper Carboniferous trough, with possible structural and stratigraphic traps, is suggested (Vine, pers. comm.);
  b) Cork Fault area - a thickening and deepening of pre-Eromanga sequence (Permian-Carboniferous) to the west of the fault is suggested (Senior & Harrison, in prep.);
  c) Eastern margin - a thickening of the Devonian sequence towards the north is suggested by American Australian Energy Ltd (AAE, 1972);
- Adavale Basin: Possible extension of Adavale Basin sediments to the north under the Galilee Basin;
- Cooper Basin: Possible extension of the Cooper Basin to the north towards the Galilee Basin;

- Wiso Basin: Reconnaissance surveys to assist in geological mapping of the basin area;
- Georgina Basin: Reconnaissance surveys to assist in geological mapping and possible investigation of the southern and southeastern margins;
- Canning Basin: Investigation of the relation with the Officer Basin and of the evaporites in the general area.

Additional recommendations for the long-term future programs will be made after more detailed reviews of the existing geological and geophysical information have been completed. These will be necessary to define clearly the areas to be surveyed, the objectives of the survey, and the techniques to be used.

To achieve the main objective of the future seismic program, viz., to obtain more reliable and detailed information on sediments and structures in deeper parts of the basins and in areas of poor record quality, it will be necessary for BMR to upgrade its seismic exploration facilities by acquiring digital recording and processing equipment, and adequately trained personnel for efficient operation of the program.

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APPENDIX 1 - SUMMARY OF GEOLOGICAL AND GEOPHYSICAL INFORMATION FOR ALL MAJOR BASINS IN AUSTRALIA

Basin:	ADAVALE BASIN
Location:	Central Qld
Area:	60 000 km^2
Sediments:	Up to 6000 m of L. to U. Devonian sediments
Basement/underlying basin:	Granite, basalt, indurated sediments, and metamorphics
Surrounding basins/areas:	Overlain by Galilee and Eromanga Basins; Cooper Basin to W
Drilling activities:	24 exploratory wells since 1961 (deepest 4420 m), mostly in the central part with thick Eromanga & Galilee sediments
Petroleum prospects:	Gas discovered in 1964 in Middle Devonian sandstone and structural trap
Deficiency in geological knowledge:	Geology of N extension poorly known; shape of salt diapirs poorly known
Most recent geophysical surveys:	3 seismic surveys during 1971-73
Magnetic/gravity coverage/ problems:	Regional gravity and magnetic coverage complete; magnetics defined broad structure; gravity related to basin sediments and margins

Seismic surveys

Coverage:	Good
Techniques used:	Light to moderate
Quality of data obtained:	Good for shallow depths, poor for deeper information
Problems defined:	Investigation of NE extension of the basin and possible connexion with Drummond Basin; poor data from Devonian section; investigation of evaporites
Recommendations:	Use of heavy recording techniques for investigating deeper section and extension of the basin to NE.

Basin:	AMADEUS BASIN
Location:	N.T. and W.A.
Area:	About 145 000 km^2
Sediments:	Up to 9000 m of Adelaidean, Cambrian, Ordovician, ?Silurian, Devonian, and ?Carboniferous
Basement/underlying basin:	Basement of Precambrian igneous and metamorphic rocks older than Adelaidean Heavitree Quartzite
Surrounding basins/areas:	Basement rocks to N and S, Canning Basin to W and NW, Eromanga Basin to E
Drilling activities:	24 petroleum exploration wells to 1970, mostly in N part; several stratigraphic bores
Petroleum prospects:	2 gas fields in Cambrian/Ordovician sandstone anticlines; fault and stratigraphic traps possibilities; main potential in central-N and in E (at junction with Eromanga).
Deficiency in geological knowledge:	Extensions on W, NW, and SE; nature and structure of N and S margins
Most recent geophysical surveys:	1 seismic and 1 gravity in 1973 to detail structural leads in the central part
Magnetic/gravity coverage/ problems:	Regional magnetic/gravity coverage complete; magnetics outline general shape, major gravity features related to deep structure in the crust and upper mantle
Seismic surveys	
Coverage:	Good in central and N parts, sparse in E and SE, none in W
Techniques used:	Mostly light to moderate, heavy in 1973
Quality of data obtained:	Generally good in N and central part, poor in the SE
Problems defined:	Poor coverage and poor quality data in SE and E, no coverage in W; general nature and structure of sediments in the S and SE, extensions under the Canning and Eromanga Basins, structure of the N and S margins and deep in the crust and upper mantle unknown

Recommendations: Use of moderate to heavy techniques for exploration of the areas in S and SE, and the basin extensions under Canning and Eromanga Basins; deep seismic sounding tests along the N and S margins

Basin:	ARCKARINGA BASIN
Location:	Central S.A.
Area	About 64 000 km^2
Sediments:	At least 1520 m of U. Carboniferous and L. Permian sediments; possibly some Devonian evaporites
Basement/underlying basin:	Partly overlies Officer and Warburton Basins; otherwise overlies Precambrian basement
Surrounding basins/areas:	Precambrian rocks to the E, S, and SW; Warburton Basin to N; Officer Basin to W. Overlain mainly by Mesozoic and Cainozoic (Eromanga Basin)
Drilling activities:	One petroleum exploration well, one mineral exploration well (1970); 6 stratigraphic wells to 1970 (most to basement). Valuable stratigraphically
Petroleum prospects:	Generally low; no hydrocarbon shows from wells; potential source and reservoir beds present; structural traps present
Deficiency in geological knowledge:	W part of the basin not well known; nature of margins poorly known
Most recent geophysical surveys:	Seismic surveys mainly by SADM (1961 to 1973). Gravity surveys to 1972
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete. Gravity data of value around margins and in troughs; magnetic data useful in centre of basin (underlain by Gawler Block), but not in E and W (underlain by sediments)

Seismic surveys

Coverage:	Fair
Techniques used:	Light
Quality of data obtained:	Fair to poor
Problems defined:	Exact boundaries of basin have not been established; relation with E Officer Basin uncertain

Recommendations: Use of moderate to heavy techniques on W, SW, and SE margins of basin to obtain more information on limits of basin and interrelation with Officer Basin

Basin:	ARROWIE BASIN
Location:	E central S.A.
Area:	About 45 000 km^2
Sediments:	Up to 6000 m of Cambrian sediments
Basement/underlying basin:	Adelaidean Pound Quartzite and older Adelaidean sediments
Surrounding basins/areas:	Eromanga Basin to E, Pirie-Torrens Basin to W, Adelaidean sediments to N and S
Drilling activities:	34 petroleum exploration wells (to 1968) - indicate age and lithology of concealed sediments
Petroleum prospects:	Traces of hydrocarbons recorded; source and reservoir rocks present in Lower Cambrian; small traps present
Deficiency in geological knowledge:	Lithology and correlation in W part least known
Most recent geophysical surveys:	Seismic surveys conducted in E and W parts of basin by SADM from 1964 to 1966; Seismic and gravity surveys in 1966 and 1969
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete - gravity useful in unexposed E part of basin; Magnetic data is of little value, because magnetic basement different from economic basement
Seismic surveys	
Coverage:	Fair in E, sparse in W
Techniques used:	Light
Quality of data obtained:	Poor to fair
Problems defined:	Basin margins not well defined, especially in W
Recommendations:	Use of moderate to heavy techniques to investigate the structure and thickness of prospective Cambrian sediments near the E and W margins

Basin:	BANCANNIA TROUGH
Location:	NE N.S.W.
Area:	9600 km^2
Sediments:	Up to 4500 m of Cambrian, Ordovician, and Devonian sediments
Basement/underlying basin:	Precambrian sediments
Surrounding basins/areas:	Wonaminta Block to E; Precambrian to W; overlain by Eromanga Basin in N and Murray Basin in S
Drilling activities:	5 petroleum exploration wells (to 1970) - yielded stratigraphic information on Devonian sediments
Petroleum prospects:	No hydrocarbon shows to date (in Devonian); potential of Cambrian and Ordovician sequences unknown
Deficiency in geological knowledge:	Full extent of trough sediments beneath Eromanga and Murray Basins unknown; nature of subsurface sequence has yet to be defined
Most recent geophysical surveys:	Seismic surveys: 1 in 1973, 2 in 1969. Two gravity surveys (1966-67); one aeromagnetic survey (1964)
Magnetic/gravity coverage/ problems:	Recent regional gravity coverage by BMR; magnetic coverage sparse
Seismic surveys	
Coverage:	Fair throughout trough
Techniques used:	Light to moderate
Quality of data obtained:	Fair
Problems defined:	Total thickness of Devonian sediments and nature of Cambrian and Ordovician sequences in the subsurface yet to be defined; full extent of trough sediments beneath Eromanga and Murray Basins unknown
Recommendations:	Further work using moderate to heavy techniques to investigate nature, thickness, and extent of the sediments

Basin:	BONAPARTE GULF BASIN
Location:	W.A., N.T., Ashmore and Cartier Islands, a small part in Indonesia
Area:	About 18 000 km^2 onshore and 245 000 km^2 offshore
Sediments:	About 17 000 m of Cambrian, Ordovician, Devonian, Carboniferous, Permian, Mesozoic and Cainozoic; salt domes offshore, possibilities onshore
Basement/underlying basin:	Precambrian igneous and metamorphic rocks
Surrounding basins/areas:	Browse Basin and Proterozoic Kimberley Basin to SW, Precambrian rocks to SE, Money Shoal Basin to NE
Drilling activities:	29 petroleum exploration wells (to 1972)
Petroleum prospects:	Shows in L. Carboniferous and Permian; potential moderate to high
Deficiency in geological knowledge:	Lack of a recent basin wide comprehensive study
Most recent geophysical surveys:	2 seismic in 1972-73
Magnetic/gravity coverage/ problems:	Aeromagnetic coverage partly complete; at places magnetic basement different from economic basement; regional gravity coverage complete, helpful in reconnaissance, particularly offshore
Seismic surveys	
Coverage:	Good
Techniques used:	Light to heavy
Quality of data obtained:	Poor to fair
Problems defined:	Absorption of energy by surface sand; Exploration activity adequate
Recommendations:	Investigation of possible salt domes onshore

Basin:	BOWEN BASIN
Location:	Qld and N.S.W.
Area:	About 158 000 km^2
Sediments:	Up to 11 300 m of Permian and Triassic
Basement/underlying basin:	Sediments and volcanics of Drummond Basin in N, heterogeneous rocks of Lachlan and New England Geosynclines
Surrounding basins/areas:	Drummond Basin and Anakie High to NW; Connors and Auburn Arches to NE; Galilee Basin and New England Geosyncline to W, Sydney Basin to SE
Drilling activities:	More than 32 petroleum exploration wells drilled in the exposed part; most of those drilled in Surat Basin also penetrated Bowen Basin
Petroleum prospects:	Source and reservoir rocks and structure suitable in some areas, mainly in the southern part; minor discoveries of petroleum
Deficiency in geological knowledge:	Detailed geological history not known
Most recent geophysical surveys:	4 seismic in 1973-74; activity adequate in S part
Magnetic/gravity coverage/ problems:	Aeromagnetic coverage mostly complete; regional gravity complete; magnetic and gravity defined structural units, and basement depths
Seismic surveys	
Coverage:	Fair to good in S, poor in N
Techniques used:	Light to moderate
Quality of data obtained:	Variable
Problems defined:	Coal measures have prevented deep penetration of energy and mapping of deeper horizons; poor coverage in N
Recommendations:	Reconnaissance surveys in N using moderate to heavy techniques

Basin:	CANNING BASIN
Location:	N W.A.
Area:	About 430 000 km^2 onshore and 165 000 km^2 offshore to 200 m depths
Sediments:	Up to 17 000 m of Palaeozoic (Devonian-Permian), Mesozoic, and Cainozoic; possible evaporite features
Basement/underlying basin:	Basement of Precambrian metasediments, igneous intrusives in N and centre
Surrounding basins/areas:	Precambrian basement rocks to N, E, and SW; Officer Basin to S
Drilling activities:	66 petroleum exploration and 9 stratigraphic wells to 1972; outlined subsurface geology
Petroleum prospects:	2 gas shows in calcarenite and sandstone; potential source and reservoir rocks, and traps exist; prospects moderate
Deficiency in geological knowledge:	Good basin-wide stratigraphic correlation and ties with seismic horizons lacking; relation with Officer Basin unknown
Most recent geophysical surveys:	7 seismic onshore in 1973 for detailing structures; recent activity adequate in N half
Magnetic/gravity coverage/ problems:	Complete aeromagnetic and regional gravity coverage; magnetics outlined basin subdivisions, gravity anomalies related to basin as well as intrabasement features
Seismic surveys	
Coverage:	Good in N, poor in SE
Techniques used:	Mostly moderate to heavy
Quality of data obtained:	Poor to fair; improvement noted with advanced techniques
Problems defined:	Data quality adversely affected by surface sand
Recommendations:	Experimental and reconnaissance surveys in SE with heavy recording techniques; investigation of Warri Ridge area between Canning and Officer Basins, and of evaporites.

Basin:	CARNARVON BASIN
Location:	W.A.
Area:	About 110 000 km^2 onshore and 190 000 km^2 offshore to edge of continental shelf
Sediments:	Up to 11 000 m of Palaeozoic (Silurian-Permian), Mesozoic, and Tertiary
Basement/underlying basin:	Precambrian sedimentary, metamorphic, and igneous basement
Surrounding basins/areas:	Precambrian rocks of Pilbara Block, Hamersley Basin, Gascoyne Block, Bangemall Basin to W, Perth Basin and Northampton Block to S
Drilling activities:	154 petroleum exploration and 5 stratigraphic wells (to 1972), most in N part; helped identify seismic horizons
Petroleum prospects:	Commercial oil and gas discovered mostly in Jurassic and L. Cretaceous
Deficiency in geological knowledge:	Basin-wide comprehensive study
Most recent geophysical surveys:	5 seismic onshore in 1973 to detail structures
Magnetic/gravity coverage/ problems:	Regional coverage complete; helped delineate general shape and structure
Seismic surveys	
Coverage:	Fair to good in Gascoyne and Exmouth Sub-basins, poor in other areas
Techniques used:	Light to heavy
Quality of data obtained:	Fair to good onshore, generally good offshore; improvement with heavy techniques
Problems defined:	Exploration activity adequate in the producing areas in N; sediment thickness and structure not well known in the central and S parts
Recommendations:	Investigation of central and S parts using moderate to heavy techniques

Basin:	CARPENTARIA BASIN
Location:	Qld., N.T., Irian Jaya, Papua New Guinea
Area:	About 125 000 km^2 onshore, 375 000 km^2 offshore
Sediments:	Up to 1800 m of Mesozoic and Cainozoic
Basement/underlying basin:	Proterozoic rocks of Arafura, McArthur, & South Nicholson Basins in W, Euroka Arch in S, Precambrian rocks in E
Surrounding basins/areas:	Morehead Basin to N; Money Shoal Basin, Proterozoic McArthur Basin to W; Euroka Arch, Mt Isa Block to S; Cape York-Oriomo Ridge, Peninsula Ridge to E
Drilling Activities:	8 petroleum exploration wells; several water-bores stratigraphically valuable
Petroleum prospects:	Low onshore because sediments too thin; traces of hydrocarbons from L. Cretaceous
Deficiency in geological knowledge:	Subsurface information along the boundaries with Morehead and Money Shoal Basins
Most recent geophysical surveys:	1 seismic in 1965 onshore, 1 offshore in 1966
Magnetic/gravity coverage/ problems:	Partial regional magnetic coverage, onshore regional gravity coverage complete; magnetic basement depths greater than seismic, gravity mainly related to intra-basement features
Seismic surveys	
Coverage:	Poor
Techniques used:	Light
Quality of data obtained:	Poor to fair
Problems defined:	Stratigraphic details on E side of basin and definition of boundaries with Money Shoal and Morehead Basins lacking
Recommendations:	Reconnaissance surveys using moderate techniques in E part of basin

Basin:	CLARENCE - MORETON BASIN
Location:	SE Qld and NE N.S.W.
Area:	About 38 000 km^2 onshore
Sediments:	Up to 5000 m of Triassic and Jurassic
Basement/underlying basin:	Palaeozoic basement
Surrounding basins/areas:	Contiguous with Surat Basin in W; New England Fold Belt rocks to NE, SW, and E: E part offshore
Drilling activities:	55 exploration wells to 1968, mostly to Triassic volcanics, 19 stratigrahic holes to 1971
Petroleum prospects:	Gas discovered in many wells, but only minor production; potential source and reservoir rocks and traps present
Deficiency in geological knowledge:	Sub-surface geology of central Clarence Basin (NSW part) least known
Most recent geophysical surveys:	2 seismic surveys in 1970-72
Magnetic/gravity coverage/ problems:	Partial regional magnetic coverage; complete regional gravity coverage; Cainozoic igneous intrusions and extrusions confuse interpretation in terms of sediment thickness
Seismic surveys	
Coverage:	Poor
Techniques used:	Mostly light
Quality of data obtained:	Varied; mostly poor
Problems defined:	Lack of reconnaissance over most of basin; thick cover of Tertiary basalt and rugged topography in border regions
Recommendations:	Use of moderate to heavy techniques to investigate the thickness and structure of sediments, mostly in central part.

Basin:	COOPER BASIN
Location:	NE S.A. and SW Qld.
Area:	About 120 000 km^2
Sediments:	Up to 1700 m of L. Permian to Mid. Triassic
Basement/underlying basin:	Basement of L. to Mid. Palaeozoic rocks of Warburton Basin, Warrabin Trough, and Carboniferous granite
Surrounding basins/areas:	Galilee and Adavale Basins to NE; entirely concealed under Eromanga Basin
Drilling activities:	About 35 exploration wells drilled to 1969; helped delineate stratigraphy
Petroleum prospects:	Petroleum gas discovered in commercial quantities; Permian reservoir
Deficiency in geological knowledge:	N limit of basin relatively unknown
Most recent geophysical surveys:	5 seismic in 1972-73; adequate activity in S part
Magnetic/gravity coverage/ problems:	Regional gravity and aeromagnetic coverage almost complete; magnetics delineated basin shape and thickness; major gravity features related to intra-basement variations, minor to the basin sediments.

Seismic surveys

Coverage:	Good
Techniques used:	Light to heavy
Quality of data obtained:	Varied; improvement with the recent improved (heavy) techniques
Problems defined:	N extension relatively unknown; exploration activity adequate by private companies.
Recommendations:	Use of heavy techniques to investigate N and S extensions, and possible connexion with Galilee Basin

Basin:	DALY RIVER BASIN
Location:	N.T.
Area:	About 40 000 km^2
Sediments:	At least 640 m of Mid-Cambrian to L. Ordovician
Basement/underlying basin:	Basement of Proterozoic sediments, metasediments, basalts
Surrounding basins/areas:	Pine Creek Geosyncline and McArthur Basin (Proterozoic) to NE, Precambrian Victoria River Basin to W, Wiso and Georgina Basins to S
Drilling activities:	4 shallow and 16 deeper (to 600 m) holes to 1971; valuable stratigraphically
Petroleum prospects:	Cambrian rocks potential source; permeable rocks or traps unknown
Deficiency in geological knowledge:	Identification of lithological units questionable; relation between Cambrian and Ordovician rocks unknown
Most recent geophysical surveys:	Regional gravity and aeromagnetic in 1967
Magnetic/gravity coverage/ problems:	Aeromagnetic coverage partial, not helpful in basin definition; regional gravity complete
Seismic surveys	
Coverage:	None
Techniques used:	-
Quality of data obtained:	-
Problems defined:	Lack of information on basin sediments and structure, and connexion with Wiso and Georgina Basins
Recommendations:	Reconnaissance seismic surveys to investigate the general shape and thickness of sediments

Basin:	DARLING BASIN
Location:	NE N.S.W.
Area:	At least 114 000 km^2
Sediments:	?U. Silurian, Devonian, and ?L. Carboniferous
Basement/underlying basin:	Basement of L. Silurian and Ordovician granite, Lachlan Geosyncline except near W margin where basement is Carpentarian and Cambrian rocks
Surrounding basins/areas:	Lachlan Geosyncline to E, Precambrian Willyama Block to W, Eromanga Basin to N, Murray Basin to S
Drilling activities:	7 exploration wells in central W part (to 1969), deepest to 3021 m; helped delineate lithology
Petroleum prospects:	No significant shows; L. Devonian possible source rocks but impermeable
Deficiency in geological knowledge:	Subsurface extension beneath Eromanga and Murray Basins
Most recent geophysical surveys:	2 seismic (in exposed basin area) in 1969, 2 seismic (in Murray Basin covered area) in 1970, 1973
Magnetic/gravity coverage/ problems:	Regional gravity complete; aeromagnetic incomplete
Seismic surveys	
Coverage:	Fair in the exposed area and the subsurface extension to S; poor in N subsurface extension
Techniques used:	Light to moderate
Quality of data obtained:	Fair to poor
Problems defined:	Subsurface extensions to N and S not well known; poor quality data from S part (extension)
Recommendations:	Reconnaissance work to investigate the subsurface extensions to N and S using heavy recording techniques

Basin:	DRUMMOND BASIN
Location:	Central Qld
Area:	About 36 000 km^2 exposed, and unknown amount concealed below surrounding basins
Sediments:	Up to 12 700 m of U. Devonian and L. Carboniferous
Basement/underlying basin:	Basement of early Palaeozoic meta-sediments, sediments, volcanics, and granite (Tasman Geosyncline); partly covered by Galilee Basin
Surrounding basins/areas:	Eromanga, Surat, and Galilee Basins to W, Bowen Basin to E, basement rocks to N.
Drilling activities:	Numerous wells, mostly on W and S of the basin outcrop; helpful in indicating subsurface extent of basin
Petroleum prospects:	No hydrocarbons discovered in the basin sediments which have no source rock; the sandstones lack porosity; potential low
Deficiency in geological knowledge:	Extensions beneath Galilee and Bowen Basins not known fully. Tectonics of Anakie Inlier, within the basin, poorly known.
Most recent geophysical surveys:	No seismic surveys in exposed basin area; surveys near E margin of Galilee Basin indicate thick sections of Adavale and earlier sediments under Galilee Basin sediments
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete; magnetics mapped crystalline basement; gravity partly related to sediments
Seismic surveys	
Coverage:	None in exposed basin area; fair over Galilee Basin area
Techniques used:	Light to moderate
Quality of data obtained:	Good to fair, sometimes poor
Problems defined:	Presence of Adavale Basin equivalent and older sediments in basin area suggested by seismic;W boundary of Basin relatively unknown

Recommendations: Detailed surveys using moderate to heavy techniques to investigate thickness and structure of all sediments, especially deeper, in the basin area, and the connexion if any with the Adavale Basin in SW

Basin:	DUARINGA BASIN
Location:	Qld
Area:	About 4000 km^2
Sediments:	About 1000 m of Tertiary
Basement/underlying basin:	Bowen Basin (Permian - Triassic sediments)
Surrounding basins/areas:	Bowen Basin
Drilling activities:	Stratigraphic drilling near Duaringa
Petroleum prospects:	Thin beds of oil shale
Deficiency in geological knowledge:	Structure and thickness of sediments not well known
Most recent geophysical surveys:	Seismic in 1960, aeromagnetic in 1963, gravity in 1964
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete

Seismic surveys

Coverage:	Sparse
Techniques used:	Light
Quality of data obtained:	Poor
Problems defined:	Structure and thickness of sediments, extent of oil shale not well known
Recommendations:	Use of moderate techniques to determine structure and thickness of sediments and map oil shale

Basin:	EROMANGA BASIN
Location:	Qld, N.T., S.A., and N.S.W.
Area:	About 1 200 000 km^2
Sediments:	Up to 3200 m of generally flat-lying Mesozoic (Jurassic and Cretaceous)
Basement/underlying basin:	Overlies Galilee, Drummond, Adavale Basins in NE, Cooper Basin in centre, Darling Basin in S, Arrowie, Arckaringa, Warburton, and Pedirka Basins in SW, Georgina and Amadeus Basins in NW
Surrounding basins/areas:	Euroka Arch, Mt Isa Geosyncline, Georgina Basin, Arunta Block, Amadeus Basin to NW, Adelaide Geosyncline, Musgrave, Denison, Mt Painter, Willyama Blocks to SW, Bancannia Trough, Darling Basin, Tasman Geosyncline, Wonaminta Block to S, Nebine Ridge, Tasman Geosyncline to E
Drilling activities:	Extensive for Eromanga sediments
Petroleum prospects:	Poor to fair; oil show at Morven; petroleum accumulations probably flushed
Deficiency in geological knowledge:	Underlying rocks poorly known
Most recent geophysical surveys:	Adequate seismic activity in areas underlain by Pedirka, Cooper, Adavale, and Galilee Basins
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete over most of area; interpretation subject to variations in the underlying basin thicknesses.
Seismic surveys	
Coverage:	Good in Cooper and Adavale Basins areas; fair in Galilee and Pedirka Basins areas; poor in rest
Techniques used:	Light to heavy
Quality of data obtained:	Varied, poor for the deeper sediments
Problems defined:	Poor reconnaissance coverage in N, SW, SE; information on deeper sediments poor

Recommendations: Use of heavy techniques to investigate margins and sediments of underlying basins; medium techniques for reconnaissance in SE part

Basin:	EUCLA BASIN
Location:	W.A. and S.A.
Area:	About 217 000 km^2 onshore and 141 000 km^2 offshore
Sediments:	Up to 1000 m of Mesozoic (L. and U. Cretaceous) and Tertiary
Basement/underlying basin:	Precambrian igneous and metamorphic rocks of Gawler Block and Fraser-Albany Province; Officer Basin in N
Surrounding basins/areas:	Precambrian rocks to W & E, Officer Basin to N; Polda Basin to SE
Drilling activities:	8 exploration wells to 1969, mostly in S onshore part and bottomed in crystalline basement
Petroleum prospects:	Poor because of thin sequence, lack of source rocks and structures
Deficiency in geological knowledge:	Age of older sediments in offshore channels and extension of channels onshore unknown
Most recent geophysical surveys:	1 seismic in 1972 near the coast, others offshore
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete; indicated general structure
Seismic surveys	
Coverage:	Poor, mostly in S part
Techniques used:	Light to moderate
Quality of data obtained:	Generally good
Problems defined:	Reconnaissance coverage of onshore part lacking; extension onshore of channels offshore unknown
Recommendations:	Reconnaissance surveys using moderate techniques

Basin:	GALILEE BASIN
Location:	Central Qld
Area:	160 000 km^2
Sediments:	Almost 3000 m of U. Carboniferous, Permian, and Triassic sediments
Basement/underlying basin:	Underlain by Drummond and possibly Adavale Basins in E and S; Precambrian basement elsewhere
Surrounding basins/areas:	Drummond Basin to E; Bowen Basin to SE; Cooper Basin to SW; most covered by Eromanga Basin
Drilling activities:	About 20 exploration and stratigraphic wells; valuable stratigraphically
Petroleum prospects:	Deeper sediments which possibly constitute a N extension of the Adavale Basin may be petroliferous; potential source and reservoir rocks in Permian
Deficiency in geological knowledge:	Basin margins and extensions poorly known
Most recent geophysical surveys:	Survey by BMR (1971); 5 other seismic surveys to 1971
Magnetic/gravity coverage/ problems:	Regional gravity coverage complete; good regional magnetic coverage; magnetics defined shape of basin; gravity helpful
Seismic surveys	
Coverage:	Fair
Techniques used:	Light to moderate
Quality of data obtained:	Poor to good
Problems defined:	A strong reflector associated with U. Permian coal measures ('P' reflector) interferes with deeper reflections by creating strong surface multiples; structure and thickness of deeper Devonian sediments poorly known
Recommendations:	Use of heavy recording techniques for investigating deeper sediments and structures along N, W, and E margins

Basin:	GEORGINA BASIN
Location:	N.T. and NW Qld
Area:	About 300 000 km^2
Sediments:	?Adelaidean, Cambrian, Ordovician and Devonian, up to 1800 m in S, less than 300 m in N
Basement/underlying basin:	Precambrian igneous and metamorphic basement
Surrounding basins/areas:	Precambrian rocks to SW, W, N, E. Probable connexion with Daly River (NW) and Wiso (W) basins; underlies Eromanga Basin in SE
Drilling activities:	49 stratigraphic wells (to 1968), 13 petroleum exploration wells
Petroleum prospects:	Potential source, reservoir, and cap rocks exist, but there is a general lack of structure
Deficiency in geological knowledge:	Structure and stratigraphy of Palaeozoic rocks poorly known; basement relations and SE extent of Palaeozoic sediments unknown
Most recent geophysical surveys:	Alliance Oil Dev. Aust. N.L. survey in 1970
Magnetic/gravity coverage/ problems:	Complete regional gravity coverage - lack of density contrast between Palaeozoic and Precambrian makes interpretation difficult. Almost complete regional magnetic coverage - prediction of depth to basement made difficult by overlying Adelaidean rocks
Seismic surveys	
Coverage:	Fair coverage in SE, especially around Toko Syncline; Most other sections of basin - no coverage
Techniques used:	Light
Quality of data obtained:	Mostly poor
Problems defined:	Poor seismic results in areas underlain by carbonate rocks; Relations with Daly River and Wiso Basins, and extensions under Eromanga Basin poorly known; Reconnaissance coverage of most of basin lacking

Recommendations: Use of improved seismic technique for reconnaissance surveys to determine structure and thickness of sediments in basin and their relations with the Daly River, Wiso, and Eromanga Basins

Basin:	GIPPSLAND BASIN
Location:	SE Vic.
Area:	About 63 000 km^2, mainly offshore (to 200 m depths)
Sediments:	Up to 12 000 m of U. Jurassic, Cretaceous, and Tertiary
Basement/underlying basin:	Basement of Palaeozoic Tasman Geosyncline rocks
Surrounding basins/areas:	Otway Basin to NW, Bass Basin to SW
Drilling activities:	230 petroleum exploration wells drilled, active exploration in progress
Petroleum prospects:	Commercial oil and gas discovered in Latrobe Complex (U. Cretaceous to Eocene) offshore; basal Tertiary prospective onshore
Deficiency in geological knowledge:	Basal Tertiary poorly known
Most recent geophysical surveys:	1 seismic survey onshore in 1970 and 1 offshore in 1973
Magnetic/gravity coverage/ problems:	Coverage adequate; magnetics mapped general shape of basin
Seismic surveys	
Coverage:	Good offshore, fair onshore
Techniques used:	Light to moderate onshore, recently heavy offshore
Quality of data obtained:	Generally poor onshore, good offshore
Problems defined:	On land: multiples below Latrobe Valley coal measures; basal Tertiary and basement poorly known
Recommendations:	Use of heavy techniques to explore basal Tertiary and basement

Basin:	LAURA BASIN
Location:	NE Qld
Area:	About 16 000 km^2 onshore, unknown area offshore
Sediments:	Up to 900 m of Cainozoic to Mesozoic on land
Basement/underlying basin:	Overlies Hodgkinson (Palaeozoic) Basin
Surrounding basins/areas:	Peninsula Ridge to W, Hodgkinson Basin to S and E
Drilling activities:	3 exploration wells, helped stratigraphically
Petroleum prospects:	Poor; pre-Mesozoic section may be prospective
Deficiency in geological knowledge:	Stratigraphy and structure of pre-Mesozoic sediments
Most recent geophysical surveys:	1 seismic in 1969
Magnetic/gravity coverage/ problems:	Magnetic coverage only over offshore part; regional gravity complete; gravity not related to basin features
Seismic surveys	
Coverage:	Sparse
Techniques used:	Light
Quality of data obtained:	Fair
Problems defined:	Stratigraphy and structure of sediments between Mesozoic (Laura Basin) and Devonian-Carboniferous (Hodgkinson Basin) sediments poorly known
Recommendations:	Use of moderate to heavy techniques to investigate sediments below Mesozoic

Basin:	MARYBOROUGH BASIN
Location:	E coast of Qld
Area:	About 25 000 km^2, mostly offshore
Sediments:	Up to 4500 m of Jurassic and Cretaceous
Basement/underlying basin:	Tasman Geosyncline rocks
Surrounding basins/areas:	Tasman Geosyncline rocks to E
Drilling activities:	3 exploratory wells to 1970
Petroleum prospects:	Poor to fair; some gas discovered
Deficiency in geological knowledge:	Detailed structure and thickness of sediments
Most recent geophysical surveys:	3 seismic to 1967
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete
Seismic surveys	
Coverage:	Poor, mostly offshore
Techniques used:	Light mostly
Quality of data obtained:	Fair to poor
Problems defined:	Poor knowledge of structure and thickness of sediments
Recommendations:	Use of light to moderate techniques for reconnaissance surveys

Basin:	MONEY SHOAL BASIN
Location:	Onshore in N.T., offshore on Arafura Shelf in adjacent areas of N.T. and Indonesia
Area:	About 390 000 km^2 offshore (230 000 km^2 in Australian adjacent area), and 1000 km^2 onshore
Sediments:	Up to at least 6000 m of sediments, predominantly Mesozoic and Tertiary, probable Palaeozoics in deeper parts
Basement/underlying basin:	Adelaidean Arafura Basin sediments, and Carpentarian sediments and granite in S; possible Precambrian granitic basement in N
Surrounding basins/areas:	Adjoins Bonaparte Gulf Basin to SW; Pine Creek Geosyncline, McArthur Basin (onshore) and Arafura Basin (offshore) to S; Carpentaria Basin
Drilling activities:	One petroleum exploration well gave stratigraphic information in a shallow part of the basin; 2 shallow coreholes drilled
Petroleum prospects:	Insufficient information to assess potential; but potential source, reservoir, and cap rocks exist, and traps probably exist
Deficiency in geological knowledge:	Stratigraphic sequence very poorly known
Most recent geophysical surveys:	2 seismic in 1970-72
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage incomplete; magnetic basement appears to coincide approximately with Precambrian basement on Melville and Bathurst Islands
Seismic surveys	
Coverage:	Fair, mostly offshore
Techniques used:	Light to heavy
Quality of data obtained:	Generally good for shallow horizons
Problems defined:	Stratigraphic sequence, particularly the older part, very poorly known. Almost complete lack of mappable seismic reflections in a large area below an intra-L. Cretaceous seismic event.

NW boundary of basin beyond edge of continental shelf (Arafura Shelf) not defined

Recommendations: Reconnaissance surveys using moderate to heavy techniques

Basin:	MURRAY BASIN
Location:	SW N.S.W., NW Vic., SE S.A.
Area:	About 320 000 km^2
Sediments:	Up to 1500 m of U. Palaeozoic to Cainozoic
Basement/underlying basin:	Basement rocks of Adelaide Geosyncline in S.A., of Lachlan Geosyncline in Vic. and S N.S.W., Darling Basin in N N.S.W.
Surrounding basins/areas:	L. Palaeozoic rocks of Lachlan Geosyncline to S and E, Adelaide Geosyncline and Willyama Block to NW and W, Darling Basin to N and NE, Otway Basin to SW
Drilling activities:	36 petroleum exploration wells (to 1970), deepest to 2289 m
Petroleum prospects:	Tertiary sediments lack source and reservoir rocks; L. Cretaceous basal sands best potential reservoir; no source rocks in Permian
Deficiency in geological knowledge:	Stratigraphy in N.S.W. and Vic. parts; extent of Mesozoic and Permian sediments beneath Tertiary
Most recent geophysical surveys:	1 seismic in 1973, 3 in 1970
Magnetic/gravity coverage/ problems:	Aeromagnetic incomplete; regional gravity complete; magnetic and gravity interpretation at places in conflict
Seismic surveys	
Coverage:	Fair in NW and SE, poor or none in rest
Techniques used:	Light to moderate reflection and refraction
Quality of data obtained:	Shallow fair to good, deeper varied and generally inferior
Problems defined:	Poor-quality reflections from deeper levels (Darling Basin sediments); Structure and thickness of sediments in SW and NE poorly known
Recommendations:	Use of heavy techniques for investigation of deep structure; reconnaissance surveys in SW and NE

Basin:	NGALIA BASIN
Location:	N.T.
Area:	About 15 000 km^2
Sediments:	Up to 5000 m of Adelaidean, L. Cambrian, Ordovician, and Carboniferous
Basement/underlying basin:	Precambrian igneous and metamorphic basement
Surrounding basins/areas:	Precambrian igneous and metamorphic rocks
Drilling activities:	19 stratigraphic wells, no exploratory wells
Petroleum prospects:	Prospective source rocks - Cambrian and Ordovician; most promising reservoir - Ordovician Djagamara Formation
Deficiency in geological knowledge:	Complete sequence of sediments; nature and structure of N margin
Most recent geophysical surveys:	1 seismic in 1971, 1 gravity in 1973 to detail structural leads
Magnetic/gravity coverage/ problems:	Regional coverage complete; magnetics outlined general shape of the basin, gravity related to deep structure in crust and upper mantle
Seismic surveys	
Coverage:	Good in central and N parts, poor in E and W
Techniques used:	Light to moderate
Quality of data obtained:	Fair to poor in E, better in W
Problems defined:	Complex faulting in E degrades quality of data; exploration activity by private companies adequate
Recommendations:	Exploration of N margin and deep structure in crust and upper mantle; detailed surveys to outline structural traps

Basin:	OFFICER BASIN
Location:	S.A. and W.A.
Area:	About 350 000 km^2
Sediments:	Up to 12 000(?) m of Proterozoic, Palaeozoic, and Mesozoic
Basement/underlying basin:	Precambrian igneous and metamorphic basement
Surrounding basins/areas:	Canning Basin to NW, Bangemall Basin (Proterozoic) and Yilgarn Block to W, Eucla Basin to S, Gawler Block to SE, Eromanga Basin to E, Musgrave Block to N
Drilling activities:	11 stratigraphic and petroleum exploration wells (to 1968); 19 shallow stratigraphic wells in W.A.
Petroleum prospects:	No suitable source rocks, minor hydrocarbon shows
Deficiency in geological knowledge:	Basin wide lithological correlations; regional structure of basin, including transition from W to E
Most recent geophysical surveys	Seismic, gravity, and magnetic in 1972 (BMR)
Magnetic/gravity coverage/ problems:	Magnetic coverage sparse, regional gravity complete; magnetic interpretation confused by basalt cover, gravity interpretation difficult because of little density contrast at depth
Seismic surveys	
Coverage:	Poor, sparse coverage, mostly in N and central parts
Technique used:	Light to moderate, some heavy
Quality of data obtained:	Shallow data fair, deeper poor
Problems defined:	Noise and poor penetration of seismic energy below basaltic and sand dune cover; deeper information lacking
Recommendations:	Use of heavy recording techniques for reconnaissance surveys in W and E, and investigation of transition from W (thicker Proterozoic) to E (thicker Palaeozoic) part of basin, of evaporites in NW, and of its relation with Canning Basin

Basin:	OLIVE RIVER BASIN
Location:	NW Qld
Area:	Estimated 2000 km^2
Sediments:	About 1000 m of sediments (?Mesozoic)
Basement/underlying basin:	Metamorphic basement rocks
Surrounding basins/areas:	Overlain by Carpentaria Basin
Drilling activities:	None
Petroleum prospects:	Unknown
Deficiency in geological knowledge:	Stratigraphy and structure of the sediments unknown
Most recent geophysical surveys:	1 seismic in 1965
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete; magnetics outlined the general shape

Seismic surveys

Coverage:	Poor
Techniques used:	Light
Quality of data obtained:	Fair
Problems defined:	Stratigraphy and structure of basin sediments unknown
Recommendations:	Use of moderate techniques to investigate sediments in basin area

Basin:	ORD BASIN
Location:	N of W.A. and N.T.
Area:	About 30 000 km^2
Sediments:	Up to 2000 m of L. and Mid Cambrian and Devonian rocks
Basement/underlying basin:	Adelaidean marine sediments
Surrounding basins/areas:	Adelaidean sediments of Victoria River Basin in S, E, and N; Precambrian rocks of Halls Creek Mobile Zone in W
Drilling activities:	One petroleum exploration well (1922)
Petroleum prospects:	Poor owing to lack of traps
Deficiency in geological knowledge:	Conflicts between palaeontological dating and lithological mapping of some formations
Most recent geophysical surveys:	None
Magnetic/gravity coverage/ problems:	Regional gravity coverage complete; no magnetic coverage
Seismic surveys	
Coverage:	No seismic coverage
Techniques used:	
Quality of data obtained:	
Problems defined:	General thickness and structure of sediments lacking
Recommendations:	Reconnaissance survey using moderate techniques to determine general thickness and structure of basin

Basin:	OTWAY BASIN, including KING ISLAND SUB-BASIN offshore
Location:	SE S.A., SW Vic.
Area:	About 34 000 km^2 onshore, 38 000 km^2 offshore
Sediments:	Varying thicknesses of U. Jurassic, Cretaceous, Tertiary, and Quarternary
Basement/underlying basin:	Basement of L. Palaeozoic rocks of Tasman Geosyncline
Surrounding basins/areas:	Murray Basin to NW, Bass Basin to SE, Gippsland Basin to E, basalt cover to N
Drilling activities:	95 petroleum exploration wells, few in E part; coal and water bores
Petroleum prospects:	Traces of hydrocarbon throughout Cretaceous; basal U. and L. Cretaceous best potential reservoir
Deficiency in geological knowledge:	Lithology and thickness of sediments in E and King Island Sub-basin
Most recent geophysical surveys:	1 seismic survey in E in 1972, several in other parts and offshore in 1973-74
Magnetic/gravity coverage/ problems:	Regional coverage adequate; magnetic interpretation subject to the influence of basalt cover, gravity helpful in defining tectonic units
Seismic surveys	
Coverage:	Good in W, central, and offshore parts, poor in E
Techniques used:	Light to heavy, mostly heavy since 1972
Quality of data obtained:	Poor to fair
Problems defined:	Poor energy penetration below basalt, limestone, and sand dune cover; faulting and pinchouts confuse interpretation; some improvement in data quality with heavy techniques; effort inadequate in E
Recommendations:	Use of heavy recording techniques to investigate basal Cretaceous mainly in E

Basin:	PEDIRKA BASIN
Location:	NE S.A., SE N.T.
Area:	90 000 km^2
Sediments:	Up to 1000 m of U. Carboniferous to ?Triassic sediments
Basement/underlying basin	Amadeus and Warburton Basins
Surrounding basins/areas:	Overlain by Eromanga Basin
Drilling activities:	6 wells (all reached basement) provide significant stratigraphic information
Petroleum prospects:	Potential source and reservoir beds present; traps present; minor gas shows from Permian & Cretaceous; prospective anticlines in NE and E edge
Deficiency in geological knowledge:	Margins of basin, especially S and E, poorly defined. Stratigraphy of S and E parts of basin almost unknown
Most recent geophysical surveys:	Numerous seismic surveys (to 1974); gravity survey (1971)
Magnetic/gravity coverage/ problems:	Regional gravity and magnetic coverage complete - both of limited use because economic basement different from magnetic, and density variations expected within the basement
Seismic surveys	
Coverage:	Fair except in NW
Techniques used:	Mainly light to 1970; recent surveys have used moderate - heavy techniques
Quality of data obtained:	Fair to good
Problems defined:	Basins margins poorly defined; stratigraphic sequence in S and E almost unknown
Recommendations:	Use of moderate to heavy techniques to define margins and stratigraphy better in S and E

Basin:	PERTH BASIN
Location:	W.A.
Area:	About 62 000 km^2 onshore, 52 000 km^2 offshore (to 200 m depths)
Sediments:	Over 12 000 m of Palaeozoic (Ordovician, Silurian) Mesozoic, and Cainozoic
Basement/underlying basin:	Precambrian crystalline basement
Surrounding basins/areas:	Precambrian basement rocks to SE, E; Carnarvon Basin to N
Drilling activities:	82 petroleum exploration wells, 11 stratigraphic wells to 1972
Petroleum prospects:	Commercial gas in 5 fields from basal Triassic and Permian structural traps; stratigraphic traps possible
Deficiency in geological knowledge:	Basin-wide lithological (and seismic) correlation
Most recent geophysical surveys:	5 seismic and 1 gravity surveys during 1973-74
Magnetic/gravity coverage/ problems:	Regional coverage complete; general shape of basin defined
Seismic surveys	
Coverage:	Good coverage in central and S parts, fair offshore, poor in N
Techniques used:	Light to heavy techniques
Quality of data obtained:	Generally poor
Problems defined:	Poor seismic energy penetration below coastal limestone and coal measures. Data poor and interpretation difficult owing to complex faulting
Recommendations:	Experimental use of heavy recording techniques to determine if data quality can be improved

Basin:	POLDA BASIN
Location:	Great Australian Bight of S.A.
Area:	About 1300 km^2 onshore; 14 000 km^2 offshore (to 200 m depths)
Sediments:	Up to 4300 m of sediments in Elliston Trough, thinning onshore. Sediments tentatively aged Proterozoic to Cambrian, Jurassic to Cretaceous, and Tertiary
Basement/underlying basin:	Carpentarian metamorphics of Gawler Block
Surrounding basins/areas:	Eucla Basin to NW
Drilling activities:	One shallow stratigraphic well, and onshore water-bores give information on Tertiary and Jurassic sediments
Petroleum prospects:	Potential untested; Elliston Trough appears prospective offshore
Deficiency in geological knowledge	Lithology of sediments, particularly in offshore basin, poorly known
Most recent geophysical surveys:	9 offshore seismic surveys (1966-73) BMR combined marine seismic, gravity, magnetic survey (1972)
Magnetic/gravity coverage/ problems:	Regional gravity coverage complete - onshore margins of basin located from gravity data. Aeromagnetic coverage good - outlined offshore elongate trough

Seismic surveys

Coverage:	Fair offshore; none onshore
Techniques used:	Moderate to heavy
Quality of data obtained:	Poor to good
Problems defined:	Lithology of sediments poorly known; margins of offshore basin not clearly defined especially in S
Recommendations:	Use of moderate techniques for a reconnaissance survey onshore to delineate extension of prospective Elliston Trough on land

Basin:	ST VINCENT BASIN
Location:	St Vincent Gulf of S.A.
Area:	About 7400 km^2 onshore; 9500 km^2 offshore
Sediments:	Up to 700 m of Eocene to Pleistocene sediments
Basement/underlying basin:	Proterozoic and Cambrian sediments of Adelaide Geosyncline, and Permian tillite, sandstone, and claystone
Surrounding basins/areas:	Proterozoic, Cambrian, and Permian basement rocks
Drilling activities:	13 petroleum exploration wells, mainly along Yorke Peninsula
Petroleum prospects:	Traces of hydrocarbons from Permian and Cambrian basement rocks; Cambrian sandstone and limestone have good reservoir characteristics
Deficiency in geological knowledge:	Maximum thickness of Tertiary in E part of Gulf
Most recent geophysical surveys:	6 surveys offshore and onshore (1965-72) BMR seismic, gravity, and magnetic survey in St Vincent Gulf (1972)
Magnetic/gravity coverage/ problems:	Regional gravity coverage complete - onshore data of little value as Tertiary strata are very thin. Magnetic coverage complete - of little value because top of magnetic basement usually deeper than base of Tertiary
Seismic surveys	
Coverage:	Fair
Techniques used:	Mainly light
Quality of data obtained:	Generally poor
Problems defined:	Trap structures in basement rocks to be investigated
Recommendations:	Analysis of offshore data

Basin:	SURAT BASIN
Location:	SE Qld and NE N.S.W.
Area:	About 250 000 km^2
Sediments:	Up to 2300 m of Jurassic and Cretaceous
Basement/underlying basin:	Bowen Basin in NW, Gunnedah Basin (NW Sydney Basin) in SW, igneous and metamorphic rocks elsewhere
Surrounding basins/areas:	Bowen Basin to N, Lachlan Geosyncline to S, contiguous with Eromanga Basin in W and Clarence-Moreton Basin in E
Drilling activities:	360 exploratory and several stratigraphic wells to 1972; discovered oil and gas and provided stratigraphic information
Petroleum prospects:	Fair to good on Roma Shelf, poor to fair elsewhere; gas and oil occurrences in Jurassic at Roma Shelf, Moonie, and Alton
Deficiency in geological knowledge:	Stratigraphy and structure in SW
Most recent geophysical surveys:	About 10 seismic during 1970-73
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete; contributed to general understanding of basin structure and sediment thickness
Seismic surveys	
Coverage:	Good in N, NW and centre, poor in S and SE
Techniques used:	Mainly light to moderate
Quality of data obtained:	Varied; good to poor
Problems defined:	Poor reconnaissance coverage in S
Recommendations:	Reconnaissance survey in SW to delineate Dirranbandi Syncline and possible Jurassic pinchouts against basement to W and S

Basin:	SYDNEY BASIN
Location:	N.S.W.
Area:	About 66 000 km^2 onshore, 18 000 km^2 on the continental shelf
Sediments:	Up to 5000 m of Permian and Triassic
Basement/underlying basin:	Basement of Lachlan Geosyncline rocks in W and New England Geosyncline rocks in NE
Surrounding basins/areas:	Lachlan Geosyncline rocks to W, Oxley and Bowen Basins to N, New England Geosyncline rocks to NE
Drilling activities:	71 petroleum exploration wells drilled onshore to 1973; numerous coal and stratigraphic bores
Petroleum prospects:	Potential source rocks in Permian, structural traps present; only impermeable sections encountered so far; small shows of oil and gas
Deficiency in geological knowledge:	Details of subsurface geology; structure along Hunter Thrust in NE
Most recent geophysical surveys:	2 seismic onshore and 3 offshore in 1970-71
Magnetic/gravity coverage/ problems:	Magnetic coverage incomplete; regional gravity to be completed soon, locally basic intrusives confuse magnetic interpretation

Seismic surveys

Coverage:	Good in central and N areas onshore, and N of Sydney offshore
Techniques used:	Light to moderate mostly, heavy only recently
Quality of data obtained:	Onshore-fair to good from within coal measures, otherwise poor; Offshore-good from presumed Tertiary and Triassic horizons; poor to fair from deeper levels.
Problems defined:	Difficulty in obtaining good reflections owing to noise, adverse terrain on land; Poor to no coverage in S, W, and SW and extreme N. Use of heavy techniques has shown improvement in quality of data

Recommendations: Use of heavy recording techniques to obtain good data and exploration in S, W, and N

Basin:	TASMANIA BASIN
Location:	Tas.
Area:	At least 36 000 km^2 (mainly onshore)
Sediments:	Up to 1000 m of U. Palaeozoic to Cainozoic sediments
Basement/underlying basin:	L. and Mid Palaeozoic sediments and granite; Precambrian metasediments
Surrounding basins/areas:	Bass Basin to N; Precambrian and Palaeozoic basement to W; Palaeozoic basement to NE
Drilling activities:	28 wells to 1967, mainly in N; wells of little value in regional geology
Petroleum prospects:	Potential low - sequence is thin, and sediments are flat-lying, extensively faulted, and intruded by dolerite; lack of traps
Deficiency in geological knowledge:	Lack of suitable time and rock correlations for Permian and Triassic sediments; S offshore part of basin unknown
Most recent geophysical surveys:	Offshore part of basin surveyed in 1971-72 by BMR. Detailed onshore gravity survey in 1972
Magnetic/gravity coverage/ problems:	Regional gravity coverage complete; Regional magnetic coverage complete - results affected by Jurassic dolerite
Seismic surveys	
Coverage:	Offshore part of basin only is covered (1971-72 BMR survey)
Techniques used:	
Quality of data obtained:	
Problems defined:	Absence of information on extent and type of basin sediments in S offshore area; lack of reconnaissance seismic survey onshore
Recommendations:	Reconnaissance survey using moderate techniques onshore

Basin:	WARBURTON BASIN
Location:	Mainly NE S.A., extends into SE N.T., SW Qld and NW N.S.W.
Area:	Unknown, but extends beneath Arckaringa, Pedirka, and Cooper Basins
Sediments:	Adelaidean to L. Cambrian, Cambrian, Ordovician, possible Silurian, and Devonian sediments; thickness unknown
Basement/underlying basin:	Metamorphic and igneous rocks of Denison Block, Muloorinna Ridge, Mt Painter Block
Surrounding basins/areas:	Contiguous with Amadeus Basin on NW; Denison Block, Muloorinna Ridge, Mt Painter Block to SW; concealed beneath Eromanga, Cooper, Arckaringa, and Pedirka Basins
Drilling activities:	37 wells intersected pre-Permian rocks; provide only indication of geology
Petroleum prospects:	Mediocre to poor; stratigraphic and structural traps present but no indigenous hydrocarbons; migration from Permian source possible
Deficiency in geological knowledge:	Little known about stratigraphy of basin; margins poorly defined in S.A. and undefined in N.T., Qld, and N.S.W.
Most recent geophysical surveys:	Seismic surveys mainly in Pedirka and Cooper Basins covered areas up to 1973; numerous gravity surveys to 1970
Magnetic/gravity coverage/ problems:	Regional magnetic and gravity coverage complete; magnetics helped delineate W and S margins and estimate thickness of sediments; interpretation of gravity data difficult because of insufficient stratigraphic and density control

Seismic surveys

Coverage:	Poor
Techniques used:	Light to heavy
Quality of data obtained:	Poor from the deep basin sediments

Problems defined:	Structure and thickness of basin sediments poorly known; margins undefined in E and NE, and only partly in NW and S; little seismic information from Warburton Basin sediments
Recommendations:	Use of heavy techniques to obtain data from deep sediments and to define basin margins

Basin:	WARRABIN TROUGH
Location:	Central Qld
Area:	About 10 000 km^2
Sediments:	Over 1600 m of Mid. Devonian and L. Carboniferous
Basement/underlying basin:	Basement of L. Palaeozoic rocks
Surrounding basins/areas:	Basement rocks (Canaway Ridge) separating from Adavale Basin in E, basement in SW; concealed under Cooper Basin
Drilling activities:	Several exploratory wells to basement; delineated stratigraphy
Petroleum prospects:	Prospects of gas in Mid. Devonian
Deficiency in geological knowledge:	Extent to N and S not fully known
Most recent geophysical surveys:	2 seismic in 1969
Magnetic/gravity coverage/ problems:	Magnetic partial, regional gravity complete; gravity relates to seismic
Seismic surveys	
Coverage:	Fair
Techniques used:	Light
Quality of data obtained:	Poor in lower section, fair above
Problems defined:	Deeper sediments not well defined, extent to N and S not well known
Recommendations:	Use of heavy techniques to investigate deep sediments and extensions to N and S

Basin:	WISO BASIN
Location:	N.T.
Area:	170 000 km^2
Sediments:	Cambrian, Ordovician, and Devonian rocks, up to 2000 m thick in Lander Trough
Basement/underlying basin:	Carpentarian and Adelaidean sediments in W; Precambrian metamorphic and igneous rocks in S and SW; Proterozoic in E
Surrounding basins/areas:	Daly River Basin to N, Precambrian rocks to W and S, Georgina Basin to SE, Proterozoic rocks and Davenport Geosyncline to E.
Drilling activities:	20 stratigraphic holes down to 200 m - identified rock units at depth
Petroleum prospects:	Possible source rocks in Lander Trough; some evidence of structure in trough; prospects unknown
Deficiency in geological knowledge:	Sedimentary rocks in Lander Trough poorly known; L. Palaeozoic rocks not differentiated in some areas
Most recent geophysical surveys:	1 seismic survey in 1967; several aeromagnetic surveys (to 1967)
Magnetic/gravity coverage/ problems:	Regional gravity coverage complete; limited aeromagnetic coverage - difficulty in differentiating Adelaidean from Palaeozoic strata
Seismic surveys	
Coverage:	One survey only in 1967
Techniques used:	Weight-dropping
Quality of data obtained:	Poor
Problems defined:	Lack of reconnaissance seismic coverage; relations with Georgina and Daly River Basins unknown
Recommendations:	Reconnaissance seismic surveying to determine structure and thickness of sediments, and their relations with Georgina and Daly River Basins

Basin:	YARROL BASIN
Location:	E Qld
Area:	About 20 000 km^2
Sediments:	Up to 17 500 m of U. Devonian to Permian rocks
Basement/underlying basin:	Folded and metamorphosed L. Devonian sediments and volcanics
Surrounding basins/areas:	Pre-Devonian rocks to E, N, and W. L. Permian sediments contiguous with Bowen Basin between Connors and Auburn Arches. Overlain by Surat Basin in S
Drilling activities:	3 wells (to 1968)
Petroleum prospects:	Poor
Deficiency in geological knowledge:	Extent, sediments, and structure of sediments
Most recent geophysical surveys:	2 seismic surveys (1962, 1963)
Magnetic/gravity coverage/ problems:	Regional gravity coverage complete; no magnetic coverage
Seismic surveys	
Coverage:	Very sparse
Technique used:	Light
Quality of data obtained:	
Problems defined:	Reconnaissance inadequate
Recommendations:	Reconnaissance surveys using moderate techniques to investigate structure and thickness of sediments

TABLE 1. LIST OF SEISMIC SURVEYS BY BMR (1949–72)*

Area	Year	Record or Report	Objective	Nature of work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Amadeus Basin							
S margin	1961	1962/167	To investigate strat. and str. between Polhill and Finke	Refraction/ Reflection	Good reflections and refractions; thickness and str. of sed. determined	No info. from basement; sed. south of Black Hills unknown	
Palm Valley Anticline	1961	1963/5	To test method, confirm the str. at depth, determine thickness of sed.	Refraction/ Reflection	Good reflections, refractions; anticline confirmed at depth, sed. thickness determined	No info. from basement	Now a gas field
Alice Springs Farm Area	1961	1963/6	To assist in search for water by determining thickness of Mesozoic sed.	Refraction	Scatter in data; velocities and thicknesses estimated	Geologic correlation not definite	
Coraminna	1962	1966/57	To investigate str. between Polhill and Deep Well	Refraction/ Reflection	Excellent reflections with simple techniques; str. and thickness determined	Poor info. near Alice Springs, Deep Well, N of anticline and on anticlinal closure. Heavier techniques recommended	Well drilled near the crest of Coraminna anticline encountered gas shows
Gosses Bluff	1962	1964/66	To investigate Missionary Plains Syncline, Gosses Bluff uplift, Gardiner Range Fault, and N margin	Refraction/ Reflection	Reflections excellent in undisturbed parts; structure and thickness of sed. determined	Nature of N margin unknown	Well drilled to 1382 m at the centre of bluff recorded a gas show
Gosses Bluff	1969	1971/4 1971/141	To define Bluff str. features more clearly	Refraction Reflection (CDP)	Reflections good below Bluff at depth; shape and size of disruption zone defined		
Bowen Basin							
Comet	1951	1951/9	To determine depth of basement rocks at Comet Anticline	Refraction	Igneous rock (5 500 m.p.s.) at 670 m		
Corroorah Anticline	1959	1961/107	To select site for deep strat. test bore.	Refraction/ Reflection	Str. & thickness of sed. determined; Anticline detailed; sites selected		
Emerald-Duaringa	1960	1965/2	To determine basin str. and thickness of sed. W to E	Refraction/ Reflection	Str., thickness of sed. and basin margin indicated	Pre-Permian sed. unknown; more refraction work needed to find if they exist	
Bonaparte Gulf Basin							
Carlton and Burt Range Sub-basins	1956	1957/46	To obtain regional info. on thickness of sed. and on tectonics, to establish applicability of method	Refraction/ Reflection	Poor to fair reflections; refraction unsuccessful; str. and thickness indicated		
Canning Basin							
Merrima Dome	1952	1953/72	To determine str. at depth and locate drilling site	Refraction/ Reflection	Str. complex at depth; reflection method not successful	Survey at Poole Range to determine str. at depth	
Poole Range–Prices Creek	1953	1955/35	To evaluate thickness of unexposed Ordovician, and other sed. and to determine str. at depth	Refraction/ Reflection	Thickness determined; dome str. persists to 250 m in NE	Similar info. required on S, E, & W flanks; correlation of refractors with outcrops	

*Abbreviations used: str. = structure; sed. = sediments; info. = information; strat. = stratigraphic

TABLE 1 (CONT.)

Area	Year	Record or Report	Objective	Nature of work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Poole Range-Christmas Creek	1954	1956/66	To find thickness and str. of sed. on E, S, and SW sides of Poole-Range dome	Reflection	Existence of str. at depth confirmed; thickness determined	Lack of reflections near centre and SW flank. No seismic work recommended	
Christmas Creek	1955	1957/37	To determine if refraction velocities useful in correlation with rock beneath Permian and in comparing with those at Nerrima	Refraction	Velocities similar to those at Nerrima, but lower; geologic correlation made		
Poole Range	1962	1974/43	To determine str. at depths below 4000 m, the attitude of formations N of Christmas Creek and follow markers S of Poole Range	Refraction/ Reflection multiple holes and geophones	Shallow reflections good, deeper (> 2.5s) poor; inadequate for mapping deep str.; good refractions; no extension of Poole Range str. at depth	Additional work to delineate most interesting str. locations	Contract survey by CGG
Broome	1954	1955/112	To determine the thickness of sed., any major unconformities, str., and if detailed work required	Reflection	Thickness and str. determined; unconformity indicated; evidence inconclusive	Intensive investigation required to discover concealed anticline at Permian and deeper levels	
Broome	1955	1961/57	To confirm thickness of sed. and investigate suspected folding	Reflection	Thickness determined; str. in subsurface (folding & faulting); no evidence for unconformity		
Deep Well Anticline	1954	1955/110	To map feature in subsurface sed.	Reflection	Numerous reflections on flanks down to 7300 m, very few in syncline; anticline persists to 7300 m; faulting possible	Further work to delineate str. and prove closure	
Fenton Fault	1955	1957/63	To determine nature and throw of fault, thickness and altitude of sed. on both sides	Refraction/ Reflection	Normal fault with 3000 m throw, thickness determined	Test bore on S side to identify horizons	
Langeys Crossing	1955	1956/112	To obtain info. on thickness of sed. and str. at depth	Reflection	Fair reflections; thickness and str. determined		
La Grange	1955	1960/49	To investigate sediments S of Fenton Fault	Reflection	Thickness of sed. determined; minor folds and faults indicated; no evidence for unconformity		
<u>Carnarvon Basin</u>							
Giralia-Bullara	1951	1951/62					Report not available
Giralia Anticline	1951	1954/67	To verify unconformity between Mesozoic and Palaeozoic shown by previous traverse	Reflection	Shallow events good quality, deeper poor; unconformity and fault indicated	Evidence of str. in deeper beds unreliable	
Wandagee Hill/ Niddalya	1955	1962/117	To assist in interpreting gravity results	Reflection	Thickness and str. of sed. indicated		

TABLE 1 (CONT.)

Area	Year	Record or Report	Objective	Nature of work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Tomala-Marryer	1963	GPR1964/6	To investigate regional str. and thickness of sed.	Refraction/ Reflection	Reflection not successful; refraction useful in determining thickness & str.	Seismic not useful for determining tectonic relation between Coolcalalaya Basin and Yallalong Ridge	
Eyre Basin	1963	GPR1964/7	To determine thickness and str. of Eyre Basin	Refraction/ Reflection	Reflection successful over Permian and not over Quaternary cover; thickness and str. determined		
Gascoyne Junction	1964	1967/10	To investigate regional str. and thickness of Palaeozoic sed.	Refraction/ Reflection	Reflections good to poor; refractions helpful in determining str. and thickness	Quality of data poor; str. indefinite	
Pelican Hill Bore	1964	1965/40	To examine strat. and str. position of Devonian in Bore	Refraction/ Reflection 6 geophones	Thickness and str. determined; evidence inconclusive	Multiples present	
Carpentaria Basin							
	1958	1959/4	To determine general form of basin, str. position of Karumba Bore, str. significance of gravity anomalies	Refraction/ Reflection	Methods suitable; Basin shape and margin str. determined; gravity not related to basement surface features; thicknesses measured	Gravity related to intra-basement features	
Eromanga Basin							
Haddon Downs	1957	1959/19	To determine suitability of reflection method, thickness of Mesozoic and Palaeozoic section, and correlation between near surface and deep str.	Refraction/ Reflection	Refraction useful tool; reflection useful with large arrays of multiple shots and geophones; str. and thickness of sed. determined	Further reconnaissance recommended	
Oodnadatta	1957	1962/17	To find if reflections could be recorded from beneath siliceous surface deposit and if surface structures persist at depth	Refraction/ Reflection multiple holes and geophones	Poor to fair reflections recorded; str. and thickness of sed. determined		
Thargomindah-Noccundra	1962	1964/72	To investigate nature of rocks beneath Mesozoic (sed. or igneous) and whether sed. troughs exist	Refraction/ Reflection	Good to poor reflections; thickening of Permian sed., in area of low gravity	Evidence for Permian unreliable	
	1963	1966/117	As above (continuation of 1962) and to confirm str. shown by previous survey	Refraction/ Reflection	Good to poor reflections; str. and thicknesses determined	'P' reflection either within Permian or base of Mesozoic	
Quilpie-Eromanga	1959	1962/161	To determine the thickness of sed., whether anticlinal str. persist at depth, and relation of gravity to sed. thickness and str.	Refraction/ Reflection multiple geophones.	Good reflection on alluvium, poor on duricrust; str. and thicknesses mapped; gravity useful guide	Multiple shots and geophones on duricrust areas	
Hinton	1960	1964/116	To resolve contradiction between direction and throw of fault obtained from gravity and aeromagnetic results	Reflection	Poor to fair reflections; confirmed direction indicated by gravity; thickness of sed. determined (about 1800 m. Mesozoic)	Thickness of sed. not definite because of multiple and unreliable reflections	

TABLE 1 (CONTD)

Area	Year	Record or Report	Objective	Nature of Work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Westbourne-Tambo	1961	1964/73	To find whether gravity or aeromagnetic interpretation of steep gradient is correct	Reflection	Good to poor reflections; gravity high caused by anticline and steep gradient by the flank of the anticline		
St George-Eulo	1962	1966/144	To provide info. on nature and str. of rocks underlying Mesozoic across Nebine Ridge and Eulo Shelf	Refraction/ Reflection	Poor to fair reflections; thickness and str. of sediment and basement configuration mapped	Magnetic interpretation and seismic disagree	
Flinders River	1966	1970/52	To carry out seismic reconnaissance on the gravity low, and extent of Palaeozoic sed.	Refraction/ Reflection multiple shots and geophones	No appreciable thickness of Palaeozoic sed.; thickening of Mesozoics and intra-basement changes reflected in gravity lows. Refraction more successful in Bowen Downs area		
<u>Galilee Basin</u>							
E of Lake Galilee	1971	1973/33	To investigate structure of E part of the basin and its relation to Drummond Basin	Refraction/ Reflection 6-fold CDP	Good to poor reflections; thickness, structure of sed. determined; relation indicated; Adavale Basin sed. indicated	Multiples present; investigation of Adavale sed. recommended	
<u>Georgina Basin</u>							
Undilla Basin	1961	1963/63	To determine thickness of relatively unmetamorphosed strata, relation between Mid. Cambrian sed. and Camooweal Dolomite, and existence of a sandstone below Mid. Cambrian limestone	Refraction/ Reflection multiple shots and geophones	Insufficient reliable reflections; thickness and str. of sed. estimated; successful in outlining problems and some solution; objectives only partly fulfilled	Surface noise; drilling difficult; because of near-surface limestone	
SE of Toko Syncline	1963	1965/75	To determine most suitable techniques, investigate Syncline and its extension, Palaeozoic sed. and their extension	Refraction/ Reflection multiple geophones	Toko Syncline extends SE from outcrop area; reflections mapped; thickness and str. indicated; method very effective in undisturbed areas	Ages and lithologic correlation; another synclinal area; multiples in some areas	
SE of Toko Syncline	1964	1965/39	To determine stratigraphic ties with Canary Bore and to eliminate multiples	Refraction/ Reflection single and 2-fold	No reliable refraction markers in L. Palaeozoic; poor reflections in areas of L. Palaeozoic outcrops; thickness and str. of sed. indicated	Strat. holes to determine lithology	
Cockroach Waterhole	1964	1966/75	To develop technique suitable for shooting on L. Palaeozoic carbonate rocks, to carry out reconnaissance survey	Refraction/ Reflection single hole, multiple geophones	Poor to fair reflections; a suitable technique can be developed	Random high-frequency noise; difficult drilling conditions	
S part	1965	1966/28	To develop techniques, obtain regional info. for interpretation of other geophysical data	Refraction/ Reflection multiple shots and geophones	Poor reflections; thick sed. unlikely; several techniques tried but no good results	Difficult drilling; high noise; vibroseis or weight-dropping to be tried	

TABLE 1 (CONT.)

Area	Year	Record or Report	Objective	Nature of Work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Gippsland Basin							
Avon	1952	1952/35	To investigate magnetic and gravity anomalies near Lake Wellington	Reflection	No favourable str. in area of anomalies		
Darriman	1954	Rep. 19	To investigate gravity anomaly	Reflection	Good reflections; anticline discovered; thickness determined		
Latrobe Valley	1958	1958/101 1959/151	To find if method of value in mapping coal measures and basement depths	Refraction/ Reflection	Method successful; sediment and basalt mapped		
Latrobe Valley	1959	1960/48	To determine str. of coal measures, depth to basement, and its nature.	Reflection	Some data poor; str. and thickness of sed. determined	Multiple shots and geophones necessary for deeper info.	
Rosedale	1961	1961/165	To provide more info. about coal measures and to test new recording equipment	Refraction/ Reflection	Poor to good reflections; thickness and str. determined	Info. deeper than 1400 m not reliable	
Murray Basin							
Oaklands-Coorabin	1949	Bull. 19	To obtain thickness and velocities of sed. at several places and to help gravity interpretation	Refraction	Thickness and velocities determined; helped gravity interpretation	Test drill sites recommended	
Murray Basin	1960	1962/164	To investigate thickness and str. of sed. across basin	Refraction/ Reflection	Thickness, velocity, str. of sed. determined	Long refraction lines for deeper info; identification of refractors	
Ngalia Basin							
Vaughan Springs	1967	1969/69	To develop optimum technique for reflections from L. Palaeozoic, record all refractors to basement	Refraction/ Reflection multiple shots and geophones	Refractions and good to poor reflections, extent of L. Palaeozoic could not be outlined but method effective for delineating str. at depth	Geological correlation of horizons to outcrops required	
Napperby Ck, Mt Allan, Mt Doreen, Waite Ck	1968	1969/70	To identify horizons previously recorded, and map elsewhere	Refraction/ Reflection	Fair quality; basin shape confirmed; thickness and str. determined; tentative correlation with geology		
Waite Ck, Gum Ck	1969	1974/49	To clarify extent of overthrusting at NW margin and closure and to complete reconnaissance	Reflection/ Refraction multiple shots and geophones	Good to poor, best in deeper parts under Quaternary cover; methods successful in delineating shape, sed. thickness, and str.	Refraction interpretation inconclusive; extent of L. Palaeozoic undefined; correlation difficult	
Officer Basin							
Giles-Mt Beadell	1961	1963/7	To distinguish between main sequences of rocks, delineate regional str., trace tectonic history, locate sites for strat. drilling	Refraction/ Reflection multiple shots and geophones	Fair reflections at Mt Beadell, poor at NMF19; refraction velocities measured; thickness and str. determined	Further work to fill gaps; strat. drilling at Lake Breaden	

TABLE 1 (CONT.)

Area	Year	Record or Report	Objective	Nature of Work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Mt Beadell–Carnegie	1962	GPR1963/5 1967/123	Same as above (extension of work)	Refraction/ Reflection multiple holes and geophones	Reflections with large no. of holes, geophones and multiplicity useful in areas of Cretaceous outcrop; refraction useful in following main horizons; sed. thickness, str., and correlation obtained	Strat. hole at Lake Keane to determine nature of sed.	
Warburton Mission–Laverton	1972	1972/95 1973/62	To define SW and NE margins, obtain reliable configuration of basement, determine str., thickness and velocity of sed.	Refraction/ Reflection multiple pattern and coverage	Reflection quality dependent on surface conditions; thickness, str. and correlation of total sediments obtained; nature of SW margin indicated	Reflection work with heavy techniques to fill gaps, and near S.A. border; rapid reconnaissance using refraction; strat. drilling in SW	
Otway Basin							
Heywood	1956	1958/28	To determine if possible to obtain reflections from sed. beneath basalt cover	Refraction/ Reflection	Reflection method applicable; good reflections in no-basalt-cover areas; techniques evolved to obtain refl. through some type of basalt; sed. thickness determined		
Portland	1964	1964/143 1965/198	To assess Vibroseis method on basalt-covered areas	Reflection, Vibroseis, 10-fold	Fair to good reflections obtained in basalt-covered areas, except where geological conditions disturbed		Contract survey by SSL
Gambier Sunklands	1964	1964/183 1965/198	To assess Vibroseis method on limestone-covered, sand-covered, and sand-dune ridges area where conventional results were poor	Reflection, Vibroseis, 10-fold	Reliable data to 4000 m obtained in limestone areas; good results in sand-cover areas except at depth; poor results in swampy ground between sand-dune ridges	Further work necessary in sand-dune areas	Contract survey by SSL
Hamilton–Heywood	1965	1966/25	To obtain comparison of shot-hole and Vibroseis techniques in basalt areas	Reflection, multiple shots and geophones	Technique evolved to produce reliable fair reflections; thickness of sed. determined	Surface noise, reflected refractions interfered; shorter spread and larger patterns may improve reflections	
Mt Gambier	1965	1966/176	To obtain comparison of shot-hole and Vibroseis techniques in limestone and sand-dune areas	Reflection multiple shots and geophones	Technique developed to produce fair reflections better than Vibroseis results in limestone and sand dune areas by using heavy charges	Transverse noise problem	
SE part	1967	1974/187	To determine if the gravity-low areas of Torquay Embayment and Port Phillip Sub-basin contained thick Cretaceous sed.	Refraction/ Reflection	Reflections of variable quality, refractions unreliable; thick sections of Tertiary and possible Cretaceous suggested	Additional reflection work using multiple coverage and digital processing recommended	
Perth Basin							
Dingin	1955	1956/26	To obtain info. on thickness and str. of the sed. and applicability of method	Reflection	Method applicable; thickness and str. (anticline) indicated	Additional work to map anticline and other str.	Now a gas field
		1966/149	To map anticline	Reflection	Axis and plunge of anticline indicated and str. mapped		

TABLE 1 (CONT.)

Area	Year	Record or Report	Objective	Nature of Work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Busselton	1956	1962/108	To find thickness and dip of sed. and discover any folding or faulting	Reflection	Poor reflections; thickness and str. indicated	Estimates not definite; high noise-level; multiple shot and geophones to be used	
Cookernup	1956	1962/109	To find thickness and dip of sed. near Darling Scarp and discover faulting/folding	Refraction/ Reflection	Poor reflections in limestone cover areas; better elsewhere; thickness and str. indicated; results inconclusive	Further work using multiple shots and geophones to investigate sed. thickness & str. near Darling Scarp, SW of Cookernup	
Rockingham-Mundijong	1956	1962/107	To give info. about depth of basin and str. adjacent to Darling Scarp	Refraction/ Reflection	Poor to fair results; thickness and str. indicated	Reflections E of fault unresolved	
Bullsbrook	1964	1964/155 1966/203	To derive suitable technique for reflections on the Coastal limestone formation, investigate str.	Reflection multiple shots and geophones	Poor to fair reflections in W, better in E; str. indicated	No suitable technique for limestone areas; detailed work for defining str.	
Surat Basin							
Roma	1949–50	Rep. 16	To attempt to confirm results of gravity survey and to provide more detail in critical areas	Reflection	Generally poor reflections; average dips mapped; str. agrees with gravity results	Improved techniques for better results; deep refraction also recommended	Well drilled on str. was dry; but other areas may be prospective
Roma	1952–53	Rep. 23	To determine any domal str. associated with known oil and gas occurrences at Roma	Reflection	No anticlinal str., data insufficient for closure on a domal str.; faults possible		Roma gas field
Surat	1958	1959/13	To determine best techniques in different surfaces, thickness of sed., to obtain evidence for Weribone Uplift	Refraction/ Reflection	Conventional methods useful; thickness, str. determined; no evidence for uplift	Extension of N dips to be checked by further work	
	1959	1960/107	To define E limit of basin, to investigate depth and str. of any Palaeozoic sed. of Bowen Basin	Refraction/ Reflection	Fair to good reflections; thickness and str. of sed. mapped; Permian and Carboniferous sed. suggested	Further work to investigate Permian fault blocks, relation between sed. and granite batholiths at Nebine Ridge and metamorphics sediments (in the Bore)	
N part	1960	1962/133	To extend the 1959 traverse, link to Roma area and investigate thickness and str. of sed.	Refraction/ Reflection multiple geophones	Good marker horizons mapped; str. and thickness of sediments determined; trough (Bowen Basin) indicated		
S part	1961	1962/183	To determine str. and thickness of sed., the S margin, and to work in N part	Refraction/ Reflection multiple geophones	Good reflections; thickness, str. and extension of Bowen Basin sed. indicated	Not known whether extension of Bowen Basin is separated from Sydney Basin	
Moree area	1962	1964/109	To investigate whether S extension of Bowen Basin joins Sydney Basin	Refraction/ Reflection	Good to poor quality reflections; thickness of str. and E margin outlined; troughs indicated	Poor results failed to indicate whether Bowen Basin trough joined Sydney Basin	

TABLE 1 (CONT.)

Area	Year	Record or Report	Objective	Nature of Work	Results/Conclusions	Problems remaining/ Recommendations	General Comments
Sydney Basin							
N of Sydney	1957	1958/48	To test applicability of method, to investigate sed.	Reflection, multiple hole and geophones	Method applicable; thickness determined	Insufficient work to determine structure	
Maitland	1964	1964/192 1965/198	To assess Vibroseis method in area of dense population and building	Reflection	Method capable of acceptable data; good reflections	Owing to high random noise, large compositing necessary	Contract survey by SS
Kulnura & Grassy Hill	1964	1964/191 1965/198	To assess Vibroseis method on Hawkesbury Sandstone areas of poor conventional results	Reflection	Fair to good reflection; good shallow info. and up to 3700 m using long offsets	Results not affected by surface formations	Contract survey by SS
Kulnura & Grassy Hill	1965	1966/115	To obtain comparison between shot-hole and Vibroseis techniques in areas of Hawkesbury Sandstone cover.	Reflection, multiple shots and geophones	Best results with heavy techniques; technique to be modified according to nature of Hawkesbury Sandstone	Shots to be fired under controlled conditions; noise cancellation necessary	

TABLE 2. PROPOSALS FOR FURTHER SEISMIC SURVEYS

PROJECT	PROPOSED BY	OBJECTIVE	NATURE OF WORK	REMARKS
Deep Crustal Structure Survey, central Australia	Sedimentary Section, Geophys. Br./D. Forman	To investigate str. of crust and upper mantle in Amadeus and Ngalia Basins and at basin margins to determine tectonic setting	Reflection/refraction seismic survey at these probes and detailed gravity along traverses	
Bulloo Depression, Cooper Basin	R. Vine	To investigate nature of Bulloo Depression and possible presence of thick sequence of Permo-Triassic sed.	Seismic profiling along traverse across the depression	
Nebine Ridge	B. Senior	To investigate Nebine Ridge and occurrence of Precipice and Evergreen sequences W of Ridge	Review and possible reinterpretation of existing data and a seismic survey	
Surat Basin	Geol. Branch	To assist N. Exon in review of geology of Surat Basin	Review of geophysical data which may lead to seismic field work	
Sydney Basin	A. Bigg-Wither	To obtain seismic information on critical tie-lines and on previously shot traverses to assist in study of Sydney Basin	Seismic survey	
Carpentaria Basin	F. Doutch	To obtain reconnaissance seismic coverage to assist in mapping of Carpentaria Basin N of 16°S lat.	Seismic reflection/refraction survey	
Impact Crater Study (Wolf Creek?)	Seismic, Gravity, and Marine and Regional Sections	To study another impact structure	Geophysical investigation using similar techniques as used on Gosses Bluff project	
Evaporite Study	A.T. Wells	To investigate diapiric structures and salt anticlines associated with bedded basinal evaporite deposits	Geophysical study of known diapiric structures to establish attitude, depth, source, and dimensions of mostly buried or largely concealed evaporite bodies	
Lennard Shelf	G.S.W.A.	To investigate strat. and str. of Devonian sed. in Lennard Shelf	Mainly shallow reflection survey	
Galilee Basin (Hughenden)	R. Vine	To determine if there is a steep margin to the U. Carboniferous-L. Permian trough of Galilee Basin near Hughenden	Seismic survey	
Olive River Basin, Carpentaria Basin-Peninsula Trough	H.F. Doutch	To investigate strat. and str. of Mesozoic rocks	Seismic survey	

TABLE 3. NATURE OF SEISMIC SURVEYS REQUIRED FOR ADDITIONAL INFORMATION IN BASIN AREAS

Basin	Reconnaissance survey areas	Objectives for detailed survey areas
Adavale	-	Shallow evaporites, deeper sediments, extension to NE
Amadeus	-	SE part; extensions under Canning and Eromanga Basins
Arckaringa	-	W, SW, and SE margins, relation with Officer Basin
Arrowie	-	E and W margins
Bancannia (Trough)	-	Nature and extent of sediments
Bonaparte Gulf	-	Possible salt domes onshore
Bowen	N	-
Canning	SE	Relation with Officer Basin, salt solution features and diapirs
Carnarvon	central and S	-
Carpentaria	E	-
Clarence-Moreton	most	Areas with igneous intrusions
Cooper	-	N and S extensions
Daly River	most	-
Darling	most	N and S extensions under Eromanga and Murray Basins
Drummond	-	Deeper section and connection with Adavale to SW
Duaringa	-	Mapping of oil shale
Eromanga	SE	Underlying basin sediments and their inter-relations; Toolebuc Limestone
Eucla	most	-
Galilee	-	N, W and E margins
Georgina	most	SE extension under Eromanga Basin
Gippsland	-	Basal Tertiary and basement
Laura	-	Section below Mesozoic
Maryborough	most	-
Murray	NE and SW	Underlying Darling Basin sediments
Ngalia	-	Northern margin, deep crustal structure; structural traps
Officer	selected	Transition between E and W parts; diapirs in NW
Olive River	-	Nature and structure of sediments below Carpentaria Basin
Ord	most	-
Otway	-	Basal Cretaceous in E part
Pedirka	-	S and E margins
Perth	-	Experimental
Polda	onshore	-
Surat	S	Dirranbandi Syncline and possible Jurassic pinchouts in SW
Sydney	-	S, W, and N parts; sections below coal measures
Tasmania	most	-
Warburton	-	Extent and definition of sediments
Warrabin (Trough)	-	Deep sediments; extensions to N and S
Wiso	most	-
Yarrol	most	-

PLATE 1

AREAS WHERE SEISMIC SURVEYS ARE REQUIRED IN AUSTRALIA

(PHANEROZOIC SEDIMENTARY BASINS)

MONEY SHOAL BASIN
BONAPARTE GULF BASIN
BROWSE BASIN
ORD BASIN
LALY RIVER BASIN
WISO BASIN
GEORGINA BASIN
CARPENTARIA BASIN
CAPE VOGEL BASIN
OLIVE RIVER BASIN
LAURA BASIN
CANNING BASIN
NGALIA BASIN
AMADEUS BASIN
OFFICER BASIN
ARCKARINGA BASIN
EUCLA BASIN
PEDIRKA BASIN
EROMANGA BASIN
COOPER BASIN
WARRABIN TROUGH (ADAVALE)
ADAVALE BASIN
GALILEE BASIN
DRUMMOND BASIN
DUARINGA BASIN
HILLSBOROUGH BASIN
STYX BASIN
YARROL BASIN
CAPRICORN BASIN
BOWEN BASIN
MULGILDIE BASIN
SURAT BASIN
MARYBOROUGH BASIN
ESK TROUGH
BANCANNIA TROUGH
DARLING BASIN
CLARENCE – MORETON BASIN
CARNARVON BASIN
PERTH BASIN
BREMER BASIN
ARROWIE BASIN
POLDA BASIN
ST VINCENT BASIN
MURRAY BASIN
SYDNEY BASIN
DUNTROON BASIN
OTWAY BASIN
GIPPSLAND BASIN
BASS BASIN
KING ISLAND SUB-BASIN (OTWAY)
TASMANIA BASIN

REFERENCE

- *Jurassic – Cretaceous and/or Tertiary basins*
- *Permo-Triassic and Triassic basins (including Late Carboniferous in places)*
- *Early Palaeozoic basins (including Early Carboniferous in places)*
- *Composite basins*
- *Geological boundaries are dotted where concealed or indefinite*
- *Reconnaissance (light to moderate techniques)*
- *Detailed (moderate to heavy techniques)*
- E *Experimental*
- S *Deep crustal*

200 0 200 400 600 800 1000 km

Simple conic projection

116°00' 122°00' 128°00' 134°00' 140°00'
12°00' 18°00' 24°00' 30°00' 36°00'
104°00' 110°00' 116°00' 122°00' 128°00' 134°00' 140°00' 146°00' 152°00' 158°00'

Based on XAUS-1-95 *Record No. 1975/20*

PLATE 2

AREAS OF GEOLOGICAL MAPPING / REVIEW PROJECTS

(PHANEROZOIC SEDIMENTARY BASINS)

MONEY SHOAL BASIN
CAPE VOGEL BASIN
OLIVE RIVER BASIN
BONAPARTE GULF BASIN
BROWSE BASIN
DALY RIVER BASIN
ORD BASIN
CARPENTARIA BASIN
LAURA BASIN
WISO BASIN
GEORGINA BASIN
CANNING BASIN
NGALIA BASIN
AMADEUS BASIN
GALILEE BASIN
DRUMMOND BASIN
DUARINGA BASIN
HILLSBOROUGH BASIN
STYX BASIN
YARROL BASIN
CAPRICORN BASIN
EROMANGA BASIN
ADAVALE BASIN
BOWEN BASIN
PEDIRKA BASIN
CARNARVON BASIN
OFFICER BASIN
COOPER BASIN
WARRABIN TROUGH (ADAVALE)
EROMANGA BASIN
MARYBOROUGH BASIN
MULGILDIE BASIN
ESK TROUGH
SURAT BASIN
ARCKARINGA BASIN
WARBURTON BASIN
BANCANNIA TROUGH
DARLING BASIN
EUCLA BASIN
ARROWIE BASIN
CLARENCE – MORETON BASIN
PERTH BASIN
POLDA BASIN
ST VINCENT BASIN
MURRAY BASIN
SYDNEY BASIN
BREMER BASIN
DUNTROON BASIN
OTWAY BASIN
GIPPSLAND BASIN
BASS BASIN
KING ISLAND SUB-BASIN (OTWAY)
TASMANIA BASIN

116°00' 122°00' 128°00' 134°00' 140°00'
12°00' 18°00' 24°00' 30°00' 36°00'
104°00' 110°00' 116°00' 122°00' 128°00' 134°00' 140°00' 146°00' 152°00' 158°00'

REFERENCE

- *Jurassic – Cretaceous and/or Tertiary basins*
- *Permo-Triassic and Triassic basins (including Late Carboniferous in places)*
- *Early Palaeozoic basins (including Early Carboniferous in places)*
- *Composite basins*
- *Geological boundaries are dotted where concealed or indefinite*
- *Completed recently (1970 – 1974)*
- *Underway or planned (1975 – 1976)*

200 0 200 400 600 800 1000km

Simple conic projection

Based on X AUS-1-95 *Record No. 1975/20*

A/B3-12