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DEPARTMENT OF ~~NATIONAL RESOURCES~~ NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

In Confidence

Record 1978/35

AN APPRAISAL OF PETROLEUM EXPLORATION TITLE AREAS

SA-4, SA-5, SA-6, SA-7, SA-10, SA-11

GREAT AUSTRALIAN BIGHT - SOUTH AUSTRALIA

September 1974

by

W.J. McAvoy and P. R. Temple

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SUMMARY

This Record is the result of a brief examination of data relevant to the title areas. All available data have been used in its preparation, including confidential company reports, but no original interpretation has been made.

Summaries are given of the geophysical history, the regional geology, and hydrocarbon prospects of the petroleum title areas concerned. Assessments have been made of the prospectivity of each of the title areas and recommendations are made for further exploration.

The title areas have been covered by a reconnaissance seismic grid, with detail coverage over known prospects. Stratigraphic control over the entire area is sparse and inadequate; only two wells, Echidna-1 and Platypus-1 have been drilled within the title areas under consideration.

Geophysical interpretation shows that the area can be divided into a number of separate sedimentary provinces: the Duntroon Basin, Great Australian Bight Basin, Polda Basin, and the offshore Eucla Basin.

The prospectivity of the basinal areas are regarded as fair.

INTRODUCTION

This Record is the result of a brief examination of data relevant to the title areas under review; only five weeks were alloted to the work.

All available data received in the Petroleum Explortation Branch under the Petroleum Search Subsidy Act and the Petroleum (Submerged Lands) Act were studied. No time was allowed for interpretative work and thus all interpretations presented are those of contractors and the title holders.

As applications for subsidy as well as confidential company reports and files have been used in this assessment, this Record must be classified as confidential.

The prospectivity map (Plate 1) accompanying the report shows the basin margins and significant tectonic features. A number of structural leads which have been partially or fully detailed are shown, however a number of other structural leads only delineated by reconnaissance seismic coverage are not shown. These will form the basis for further seismic programmes throughout the title areas under consideration. The stippled areas shown in the Duntroon Basin are uplift areas where seismic coverage indicates that prospective section is absent.

REGIONAL SETTING

The title areas under consideration are located in the Great Australian Bight between Kangaroo Island and the South Australian - Western Australian border (figure 1). The area encompasses the continental shelf and slope of the Great Australian Bight. Water depths range from very shallow at the coastline to in excess of 10,000 ft (3000m) within SA-11.

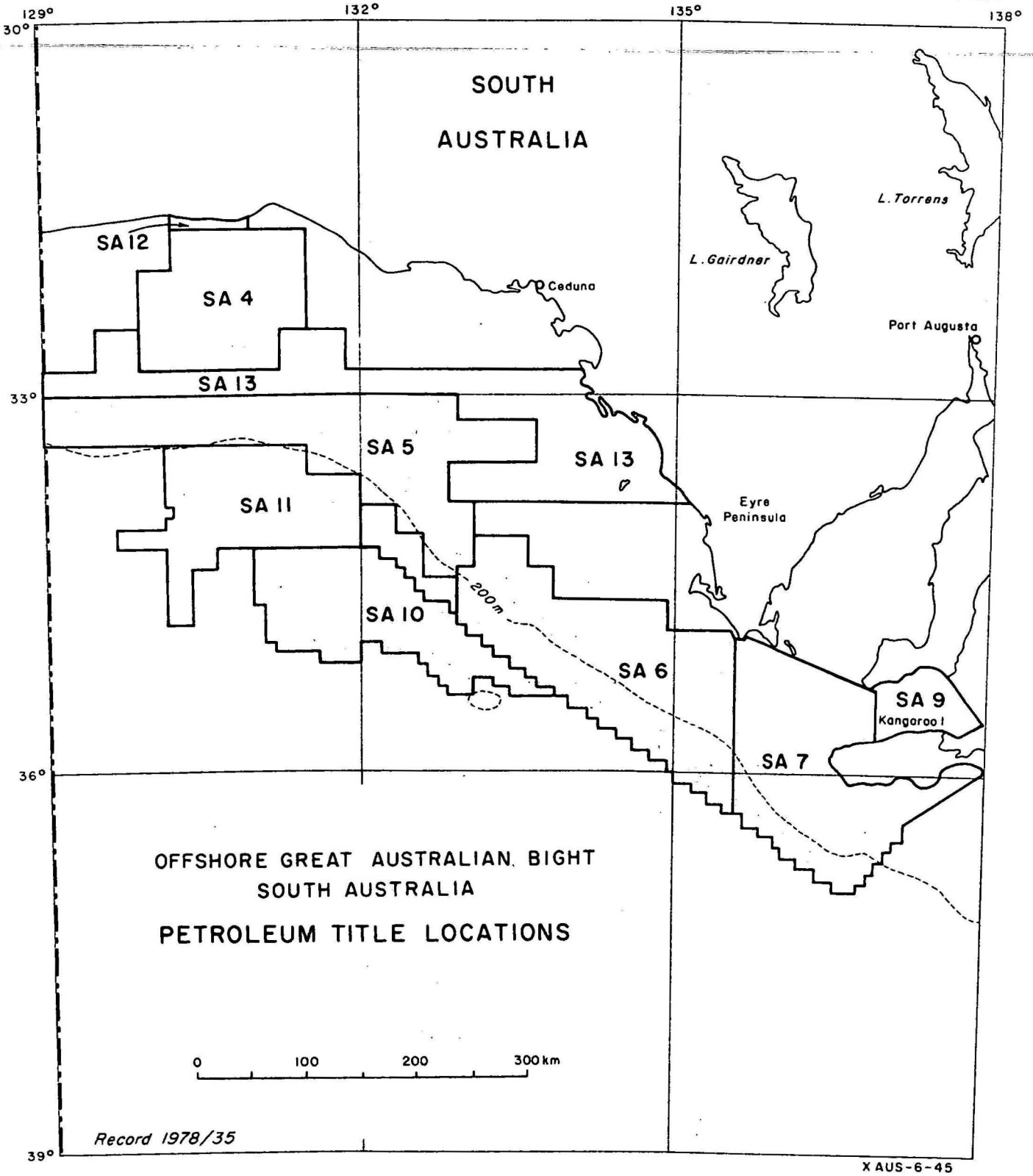
The 30-100 miles (50-160 Km) wide and 600 miles (1000 Km) long shelf of the Great Australian Bight is a gently sloping plain which is a seaward extension of the Eucla Basin. It is covered by coarse calcareous mainly Quaternary biogenic carbonate sand. The shelf to the east and west of the Great Australian Bight is generally narrow and studded with islands of Precambrian crystalline rocks.

The continental slope is steep and narrow and cut by numerous large canyons (seaward of the Precambrian outcropping shield rocks that flank the Eucla Basin). Seaward of the Eucla Basin the continental slope divides into an upper and lower slope separated by two marginal plateaus.

GEOPHYSICS

An extensive aeromagnetic coverage of tenements OEL 33 and OEL 38, covering the Great Australian Bight between longitudes 129° OOE and 137° OOE to a distance of approximately 100 miles (160 km) offshore, was completed by Aero Service Limited for Outback Oil Company N.L. and Shell Development (Australia) Pty Ltd in 1966. Approximately 10,000 line miles (16,000 Km) of N/S and NE/SW traverses at 7 (11 Km) mile intervals were flown. Results indicated that the Continental Shelf is underlain by a shallow basement complex extending out to approximately 100 miles (160 Km) narrowing to about 25 miles

FIG. 1


129°
132°
135°
138°
30°
33°
36°
39°
SOUTH
AUSTRALIA
SA 12
SA 4
SA 13
SA 5
SA 13
SA 11
SA 10
SA 6
SA 9
Kangaroo I
SA 7
Ceduna
L. Gairdner
L. Torrens
Port Augusta
Eyre
Peninsula
200 m
OFFSHORE GREAT AUSTRALIAN BIGHT
SOUTH AUSTRALIA
PETROLEUM TITLE LOCATIONS
0
100
200
300 km
Record 1978/35
X AUS-6-45

(40 Km) in the vicinity of Kangaroo Island. Basement depth estimates over this shelf area rarely exceed 3000 feet (900 m) except in an east-west trending trough west of Elliston where in excess of 8000 feet (2500 m) of sediments may be present in the Polda Basin. Other basinal developments occur at the head of the Bight where up to 6000 feet (1800 m) of sediments occur in the Mallabie Depression which extends onshore under the Eucla Basin, and in the Duntroon Basin south of Eyre Peninsula which contains more than 20,000 feet (6,000m) of sediments.

Earliest seismic investigation consisted of refraction probes shot southwest of Kangaroo Island by the U.S. Oceanographic vessel VEMA in 1960. Refraction investigations carried out onshore by SAMD in the Eucla Basin established a correlation between the high-velocity refractors (5.64 km/s to 6.10 km/s) and crystalline basement and medium-velocity refractors (4.42 km/s to 5.03 km/s) and pre-Cretaceous sediments (possibly Proterozoic). Under the PSSA, seismic surveys were carried out for Shell in 1966 and 1968, and for Tenneco in 1967.

Under the P(SL)A, Shell have carried out a series of reconnaissance surveys since 1969 and the use of modern techniques has resulted in data of improved quality. Most of the exploration effort has been concentrated in the Duntroon Basin where a number of structural leads have been detailed with a two-mile grid. Most of the title areas SA-10 and SA-11 are in water depths in excess of 2000 feet (600m) and this together with the rapidly increasing sedimentary thickness has adversely affected data quality. Reconnaissance coverage in these title areas (density 8 miles (13 km) by 8 miles (13 km) and less) has located a northwesterly trending group of structural leads in deep water. Outback Oil carried out an extensive investigation of SA-4 in 1972. The principal structural leads were detailed with a two-mile grid and three drill locations recommended.

Over the shallow shelf area it has been possible

to follow a base Tertiary event, an intra-Cretaceous horizon, and basement. Generally, sediments are thin over the shelf with sedimentary thickness increasing sharply at the continental slope to a maximum of 30,000 feet (900m) with an associated decrease in definition of deep events.

The major tectonic divisions indicated in the area by geophysical exploration are the offshore Eucla Basin and the associated Mallabie Depression, the Polda Basin, the Duntroon Basin, and the Great Australian Bight Basin.

Offshore Eucla Basin

Aeromagnetic and seismic coverage indicate that the offshore Eucla Basin consists of a thin veneer of Tertiary and Mesozoic sediments overlying shallow basement. In the Mallabie Depression up to 6000 feet (1800m) of sediments may be present. This feature lies within SA-4 and was investigated by modern seismic techniques in 1972 (Denman Seismic Survey). Structural leads were detailed and three drill sites recommended. Data of fair to good quality were obtained. The deepest continuous event, ranging from 0.5 sec. to a maximum of 1.0 sec. two-way time has the characteristic appearance of crystalline basement although the Denman interpretation correlates it with a Mesozoic horizon.

Polda Basin

The 1966 'aeromagnetic" coverage clearly suggested the presence of a trough of sediments extending east from the head of the Bight. Basement depth estimates suggested 8000 feet (2500m) of sediments. Seismic investigations in 1970 and 1971 confirmed the Polda Basin as a narrow graben with an infill of randomly dipping older sediments unconformably overlain by a

thin layer of flat-lying younger sediments. Structures have been detailed within the Polda Basin using 24 fold CDP reflection techniques. Refraction data indicate 7200 feet (2200m) of section at the western end of the trough down to a 20,300 ft (6100m)/sec. maker. Seismic record quality in the 1971 survey showed an improvement over earlier data but is still affected by multiple interference and lack of continuity of horizons.

Duntroon Basin

Geophysical results have confirmed the Duntroon Basin as an area of thick sediments consisting of folded Mesozoics unconformably overlain by Tertiary sediments. Results of the Duntroon Seismic Survey in 1972 indicate that the basin can be divided into four structural sub-divisions - a monoclinal zone, a folded zone, a step faulted zone, and a synsedimentary faulted zone. Record quality of the latest work was fair but deteriorates in water depths greater than 5000 feet (1500m). The seismic coverage has mapped the shallow basement areas forming the north and northeastern margin of the basin. Also a number of basement fault-blocks distributed between the monoclinal zone and the folded zone have been revealed. In the deeper water areas of SA-10 and SA-11 ($>$1000ft) ($>$300m) numerous structural leads are associated with a faulted zone. Further detailing of these leads would be required to mature drill sites.

Great Australian Bight Basin

The greater part of SA-10 and SA-11, which is located in water depths in excess of 2000ft (600m), occurs in a basinal area where Tertiary and Mesozoic sediments thicken

in a southerly direction. Reconnaissance seismic coverage was carried out for Shell in 1969, 1970 and 1971. Record quality ranged from poor to fair with the poor data being associated with the deeper water areas. A number of structural leads have been revealed but these will require further seismic detailing when and if exploration of prospects in these water depths becomes feasible.

REGIONAL GEOLOGY

The Great Australian Bight area lies offshore from a land mass where rocks from Archaean to Lower Palaeozoic age either cropout or have been reached at shallow depths in bores. Along Spencer Gulf and on Kangaroo Island, Cambro-Ordovician and Precambrian igneous and metamorphic rocks are exposed. From shallow boreholes further west on Eyre Peninsula and over the greater part of the Eucla Basin, basement rocks are known to occur at shallow depths overlain by a thin veneer of Tertiary and Quaternary sediments.

Data from surface geophysical surveys and two wells have enabled the geology of the continental margin of the Great Australian Bight region to be fairly well understood. Briefly, geophysical data suggest that the continental margin consists of a Precambrian crystalline shield overlain by Cretaceous to Recent sediments. Contouring of the irregular basal unconformity indicates that the old cratonic surface is dissected by a buried valley - canyon system which feeds seawards across the continental shelf to two large sediment wedges which underlie the Eyre and Ceduna marginal plateaus between depths of 1200 ft (360m) to 5400 ft (1650m). A large valleyfan system forms the continental rise seaward off the marginal plateaus and represents sediment accumulations off the

flanks and sides of these plateaus.

A number of separate basins have been recognised by explorers in these title areas and these will be further discussed. The basins of interest within the title areas under consideration are Eucla Basin, Polda Basin (Elliston Trough), Great Australian Bight Basin, and the Duntroon Basin.

Eucla Basin

To date no wells have been drilled in the offshore Eucla Basin so the sedimentary section remains speculative and can only be interpreted from geophysical data and extrapolation from onshore wells.

The Eucla Basin, onshore, is of arcuate shape and consists of a thin cover of Tertiary and Cretaceous sediments which have been deposited on an erosion surface cut across Precambrian crystalline shield rocks. Gentle subsidence of the Eucla Basin probably started in the late Jurassic or Early Cretaceous with the deposition of basal grit and conglomerate. The Cretaceous section consists of a continuous sequence of shallow marine to paralic sediments. The basin appears to have been open to the south in the western part of the Bight.

Tertiary sedimentation commenced with the local deposition of some continental clastic sediments during the Middle Eocene followed by the basinwide deposition of Middle Eocene-Lower Miocene carbonates. A hiatus between Upper Eocene and Lower Miocene limestones, observed at the eastern margin of the basin, appears to be filled progressively towards the centre of the basin. Since that time the Eucla Basin has remained a flat land surface except for minor incursions

of the dea during the Pleistocene.

Thin sequences of Upper Precambrian sediments occur sporadically on top of basement and are known to occur in some of the boreholes in the Eucla Basin. About 250 ft (75m) of Lower Permian sediments occur at the base of Nullabor 8 bore. These are the only Permian sediments known to be present beneath the Eucla Basin and probably represent a marine glacial remnant.

A recent seismic survey in the offshore area has confirmed the aeromagnetic configuration of the basin. It indicates a gently dipping section offshore between two platform areas. The depression, the Mollabie Depression is partly fault controlled and is referred to as the Central Graben. Farther south the sedimentary section thins over shallow basement and a basement ridge separates it from the Great Australian Bight Basin.

Aeromagnetic data indicate that a sedimentary section of up to 5500 ft (1650 m) exists within the graben, however seismic work indicates that the sedimentary section could even be thicker.

HYDROCARBON POTENTIAL

To the end of 1974, no wells had been drilled in the offshore Eucla Basin so the character of the sedimentary section and its hydrocarbon potential remain unknown. A Tertiary/ Cretaceous section is prognosed from exploration onshore although the existence of pre-Mesozoic sediments cannot be established until a well is drilled.

The northwest trending graben appears to be of major geologic interest. Three southwest trending anticlinal trends have been delineated in the graben and growth structures have

been mapped. A "reef-like" anomaly has also been mapped suggesting further leads within the basin.

Polda Basin (Elliston Trough)

The Polda Basin is a narrow trough extending westwards from the Eyre Peninsula into SA-13 and SA-5. A gravity survey carried out by the South Australian Department of Mines has established an onshore extension of the Polda Basin in which the Polda-1 water bore forms an important point of control.

The Polda-1 water bore, located near the southern margin of the trough drilled 65 ft (20m) of Quaternary, 160 ft (49m) of Middle Eocene non-marine sands and clay and 300 ft (91m) of Upper Jurassic non-marine lignitic silts and clay in which it reached total depth. These Upper Jurassic non-marine clastics probably represent the initial period of sedimentation within the young subsiding graben, and are believed to have been deposited directly on Precambrian granite and gneiss similar to the known granite outcrops in the immediate onshore area and also as found in the Eucla Basin located northwest of the Polda Basin. However, thin erosional remnants of Proterozoic (?) sediments, or Permian tillite, may be locally present beneath the Upper Jurassic non-marine clastics. These erosional remnants would have been covered and preserved because of their chance location within the graben area. (Local remnants of these older sediments have been penetrated in the Eucla Basin in the Nullabor - 8 bore.)

Up to late 1974, no wells had been drilled in the offshore Polda Basin and the basin configuration is only known from geophysical data. Offshore seismic data indicate that the basin is a faulted graben flanked on either side

by Archaean basement with a thin covering of probable Upper Eocene and Lower Miocene carbonates. The sedimentary section appears to thicken uniformly westwards from the Eyre Peninsula within SA-13, but at the boundary of SA-13 and SA-5 the trough narrows and the section thins appreciably towards the trough mouth, where it extends into the Great Australian Bight Basin.

The trough is believed to have evolved as a spur development during the initial rifting and separation of the Australian and Antarctic continental plates probably in the late Jurassic to early Cretaceous period.

Although no Cretaceous sediments were encountered in the onshore Polda water bore this does not exclude the occurrence of these rocks in the offshore basin where a fuller Mesozoic section is expected.

Regional extrapolations indicate that the sequence in the eastern part of the trough is likely to be developed in continental facies with marine influences increasing towards the west where the trough appears to be open to the sea. Seismic results at the mouth of the trough show that the major faulting affects only the lower (?) Mesozoic unit, which is overlain with slight angular unconformity by Tertiary sediments.

Hydrocarbon potential

To date no wells have been drilled in the offshore Polda Basin so the stratigraphy and hydrocarbon potential remain as largely speculative and extremely tentative. However, from regional considerations there is the possibility of at least three major transgressive - regressive marine cycles which would have created exploratory objectives in the Cretaceous/Tertiary section.

Great Australian Bight Basin

A deep water basinal area northwest of the Duntroon Basin and separated from the Eucla Basin by an east-west trending basement ridge has been informally named (by Shell) the Great

Australian Bight Basin.

The basin represents an area where Mesozoic and Tertiary sequences have been deposited on a continental margin. The basin obtained its present shape after the break up of the continents in the Upper Cretaceous and the subsequent emergence in Eocene times.

No wells had been drilled in the basin up to the end of 1974, and the stratigraphy is predicted from Echindna-1 and Platypus-1 wells and geological information from the onshore Eucla Basin.

Seismic horizons can be followed from SA-6 and SA-7 into the Great Australian Bight Basin and a similar sedimentary section is anticipated to that encountered in Platypus-1 and Echidna-1. From seafloor to the strong 'A' reflector (within Eocene) a carbonate section of mainly Miocene to Oligocene age is anticipated overlying a Tertiary clastic section of interbedded sands and shales of probably Palaeocene to Eocene age. A disconformity is believed to separate these Tertiary clastics from underlying uppermost Cretaceous sandstones and shales. As in the Duntroon Basin these Upper Cretaceous sandstones are believed to overlie Lower Cretaceous shales.

Although it does not seem likely, Jurassic or even older sediments may occur beneath the Lower Cretaceous overlying basement of metasediments and igneous rocks of Precambrian age as found on the Eyre Peninsula and the onshore Eucla Basin.

The northern basin edge consists of a stable basement platform dipping gently south to southwest. To the south near the boundary between SA-5 and SA-11, the platform is bounded by a system of major normal faults trending west-east to northwest-southeast throwing to the south. The basement is faulted down several thousand feet in this area; to the west and east this changes to a gently dipping basement slope broken up by down-to-the-basin faults. Faulting within the clastic sequence abutting the northern basement margins

is basement controlled. Farther south faulting rapidly decreases and basement is very deep.

Fault trends in the central part of the basin are NW-SE swinging more in a E-W direction and less dense to the south. Towards the southern part of the basin the S to SW dip in the sedimentary section is reversed and basement becomes shallower. A very pronounced regional low or depression runs E-W between these higher basement areas with a sedimentary section in the order of + 25,000 ft (7500).

The majority of structures are located in the north and central part of the basin although a number of structural leads have been delineated in the southern part of the basin. These structures are outlined by arc-shaped growth faults. Their closure is only partly due to their rollover nature and most is fault dependent. They have been covered by only a reconnaissance seismic grid and further detailing is necessary.

HYDROCARBON POTENTIAL

In view of the absence of any wells within the Great Australian Bight Basin any statement on the potential reservoir section must be regarded as tentative only. However, on the basis of a partly conjectural long distance correlation with Platypus-1 the main objective interval is thought to represent a thick sequence of porous sandstones with interfingered shales of Upper Cretaceous age. These reservoir rocks were penetrated in Platypus-1, individual sandstone beds are up to 90 ft (27m) thick with porosities ranging from 15-24%. In the southern part of the basin these sediments may be at too great a depth and objectives in this area would be Lower Tertiary sandstones.

Source rocks in this area are regarded as interbedded shales within the Upper Cretaceous sequence and Lower

Cretaceous shales. Further source potential has been indicated in Eocene and Jurassic deposits penetrated in the onshore Polda-1 well drilled by the South Australian Mines Department.

Duntroon Basin

The basin underlying the continental shelf and shelf margin in the area south of Eyre Peninsula and west of Kangaroo Island is referred to as the Duntroon Basin, the name being derived from the Duntroon Bank, situated to the west of the area.

The Duntroon Basin which was created by downfaulting of basment to considerable depth is the depositional area for a very thick sequence of sediments. The sedimentary fill which overlies basement with angular unconformity reaches a thickness of more than 20,000 feet (6000m). It consists of two sequences, a very thick and strongly folded section characterised by medium seismic velocities overlain with marked angular unconformity by a thinner section of low medium velocities which is only weakly deformed.

The basin is underlain and bounded by two different types of basement, the Archaean in the north and northeast and the Cambrian (Kanmantoo Group) in the east. This appears to be reflected by the basin margins. The northeast margin is formed by an en-echelon system of northwesterly and westerly trending major faults which limit the basin to the north. The more irregular eastern boundary is formed by a system of westerly plunging basement blocks bounded by faults which probably follow the east-west Adelaide Geosyncline trend as observed in Kanmantoo Group rocks on Kangaroo Island.

Based on the results of seismic interpretation and well data (Platypus-1, Echidna-1) the Duntroon Basin has been subdivided by Shell into 4 structural zones: Monoclinal zone, folded zone, step faulted zone, and synsedimentary faulted zone.

The first three coincide with the shelf area, the fourth covers the deeper water parts. The boundary can be conveniently taken at the 600 ft (200m) water depth contour.

In the monoclinal zone the structural configuration is a result of basement topography whereas in the other zones the structures are mainly related to a late Cretaceous phase of deformation.

In the folded zone an alternation of synclines and anticlines occurs. On all the anticlinal structures the Upper Cretaceous sandstone has been partly or wholly eroded. Echidna-1 well was drilled in this zone and penetrated a Tertiary section lying unconformably on Lower Cretaceous sediments.

The step faulted zone is divided into a number of fault blocks by two series of faults, one trending NW-SE and the second E-W. These faults do not show any associated roll-over structures and are considered to reflect deep-seated basement movement. Platypus-1 well which penetrated a Tertiary/Cretaceous section to TD 12,772 ft (3893m) was drilled in this zone. This is regarded as the most prospective zone in the basin because the Upper Cretaceous sandstone reservoirs occur at generally drillable depths while the associated source rocks are expected to lie in the mature zone.

The synsedimentary zone is characterised by a series of NW-SE trending synsedimentary faults showing a varying degree of growth. The zone forms structurally and stratigraphically part of the deeper water acreage of SA-6, SA-7, SA-10 and SA-11.

Only two wells, Platypus-1 and Echidna-1, have been drilled in the Duntroon Basin. Platypus-1 was drilled in the faulted outer shelf province. It penetrated an uppermost Tertiary carbonate section (3944 ft (1202m) proven), a Tertiary clastic section (862 ft (263m) and an Upper/Lower Cretaceous clastic section (6,570 ft (2003m)). No significant shows of hydrocarbons were encountered and

the well was plugged and abandoned at TD 12,772 ft (3893m).

Echidna-1 was drilled to evaluate the prospectivity of a regional uplift known as the mid-basin high where presumed Jurassic sandstones were mapped as occurring in a broad, faulted dome. A secondary objective was to evaluate the reservoir potential of part of the preserved Upper Cretaceous section which in this area occurs truncated by a pre-Tertiary unconformity. The well penetrated a Tertiary section lying unconformably on Lower Cretaceous sediments and terminated in Lower Cretaceous at TD 12,572 ft (3832m). The deep seismic marker expected to be the top of a Jurassic sandstone sequence was found to be caused by a contrast in velocity and density between overpressured shales above and compacted shales below at 11,940 ft (3639m) some 600 ft (183m) above prediction but still in Lower Cretaceous sediments. Neither objective section was penetrated, no significant hydrocarbon shows were encountered, and the well was plugged and abandoned.

HYDROCARBON POTENTIAL

The 3000 ft (900m) thick clastic Cretaceous sequence drilled in Platypus-1 between 9400 ft (2865m) - TD is the main proven potential reservoir section in the Duntroon Basin, and represents the primary objective for hydrocarbon search. Individual sandstone beds in Platypus-1 are up to 90 ft (27m) thick with porosities in the range from 15-24%. They are interpreted as channel deposits and may be located as shoe-string sands. These Cretaceous sandstones are considered to be present over most of the outer shelf province but may well have been deposited locally in different enviornments. No hydrocarbon shows were recorded in the porous sandstones of the Upper Cretaceous, but interbedded coal seams showed themselves capable of producing small amounts of gas. It seems

likely that the coal beds in Platypus-1 are not sufficiently mature as source rocks to have generated large volumes of hydrocarbons. Deeper burial (13,000-14,000 ft) (4000 - 4300m) may be required for them to produce large amounts of hydrocarbons. Certain areas are known in the Duntroon Basin where this section is deeper and therefore from this point of view may be considered to be more prospective than the Platypus area.

Secondary objectives are sandstones in the basal Tertiary/Upper Cretaceous section and Middle Eocene sands that represent a blanket cover over most of the onshore and offshore South Australia. These sands are considered attractive in spite of the fact that no hydrocarbons were recorded in these intervals in Platypus-1 and Echidna-1.

The absence of sizeable sandstone reservoirs and apparent paucity of source rocks in the dirlled Lower Cretaceous section of Echidna-1 and Platypus-1 considerably downgrade the prospectivity of these strata in the Duntroon Basin as a whole.

GEOPHYSICAL SURVEYS

SURVEY	DATES	COMPANY	CONTRACTOR	TENEMENTS	SEISMIC SOURCE
SUBSIDISED					
Marine Seismic					
South Australian Shelf R-1 66/11135	21/11/66-28/12/66	S.D.A.	Western	OEL 38 Sa	Expl.
Eucla Basin R-1 66/11139	12/ 1/67-20 2/67	Tenneco	Western	OEL 33 SA	Expl.
Eucla Basin R-2 67/11195	19/11/67- 3/12/67	Tenneco	Western	OEL 33 SA	Expl.
South Australian Shelf R-2 67/11/205	6/ 1/68- 6/ 1/68	S.D.A.	Namco G.S.I.	OEL 38 SA	Air-gun Expl.
Polda Basin 1 M.S. 70/163	6/ 2/70-17/ 2/70	Bridge	Teledyne	EPP 13	Sparker
Polda Basin 2 71/355	12/ 6/71-23/ 6/71	Target	Teledyne	SA5, SA13	Sparker Air-gun
Aeromagnetic					
OEL 38 A/M 66/4620	12/ 3/66-26/ 5/66	SDA/Out-back	Aero-Service	OEL 33,38	
Young Rocks A/M 68/3055	9/12/69-15/ 9/69	Hematite	C.G.G.	SA/P1, OEL 38	
UNSIBSIDISED					
South Australia Shelf R-4 69/2	15/11/69-28/12/69	S.D.A.	G.S.I. Geosurveys	SA5,6,7,10 11	Air-gun
Great Australian Bight R-5 70/1	12/11/70-24 1/71	S.D.A.	G.S.I. Western	SA 6,7 SA 5,10,11	Air-gun Aquapulse

Duntroon R-6 71/2	29/10/71-12/11/71	S.D.A.		SA 6,7	
	25/ 1/72-11/ 2/72	S.D.A.	G.S.I.	SA 10,11	Airgun
Denman 72/17	1/11/72-17/11/72	Outback Oil	G.S.A.	SA 4	Airgun
Polda Basin 72/36		Continental			
Great Australian Bight 73/6	1/ 4/73-25/ 4/73	S.D.A.	G.S.I.	SA 5, 6, 7	Airgun
Great Australian Bight R-8 74/2	22/ 2/74	S.D.A.			Airgun
Other					
B.M.R.	1970 - 1973				
South Australia Scientific Survey (72/20 (72/30	19/12/72-18/ 4/73	S.D.A.	Shell		Airgun

CABLE	RECORDER	COVERAGE	MILEAGE	REFR.	GRAV.	MEG.	QUALITY	REMARKS
1200 m	Dig.Redcor	300%	427				VP - P	Confirmed A-M Results
2400 m	Western FA-50	300/600%	536				VP - G	
1600 m	Western FA-50	300%	744				P - G	Average sedy. Thickness L 3500 feet.
7635 ft	SDS 1010	2400%	60				P - G	8000 feet in trough west of Elliston
		600%	403					
		100%	281.3				P - G	
		2400%	324					
2400-0	SDS 1010	100%	384				F	E-W Graben with
2400 m		2400%	336					approx. 7200 ft seds.
			10000					Shallow basement under most of survey area
			1754					
2400 m	DFS 111	2400%	2850				F - G	
2400 m	SDS 1010	2400%	2690				P - F	
2400 m	DFR 300		2165					
			859				F - G	
2400 m	DFS 111	2400%	1034					
5966 ft	DFS 111	2400%	1146				F - G	drillable leads

					Geophysical Summary and Drilling Proposal only
2400 m	DFS 111	2400%	251	F - G	
1200 m			933		
5966 ft			1110	F - G	
					Refer Traverse Map
2400 m	DFS 111				Refer Traverse Map

APPENDIX 2

TITLE ASSESSMENT SA-4

Title holder: Outback Oil Co. No.L.
No. of blocks: 238 blocks
Expiry date: 11.12.74
Farmout negotiations: Nil
Previous six-year conditions: Not on file
Regional setting : SA-4 is situated offshore in the Great Australian Bight, the entire title area lying on the Continental Shelf. Water depths vary from very shallow at the northern extremity to 300 ft at the southern boundary of the title area.

Wells drilled: No wells had been drilled within the title area at the time of this assessment.

Geophysical coverage : Refer to the seismic line density maps, details of geophysical surveys (Appendix 1) and basin notes.

Prospectivity: Basement is at shallow depths over this title area except in the central graben-like depression where up to 6000 ft (1800m) of sediments may be present. At present the prospectivity of SA-4 can only be regarded as fair to poor because the sedimentary section known onshore is thin and unattractive. Prospects appear to be restricted to the Tertiary and Cretaceous, however the type of section penetrated onshore was not attractive for petroleum prospects.

Geophysical exploration in SA-4 has reached a fairly advanced stage. The title area has a good reconnaissance seismic coverage and a number of features have sufficient detail coverage for drilling locations to be recommended.

Recommendations: At this stage, as very little is known of the geology of the offshore Eucla Basin, the only activity which could be recommended would be the drilling of a well to basement on one of the three structures detailed by the Outback Oil seismic coverage. Minimum sedimentary thickness expected on these features ranges from 2500 feet (750m) to 5500 feet (1650m) but there is some questionable evidence on the seismic sections for deeper section. Further exploration will be dependent upon the stratigraphy, facies, and petroleum potential of the sedimentary section encountered in the test well.

APPENDIX 3

TITLE ASSESSMENT SA-5

Title holder:	Shell Development (Aust.) Pty Ltd
No. of blocks:	400 blocks
Expiry date:	11.12.74
Farmout negotiations:	Nil
Previous six-year conditions:	Not on file

Regional setting: SA-5 is an elongated east-west title area situated centrally in the South Australian protion of the Great Australian Bight. Water depths vary from 300 ft (100m) at the northern part of the title area to in excess of 2000 ft (600m) at the southern margins.

Wells drilled: No wells had been drilled in SA-5 at the time of this assessment.

Geophysical coverage: Refer to the seismsic line density maps, details of geophysical surveys (Appendix1), and basin notes.

Prospectivity: SA-5 is located on the northern flank of the Great Australian Bight Basin. The northeast portion of SA-5, however, covers part of a separate geological province, an east-west trending depression with an onshore extension to the Eyre Peninsula (this trough is referred to as the Polda Basin). SA-5 can be conveniently divided into four distinct areas - shallow basement margins, platform areas, northern margins of Great Australian Bight Basin, and the Polda Basin.

SHALLOW BASEMENT MARGINS

This area includes the basement ridge separating the Eucla Basin from the Great Australian Bight Basin and extends along the northern extremity of the title area and the areas of shallow basement north and south of the Polda Basin. It seems likely that less than 2000 ft (600m) of Tertiary sediments occur resting unconformably on basement in these regions.

RECOMMENDATION

No further work at this stage.

PLATFORM AREAS

This is a stable basement platofrm dipping gently south to south-west. To the south between SA-5 and SA-11, the platform is bounded by a system of major normal faults trending W-E to NW-SE throwing down to the south. The sedimentary section laps onto the platform and the most likely prospects in this area are wedge-out possibilities against basement uplifts. A number of these have been delineated by seismic coverage. The prospective section is

thought to be sandstones within the Upper Cretaceous.

The southern part of the platform area lies in water depths between 600 ft (200m) and 1000 feet (300m).

RECOMMENDATION

Should subsequent investigation upgrade the hydrocarbon prospects of the basin, further seismic work to investigate stratigraphic trapping possibilities on the platform area would be warranted.

NORTHERN MARGINS OF THE GREAT AUSTRALIAN BIGHT BASIN

The Great Australian Bight Basin is a deep-water basinal area. Only the southern margins of SA-5 lie on the downthrown side of the major basin limiting fault systems. Two fault-controlled prospects have been confirmed by detailed seismic coverage in 1973. One of these structures (Potoroo) is associated with minor dip reversal into the fault and offers marginally better prospects than the other (Bunyip) which is wholly dependent on fault closue, and affords stratigraphic entrapment possibilities only.

Recommendation: As no wells have been drilled to date in SA-5 and since no anticlinal structures have been mapped, the next stage in exploration should be the drilling of a stratigraphic test on the Potoroo prospect. The stratigraphy remains speculative but it is assumed that the primary objectives would lie in the Upper Cretaceous. A well drilled to 11,500 ft (3500 m) or prior basement, should adequately test this structure. If encouraging indications result from this initial test the drilling of Bunyip prospect would be the logical next step. As in the case of the Potoroo structure, a well drilled to 11,500 ft (3500m) or prior basement should provide an adequate test of the Bunyip prospect.

Both prospects are situated updip from a large depositional basin and are well situated to receive migrating hydrocarbons.

Because of the excessive water depth 750 ft (225m) at Bunyip and 900 ft (270m) at Potoroo) the company could only reasonably be expected to drill one of these leads when suitable rig capacity becomes available.

Polda Basin Reconnaissance seismic and aeromagnetic coverage indicate a maximum of approximately 6000 feet (1800m) of sedimentary section at the mouth of the Basin. The stratigraphy and hydrocarbon potential are unknown. It is assumed that Tertiary and Cretaceous sediments overly economic basement. No structural leads are shown within SA-5 and the prospectivity must be regarded as poor.

Recommendation. No further work is considered justified except in the event of favourable indications from a well drilled in the deeper basinal area of the Polda Basin within SA-13.

APPENDIX 4

TITLE ASSESSMENT SA-6

Title holder:	Shell Development (Aust). Pty. Ltd.
No. of blocks:	385 blocks
Expiry date:	11.12.74
Farmout negotiations:	Nil

Previous six-year conditions

1st year	$ 125,000	324.68 per block/year
2nd year	$ 75,000	194.81 per block/year
3rd year	$ 75,000	194.81 per block/year
4th year)		3896.10 per block/year
5th)	$3,000,000	3896.10 per block/year
6th	$ 40,000	103.90 per block/year
	$3,315,000	average = 1435.07 per block year

Regional setting: SA-6 is located offshore from the Eyre Peninsula in the Great Australian Bight. The title area straddles the continental shelf and continental slope and water depths vary from very shallow near the coast to in excess of 6000 ft (1800m) at the southern extremity of the title area.

Wells drilled: One well, Platypus-1, has been drilled within the title area. Platypus-1 was drilled on a structure in an area south of the Duntroon Basin Mid-Basin High. The well penetrated an uppermost Tertiary carbonate section, a Tertiary clastic section, and an Upper-Lower Cretaceous clastic section in which it reached T.D. at 12,772 ft (3893m). No hydrocarbon shows were encountered and the well was plugged and abandoned.

Geophysical coverage: Refer to seismic line density maps, details of geophysical surveys (Appendix 1), and basin notes.

Prospectivity: SA-6 can be conveniently divided into three regions - a shallow basement area, a shallow water area, and a deep water area.

Shallow Basement Area. This is an area of shallow basement with only Tertiary sediments resting unconformably on shallow basement.

Recommendation. The shallow basement and thin sedimentary column make this area unattractive an no further work is recommended.

Shallow Water Area: The prospective horizons in this area are sands within the basal Tertiary/Upper Cretaceous section. On the results of exploration to date, the Duntroon Basin in SA-6 has been divided on structural grounds into a northern monoclinal zone, an inner folded zone, and an outer step-

faulted zone. The monoclinal zone is indicated as being fairly featureless, the sedimentary section thickening southwards off the basement scarp. In the folded zone a number of anticlinal features have been mapped. One of these, Echidna, has been tested by a well in SA-7. Results were discouraging because no reservoir rocks were encountered in the Cretaceous, and the prospective Upper Cretaceous section encountered in Platypus-1. was not present. Two other structures in SA-6 are located on the flanks of the Echidna basement high trend and it is therefore likely that they will show an equally unfavourable stratigraphy. There would appear to be outside possibilities of stratigraphic entrapment around the basement highs.

The step-faulted zone is regarded as the most prospective zone in the basin because the Upper Cretaceous sandstone reservoirs occur at drillable depths while the associated source rocks are expected to be mature. Platypus-1 has been drilled in this zone and has proven a potential reservoir section within the Upper Cretaceous. A number of other fault blocks have been delineated by detail seismic coverage. Two of these, Wallaroo and Bandicoot, have been detailed. Of these, Wallaroo is more prospective, having three culminations in two adjacent fault blocks (Wallaroo North, East, and West). Recent seismic evaluation has downgraded Bandicoot.

Recommendation: The culmination at Wallaroo East has achieved drillable status although it must be regarded as a risk venture because it relies on fault closure for sealing. A well drilled to a depth of 1150ft (3500m) or prior Lower Cretaceous should adequately test this feature. Further work would be dependent on the results of this well.

Deep Water Area: A number of structural leads have been delineated in water depths greater than 2000ft (600m). These structures are associated with growth

faults. Even if advances in technology were to make drilling in these excessive water depths feasible it seems likely that the prospective Upper Cretaceous sands would be beyond economic depth on some structures.

Recommendation: Further reconnaissance detail seismic coverage hopefully followed by a well on any lead.

APPENDIX 5

TITLE ASSESSMENT SA-7

Title holder:	Shell Development (Aust)Pty Ltd
No. of blocks:	371 blocks
Expiry date:	8.1.75
Farmout negotiations:	Nil
Previous six-year conditions:	Not on file

Regional setting: SA-7 is located offshore south of the Eyre Peninsula and west of Kangaroo Island. The title area straddles the continental shelf and slope and water depths vary from nil at the coast to in excess of 6000 ft (1800m) at the southern margin of the title area.

Wells drilled: One well, Echidna - 1, has been drilled in SA-7 It was drilled to evaluate the prospectivity of a regional uplift in the Duntroon Basin known as the Mid-Basin High. The well penetrated a Tertiary section lying unconformably on Lower Cretaceous sediments in which it terminated at T.D. 12,572 ft. (3832m). No significant hydrocarbon shows were encountered and the well was plugged and abandoned.

Geophysical coverage: Refer to seismic line density maps, details of geophysical surveys (Appendix 1), and basin notes.

Prospectivity: SA-7 can be conveniently divided into three regions - a shallow basement area, a shallow water area, and

a deep water area.

Shallow Basement Area. (shaded brown on the prospectivity map)

This is an area of shallow basement between the coast and the Duntroon Basin and around Kangaroo Island. Seismic investigations indicate that only Tertiary sediments rest unconformably on shallow basement.

Recommendation: The shallow basement and thin sedimentary column make this area unattractive and no further work is recommended.

Shallow Water Area: The prospective horizons in this area are sands within the basal Tertiary/Upper Cretaceous section. On the results of exploration to date the Duntroon Basin in SA-7 has been divided into three separate regions, an inner folded zone, a step-faulted zone, and a zone of basement uplift. One well, Echidna-1, has been drilled on the Mid-Basin uplift zone; the prospective section (U. Cretaceous) encountered in Platypus - 1 was not present. It seems likely that other such high areas would give the same results as Echidna - 1. Two prospects (Koala and Cuscus) have been detailed within SA-7 in the folded zone on the flanks of such uplift areas. Both prospects have been downgraded but Cuscus is believed to be similar to Echidna - 1 and thus devoid of reservoir rocks and suspected turnover at Koala has been disproven. A further lead in the south-eastern part of the Duntroon Basin (Quokka) has recently been detailed by a seismic survey recorded in February 1974.

Recommendation: Dependent on the results of the 1974 survey, Quokka may have attained drillable status. If favourable indications result from the drilling of Quokka-1 other prospects in SA-7 will be upgraded.

Deep Water Area: This area beyond 600 ft (200m) water depth is virtually unexplored. Its prospectivity remains unknown, but it seems likely that the prospective Upper Cretaceous section is at excessive depth and detailing may not be warranted. However, sparse reconnaissance seismic work would be required to clarify the situation.

Recommendation: Reconnaissance seismic coverage.

APPENDIX 6

TITLE ASSESSMENT SA-10

Title holder:	Shell Development (Aust) Pty Ltd
No of blocks:	239 blocks
Expiry date:	7.5.78
Farmout negotiations	Nil

Previous six-year conditions

1st year	$250,000
2nd year	$225,000
3rd - 6th years	Expenditure in these years dependent on appraisal of work carried out in first two years.

Special conditions: A special condition exists for title areas SA-10 and SA-11.

"During the fourth year of the permit a detailed evaluation to be carried out of all geophysical programmes with the object of determining the best possible drilling location. As the commencement of offshore drilling in waters of the depths existing in the permit area is dependent on the development of techniques which would allow for the fifth and sixth years are correspondingly conditional on technological progress beyond that now available, the permittee, therefore, may elect between the following alternatives at the end of

the fourth year-

a) relinquishment of the total area covered by the application; or

b) relinquishment of 40% of the area immediately, but at the same time to submit a programme aimed at the drilling of a well to a depth of approximately 10,000 ft (3000m) or shallower basement as soon as practicable within five years after the expiry of the initial four-year period."

The title holder has chosen the latter (b) course of action and has relinquished 40% of the title area (13 April 1973), and has also proposed to drill at least one well in each title area SA-10 and SA-11 before May 1978 providing it is possible to mature a technically sound prospect in each of the retained areas.

Regional setting: SA-10 is located on the continental slope of the South Australian portion of the Great Australian Bight. Within the retained portions of the title area, water depths vary from over 1000 ft (300m) at the northern margin to over 6000 (1800m) at the southwestern extremities.

Wells drilled: To date no wells have been drilled in SA-10.

Geophysical coverage: Refer to seismic line density maps, details of geophysical surveys (Appendix 1), and basin notes.

Prospectivity: The main reservoir objective in the permit area is equated with a sequence of alternating seismic reflections, thought to represent the basal Tertiary/Upper Cretaceous sand-shale sequence encountered in Platypus-1 well.

Shell have divided the title area into three structural zones:
a northern monoclinal zone with minor low relief roll-over

structures;
a central WNW-ESE block-faulted high zone; and
a southern zone with some structural indications.

The central high trend appears to be the most attractive zone. Two main leads, Rosella and Jabiru, have been tentatively outlined on this regional high. Both have poorly defined eastern closure. Thus the two leads could be either connected with each other constituting an enormous sturctural trap or they could be part of a gigantic structural nose. Both prospects are situated in water depths between 3500 (1100m) and 4000 ft (1200m). Reconnaissance seismic coverage in the southern zone has delineated shallow structural leads, possibly in the lower Tertiary section (?). Water depths in this area are in excess of 5000 ft (1500m).

Recommendations: Both structural leads on the central high zone have been further detailed by recent seismic coverage (R-8). Hopefully, the results of this seismic coverage will further refine these structures. However, as the structures are situated in very deep water and at present no techniques exist which would allow for drilling and production in water-depths of this nature, the company has indicated its proposal to drill a well before May 1978. This appears to be a reasonable proposition and satisfies title requirements.

Further seismic reconnaissance and detailing will be necessary to evaluate the numerous structural leads within the the title area.

APPENDIX 7

TITLE ASSESSMENT SA-11

Title holder:	Shell Development (Aust) Pty. Ltd
No. of blocks:	240 blocks
Expiry date:	7.5.78
Farmout negotiations:	Nil
Previous six-year conditions:	

1st year	$250,000
2nd year	$225,000
3rd - 6th years	Expenditure in these years dependent on appraisal of work carried out in first two years

Special Conditions: A special condition exists for title areas SA-10 and SA-11.

"During the fourth year of the permit a detailed evaluation to be carried out of all geophysical programmes with the object of determining the best possible drilling location. As the commencement of offshore drilling in waters of the depths existing in the permit area is dependent on the development of techniques which would allow for the fifth and sixth years are correspondingly conditional on technological progress beyond that now available, the permitte, therefore, may elect between the following alternatives at the end of the fourth year -

a) a relinquishment of the total area covered by the application;
or

b) relinquishment of 40% of the area immediately, but at the same time to submit a programme aimed at the drilling of a well to a depth of approximately 10,000 ft (3000m) or shallower basement as soon as practicable within five years after the expiry of the initial four-year period."

The title holder has chosen the latter (b) course of action and has relinquished 40% of the title area (13 April 1973), and has also proposed to drill at least one well in each title area SA-10 and SA-11 before May 1978 providing it is possible to mature a technically sound prospect in each of the retained areas.

Regional setting: SA-11 is located on the continental shelf and continental slope of the South Australian portion of the Great Australian Bight. Water depths vary from a little over 600 ft (200m) at the northeastern extremity of the title area to 8000 ft (2500m) at the southern margins.

Wells drilled: No wells have been drilled within the title area.

Geophysical coverage: Refer to seismic line density maps, details of geophysical surveys (Appendix 1), and basin notes.

Prospectivity: The main reservoir objective in the permit area is equated with a sequence of alternating seismic reflections thought to represent the basal Tertiary/Upper Cretaceous sand-shale sequence encountered in Platypus - 1 well.

Shell have delineated a shallow WNW-ESE basement escarpment in the north of the title area. South of this, basement again rises and forms an elongated WNW-ESE high anticlinal trend. Farther south basement dips in a southerly direction and becomes very deep. Faulting is very prominent and is partly basement controlled. Thickening of the sedimentary section on the downthrown side of the faults indicates that they are growth faults.

Two fault-closed structural traps related to the growth - faulting have been partly delineated. These are Cassowary (water depth $\pm$ 3800 ft (1150m) and Galah (water depth $\pm$ 3800ft). These prospects have been further detailed by seismic coverage (R-8).

Recommendations: Providing the results of the recent seismic coverage will sufficiently mature the two structural leads into drillable locations, then a well can be recommended on one of them. Further seismic reconnaissance and detailing will be necessary to evaluate the numerous structural leads within the title area.

TABLE NO.1

Wells	Title	TD	Rig Release	RT/WD	Basin	Base Tertiary
Echidna - 1	SA -7	12572' (3832m)	17.3.72	+99'/456' 300m 130m	Duntroon	4178' (1273m)
Platypus - 1	SA - 6	12772' (3893m)	30.4.72	+99'/518' 30m 158m	Duntroon	6103' (1860m)

TABLE 1 contd.

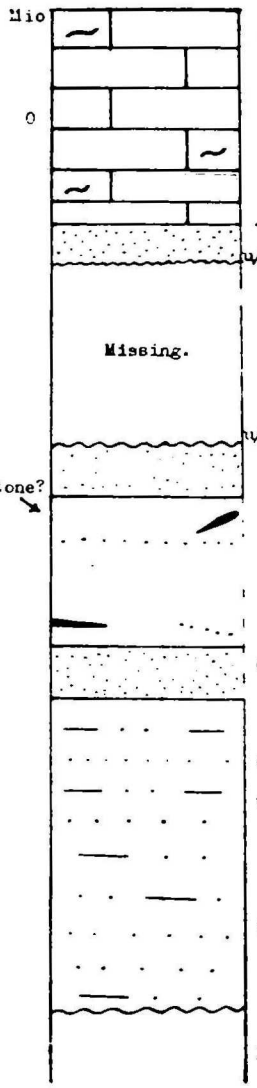
Deepest horizon	Rig	Trap	Cost $MM	Status	Remarks
L. Cretaceous	Ocean Digger	Anticline	2.83	p/a	U. Cret. absent Drilled on Mid-Basin High
L. Cretaceous	Ocean Digger	Anticline	1.96	p/a	Potential Reservoir sands in Upper Cretaceous

Table 2

DUNGROON BASIN

		RT+99'(30m) Echidna - 1	RT+99'(30m) Platypus - 1	Poss. Otway Basin Equiv.
TERTIARY	Pliocene			
	Miocene	1310'(399m)	1430'(436m)	
	Oligocene			
	Eocene	U L 3402'(1042m)	5340'(1628m) 5544'(1629m)	
CRETACEOUS Upper	Palaeocene			
	Danian			
	Maestrichtian			
	Campanian		U M L 6202'(1890m) 6467'(1971m)	- Belfast Mudstone?
	Santonian — Senonian			
	Coniacian			
	Turonian		U	
	Cenomanian		9492'(2893m)	- Waarre Fm?
CRETACEOUS Lower	Albian		11077'(3376m)	- Otway Group?
	Aptian	4277'(1304m)		
	Barremian			
	Hauterivian — Neocomian	6150'(1875m)		
	Valanginian			
	Berriasian			
		(3832m)	(3893m)	
	T.D.	12572'	12772'	

Regional Stratigraphy - based on Echidna - 1, Platypus - 1 and onshore data



Carbonates deposited on shelf and continental slope

← 'A' Horizon

Missing.

Marine barrier sands

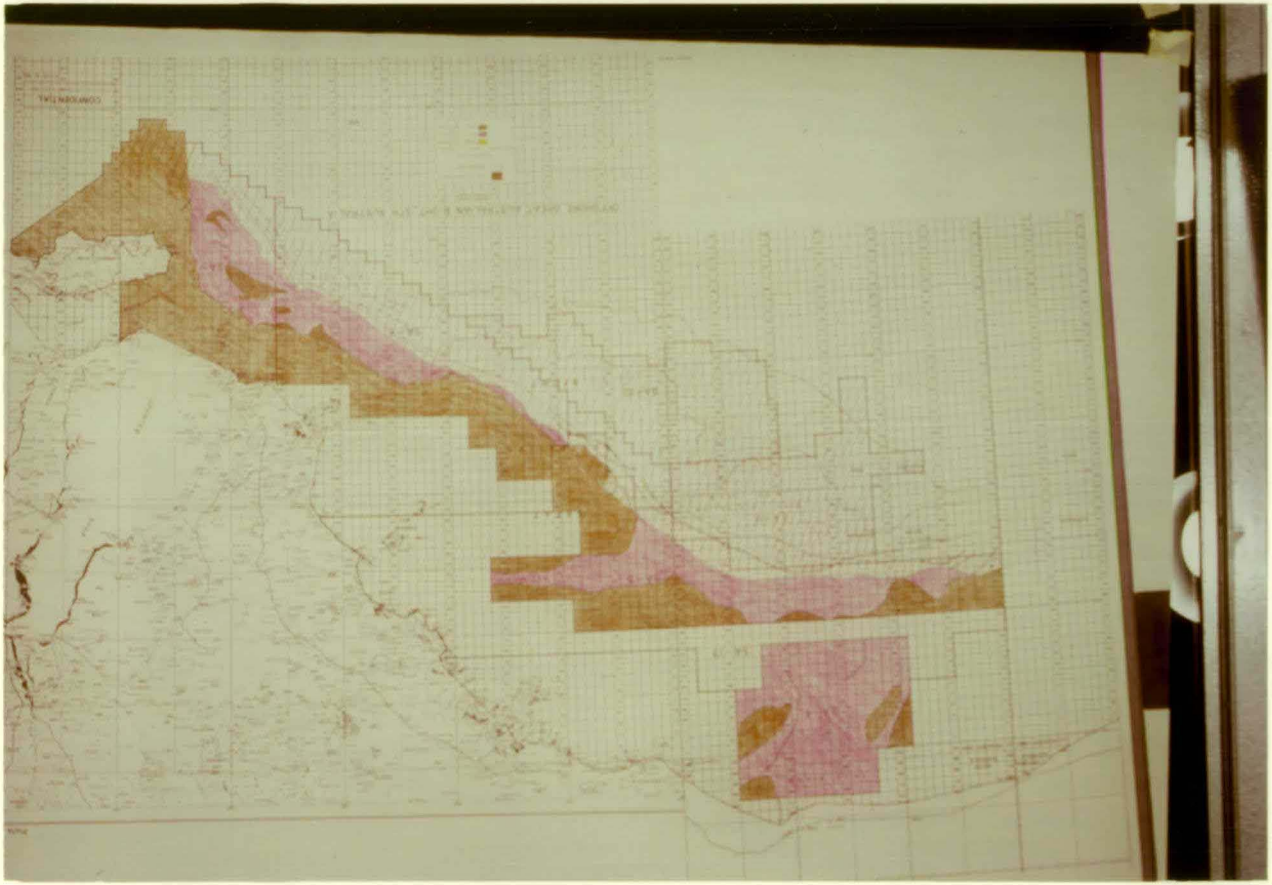
Marine clays siltstones w/occasional thin sandstone beds.

Channel sandstones w/interbedded coals and carbonaceous shales. } Main Objective. ← Mapped Cretaceous seismic horizon lies within this sequence.

Alternating siltstones, sandstones and shales w/interbedded coal.

Shales and siltstones.

Basement (Precambrian and Palaeozoic).



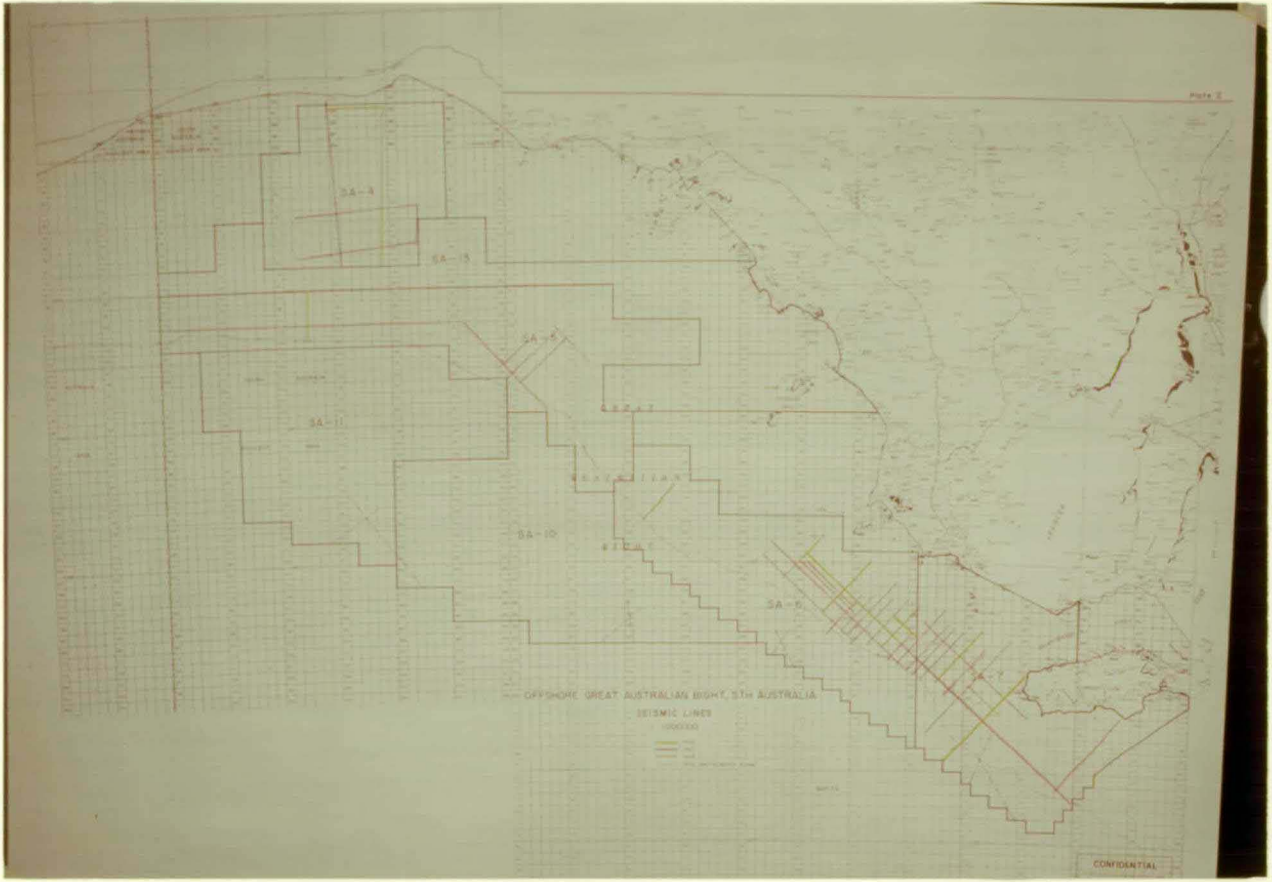


Plate 2
SA-4
SA-13
SA-6
SA-11
SA-10
SA-5
OFFSHORE GREAT AUSTRALIAN BIGHT, S.Th AUSTRALIA
SEISMIC LINES
CONFIDENTIAL

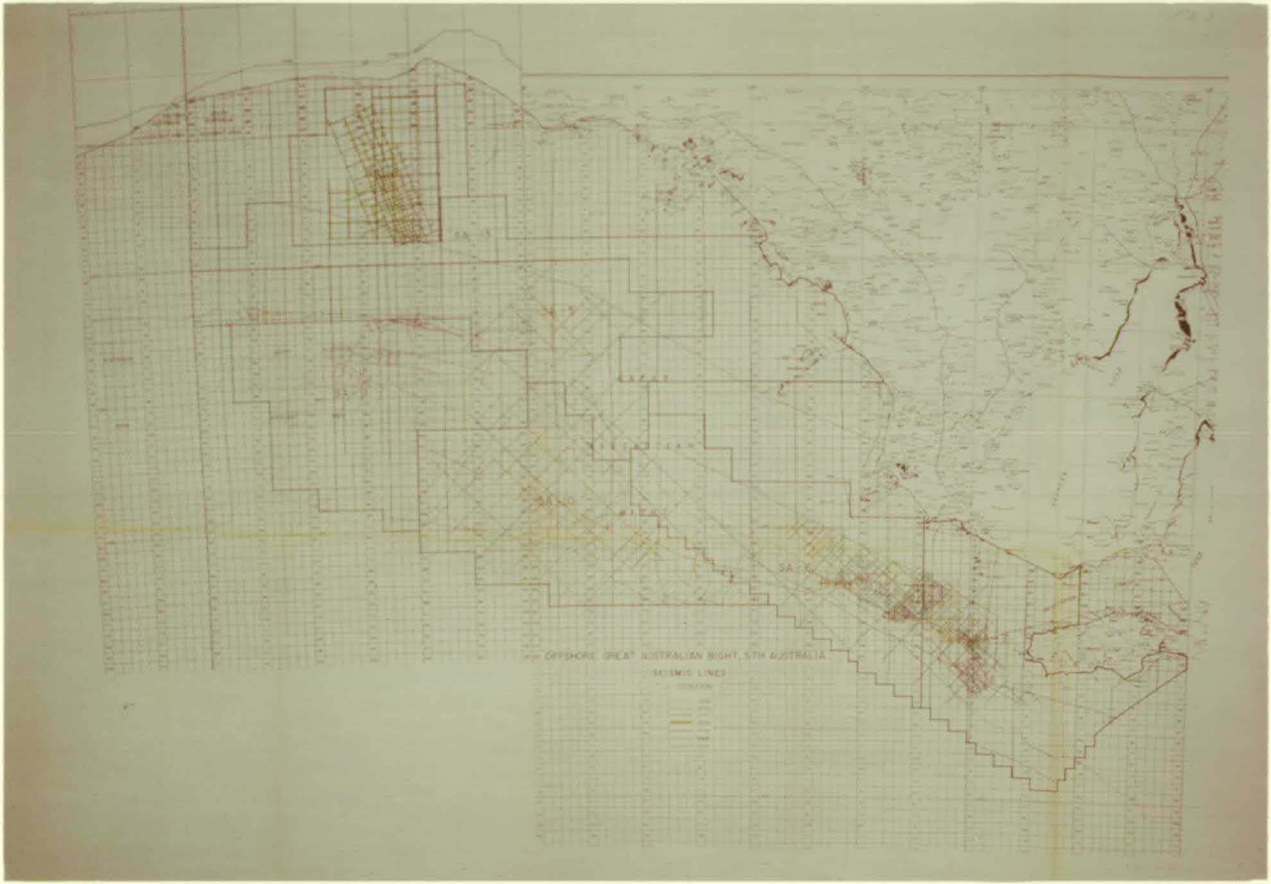

OFFSHORE GREAT AUSTRALIAN BIGHT, STH AUSTRALIA
SEISMIC LINES

Plate 1

OFFSHORE GREAT AUSTRALIAN BIGHT, STH AUSTRALIA

1 : 1 000 000

MAP 1

Upper Cretaceous absent

Structural lead

PROSPECTIVITY

Water depth	< 600 ft	> 600 ft
	Good	Good
	Fair	Fair
	Poor	Poor

SA-4 MALLABIE DEPRESSION

SA-13 EUCLA BASIN

SA-5 POLDA BASIN

SA-11 GREAT AUSTRALIAN BIGHT BASIN

SA-10 GREAT AUSTRALIAN BIGHT

SA-6 DUNTROON BASIN

SA-7

Monoclinal zone

SHALLOW BASEMENT

Sinsedimentary faulted zone

Stepfaulted zone

Folded zone

Platypus

Echidna 1

WESTERN AUSTRALIA ADJACENT AREA

SOUTH AUSTRALIA ADJACENT AREA

SOUTH AUSTRALIA

AUSTRALIA

ADJACENT AREA

INVESTIGATOR GROUP

ARKOOSE BAY

ANXIOUS BAY

EYRE PENINSULA

SPENCER GULF

INVESTIGATOR STRAIT

KANGAROO ISLAND

TARCOOLA

LAKE TORRENS

LAKE GAIRDNER

LAKE MACFARLANE

PORT AUGUSTA

WHYALLA

GERMEIN BAY

PORT LINCOLN

CEDUNA

Record 1978/35

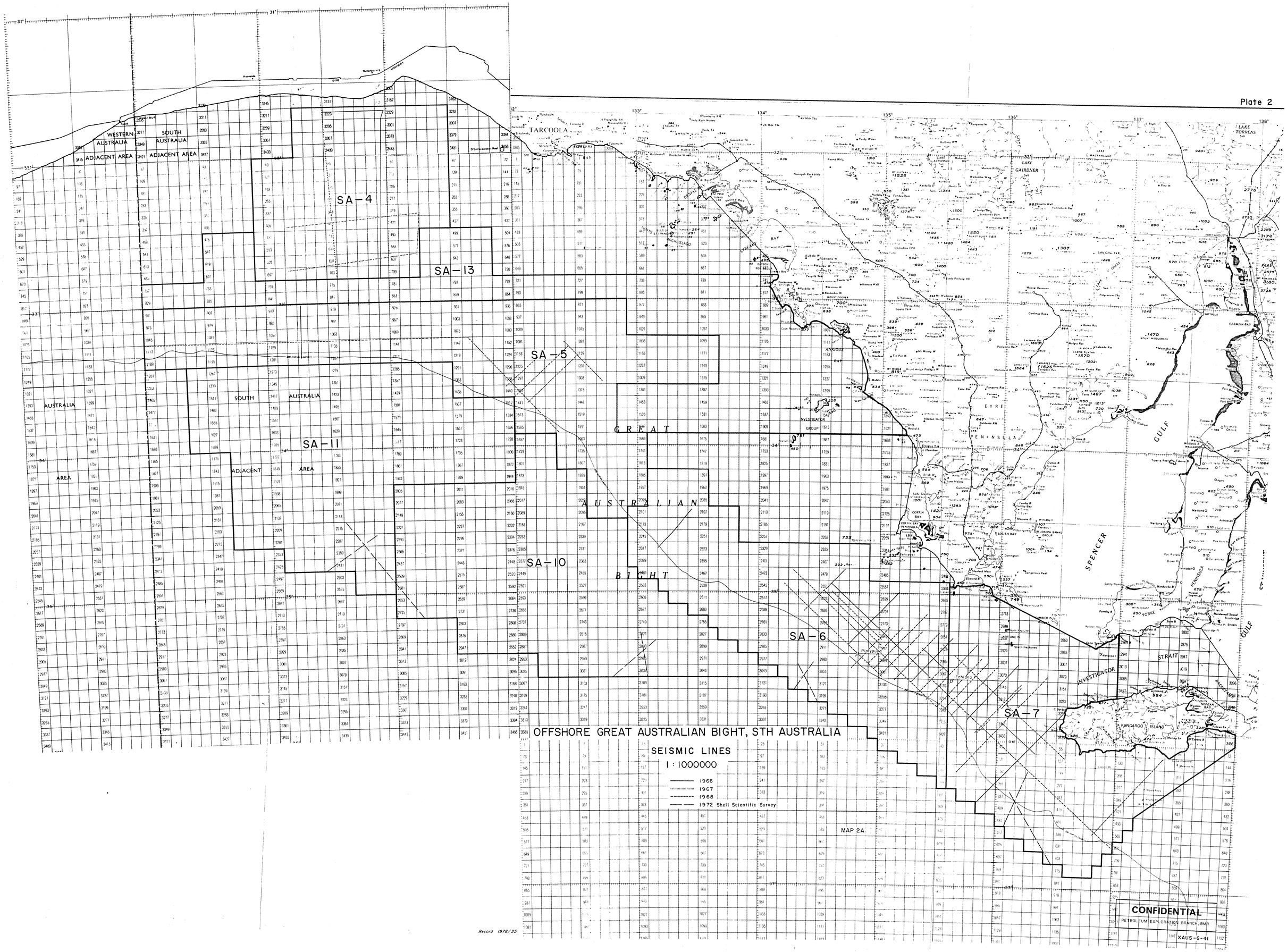
CONFIDENTIAL

PETROLEUM EXPLORATION BRANCH, DMT

XAUS-6-40

XAUS-6-40

Plate 2



OFFSHORE GREAT AUSTRALIAN BIGHT, STH AUSTRALIA

SEISMIC LINES

1 : 1000000

- 1966
- 1967
- 1968
- 1972 Shell Scientific Survey

MAP 2A

XAUS-6-41

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Plate 3

OFFSHORE GREAT AUSTRALIAN BIGHT, STH AUSTRALIA

SEISMIC LINES

1 : 1000000

- 1969
- 1970
- 1971
- 1972
- 1973
- BMR
- 1974

MAP 2B

SA-13

SA-5

SA-11

SA-10

SA-6

SA-7

GREAT AUSTRALIAN BIGHT

INVESTIGATOR STRAIT

GULF ST VINCENT

SPENCER GULF

EYRE PENINSULA

YORKE PENINSULA

KANGAROO ISLAND

TARCOOLA

LAKE TORRENS

LAKE GAIRDNER

LAKE MACFARLANE

WESTERN AUSTRALIA ADJACENT AREA

SOUTH AUSTRALIA ADJACENT AREA

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PETROLEUM EXPLORATION BRANCH, BMR

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