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NUMBER 1994

ATP 66P AND ATP 67P, PLUS PEL 5 AND PEL 6

COOPER BASIN

COOPER BASIN STRATIGRAPHY

REPORTS FOR THE PERIOD JUNE TO NOVEMBER 1972

Submitted by

Delhi International Oil Corp.
1972

MINES AND ENERGY SOUTH AUSTRALIA

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ENVELOPE 1994

TENEMENT: ATP 66P and ATP 67P, PEL 5 and PEL 6, Cooper Basin

TENEMENT HOLDER: Delhi International Oil Corp. (operator) and Santos Ltd

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SEPARATELY HELD DATA

REPORT BOOKS (Held in MESA Library):

Demaison, G.J., Townsend, I.J. and Thornton, R.C.N., 1970. A basin study of [sub-basins to] the Great Artesian Basin, South Australia: Palaeozoic and Triassic [sediments], *South Australia. Department of Mines, Report Book,* 759 (unpublished). [37 pages]

Thornton, R.C.N., 1972. Pilot lithofacies study on the Toolachee Formation, Gidgealpa - Moomba - Big Lake area, Cooper Basin, South Australia. *South Australia. Department of Mines, Report Book,* 770 (unpublished). [93 pages]

FORMATIONS OF THE GIDGEALPA GROUP IN THE COOPER BASIN

C.G. Gatehouse
June 1972

Contents

Abstract

Since its discovery in 1957 by geophysical techniques, the Permian Cooper infra-Basin has been successfully drilled for hydrocarbons. The recently created Permian Gidgealpa Group includes the Tirrawarra Sandstone, overlain in turn by the Patchawarra Formation, Murteree Shale, Epsilon Formation, Roseneath Shale, and the Toolachee Formation at the top of the Group. Knowledge of the palynological stages gained through recently increased drilling activity indicates that some units may be diachronous.

Commercial quantities of natural gas were discovered in Gidgealpa No. 2 at the end of 1963. From commencement of oil and gas exploration in the Cooper Basin to the beginning of June 1972, 103 wells were drilled. Of these, 42 encountered large quantities of gas and six had significant quantities of gas and oil.

The Cooper Basin now produces gas for the Adelaide market from the Moomba and Gidgealpa fields. Thirteen other fields are at present under investigation for the proposed Sydney market.

Historic Development

Reconnaissance gravity and seismic surveys in south-western Queensland and northeastern South Australia during 1957, led to the discovery of the Cooper Basin (Fig. 1) and to drilling of the Delhi-Frome-Santos Innamincka No. 1 well (Fig. 2) in 1959. This well proved correct the prediction that Palaeozoic sediments would be present below the western portion of the Great Artesian Basin. Subsequent seismic and drilling activity led to the definition of a Permo-Triassic sedimentary terrane in what is now known as the Cooper Basin.

The continuing search for hydrocarbons led to the discovery of commercial quantities of gas at the end of 1963, in Delhi-Santos Gidgealpa No. 2. (Fig. 2). Since then, 101 wells have been drilled to the beginning of June 1972 (Table I), this drilling has led to the discovery of 15 gas and oil fields (Fig. 2). Two of these, Moomba and Gidgealpa, supply gas to Adelaide in South Australia. The others are at present under investigation and development for a proposed market in Sydney, New South Wales (Fig. 1).

The following table shows the number of wells completed each year within the Cooper Basin.

TABLE I

YEAR	WELLS	YEAR	WELLS	YEAR	WELLS
1959	1	1963	2	1968	10
1960	0	1964	6	1969	7
1961	0	1965	6	1970	22
1962	2	1966	5	1971	22
		1967	5	1972 (to June)	15

Of the 103 wells drilled, 42 produced significant quantities of gas and six have had significant quantities of gas and oil.

General Statement

A sedimentary sequence of Permian age provides both the source and reservoirs for the major portion of the hydrocarbons discovered in the Cooper Basin. This sequence is composed of shales, siltstones, coals, and sandstones, and was named the Gidgealpa Formation (Martin, 1967) after the discovery well in the Gidgealpa Field. With information from further drilling the formation was divided into members. This division was recognized as a temporary measure because the members were, in fact, mappable units and because a disconformity was recognized within the section. Results of recent drilling activity have shown that the members themselves could be subdivided and that these subdivisions were also mappable units.

This paper follows on from Kapel (1972), where he raised the members of the Gidgealpa Formation to formation status and the original formation to a group. The Upper, Middle and Lower members of the Gidgealpa Formation were renamed the Toolachee, Moomba and Patchawarra formations. It is the purpose of this paper to raise the three parts of the Moomba Formation to formation status because of their mappable nature and to define the formations of the Gidgealpa Group according to the Australian Code of Stratigraphic Nomenclature.

The Gidgealpa Group includes Permian strata from the top of the Merrimelia Formation where present upward to the top of the Toolachee Formation.

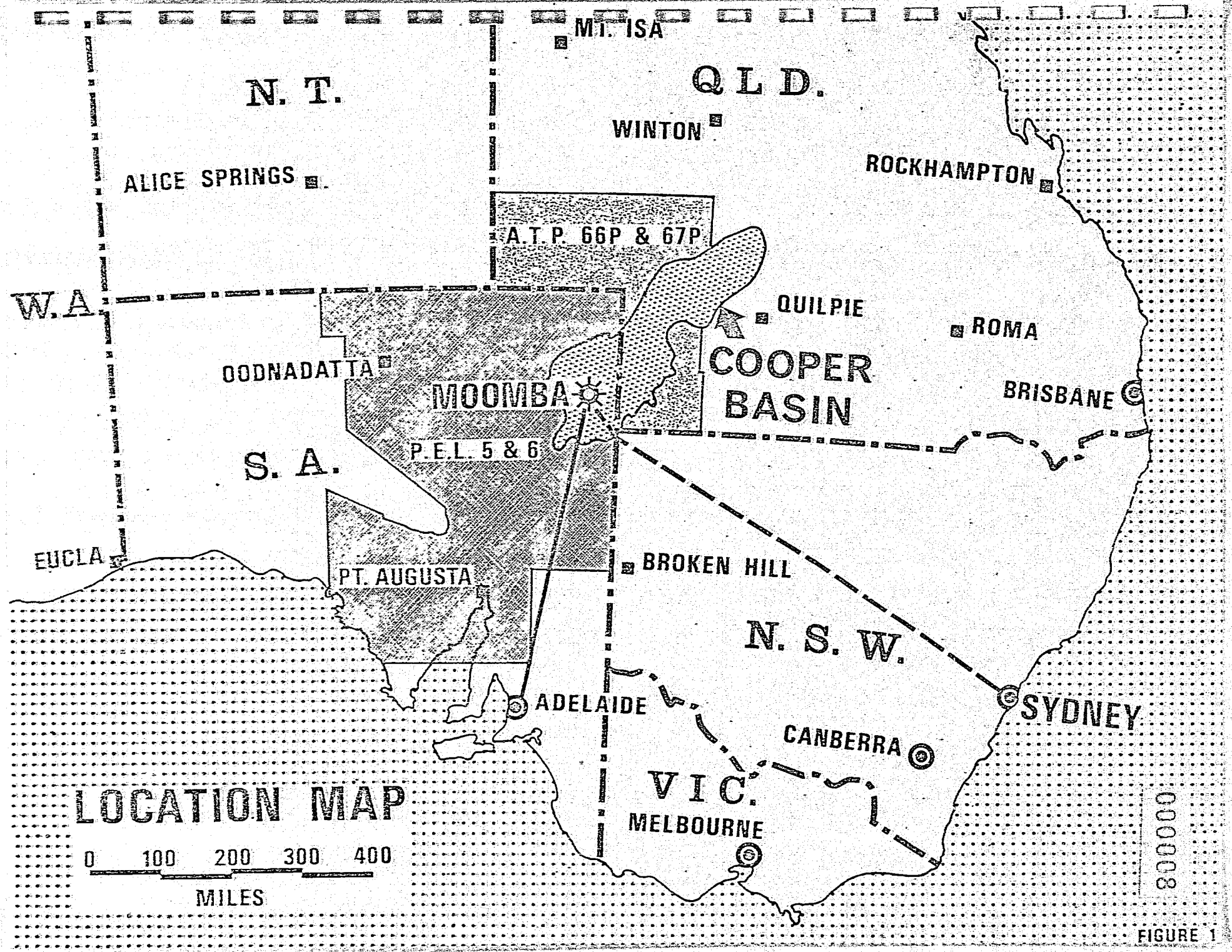
MT. ISA
N. T.
Q L D.
WINTON
ALICE SPRINGS
ROCKHAMPTON
A.T.P. 66P & 67P
W.A.
QUILPIE
ROMA
OODNADATTA
MOOMBA
COOPER
BASIN
BRISBANE
P.E.L. 5 & 6
S. A.
EUCLA
PT. AUGUSTA
BROKEN HILL
N. S. W.
ADELAIDE
SYDNEY
CANBERRA
VIC.
MELBOURNE
LOCATION MAP
0 100 200 300 400
MILES

FIGURE 1

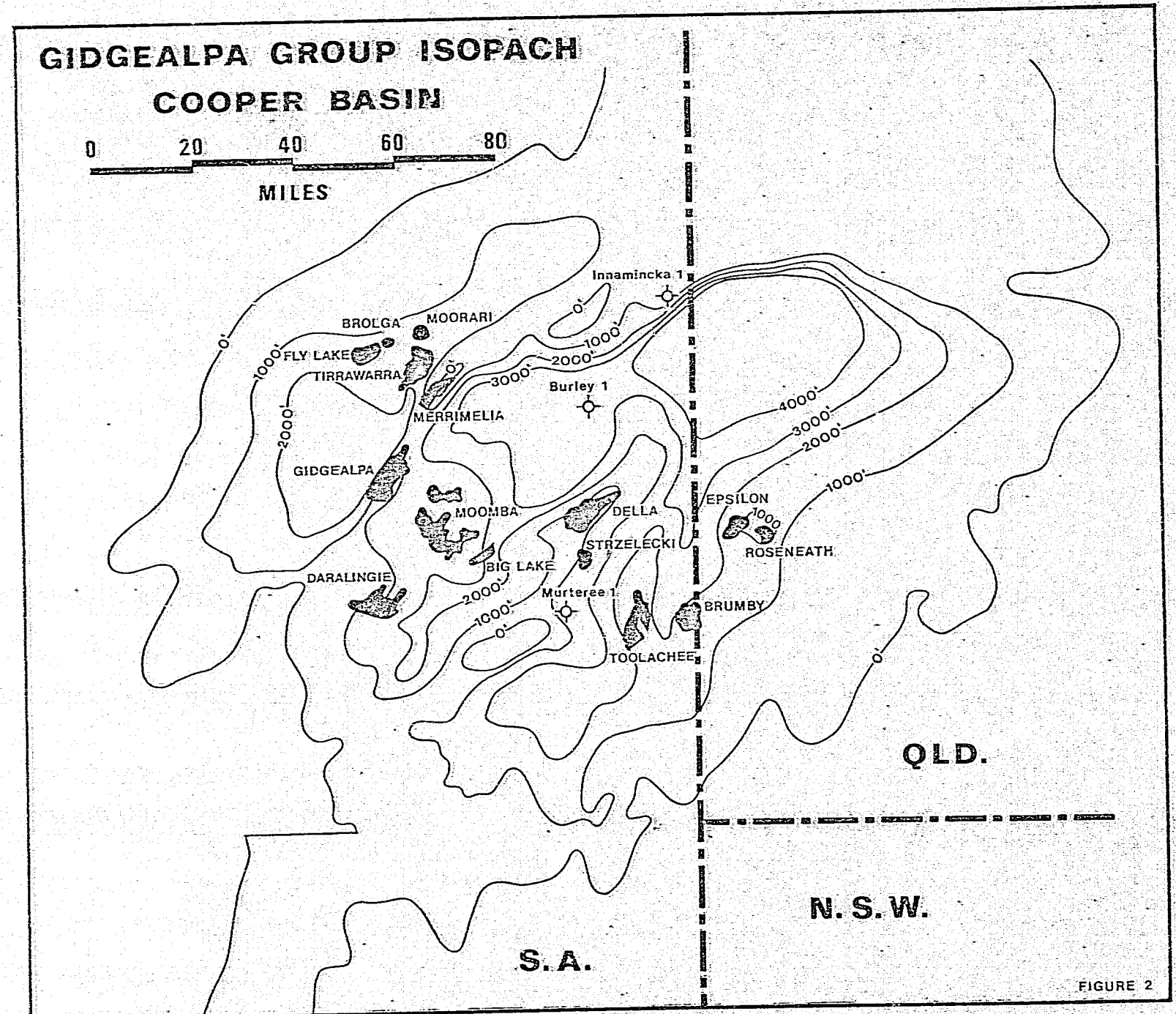

FIGURE 2

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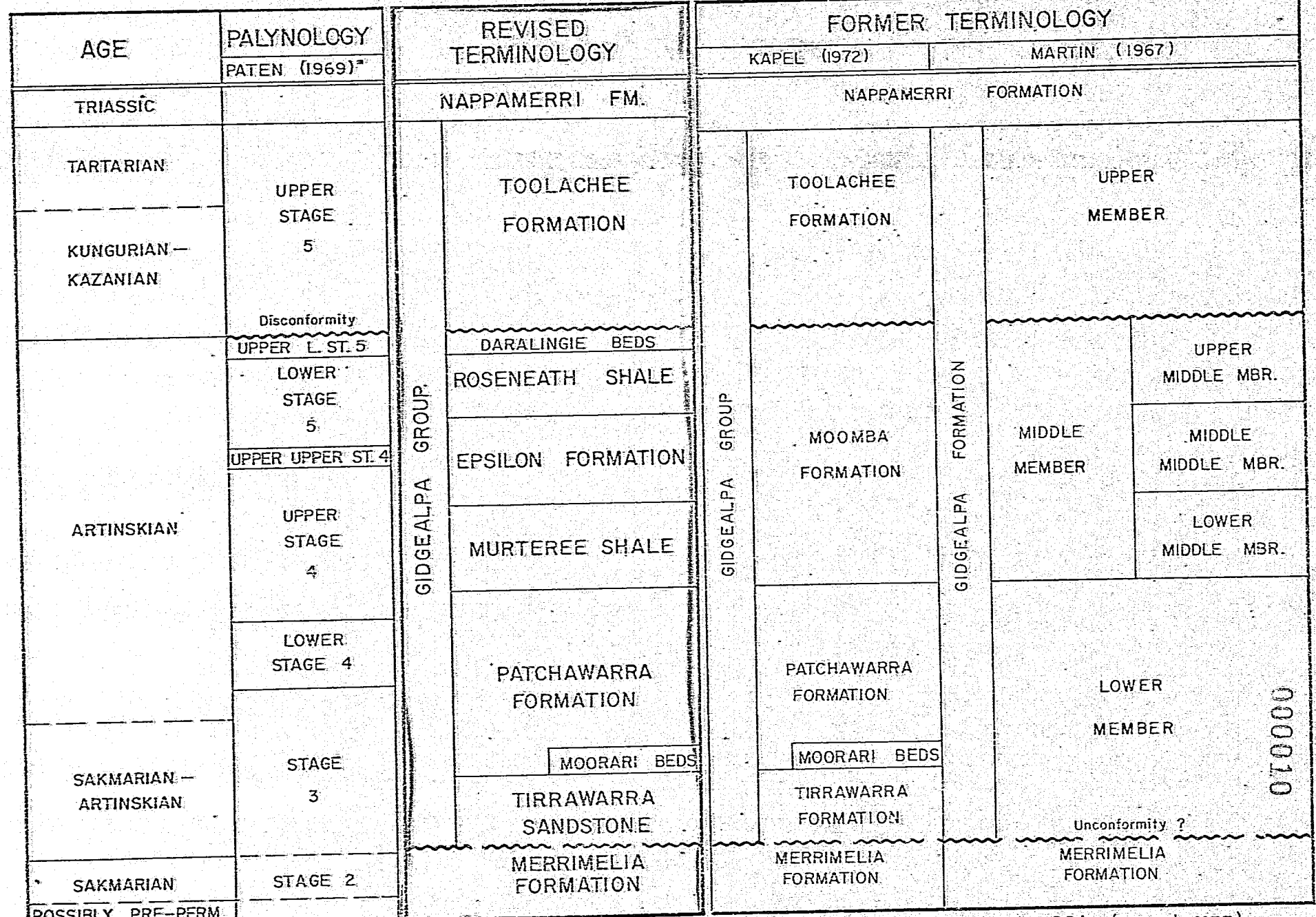
THE GIDGEALPA GROUP — COOPER BASIN



* modified by P.Price (personal comm.)

FIGURE 3

The Gidgealpa Group

The name Gidgealpa Group was first used but not defined by Kapel (1972), when he elevated the Gidgealpa Formation to a group and each of the members to formation status.

The Gidgealpa Group is defined as that succession of formations in the subsurface Cooper Basin which is conformably overlain by the Triassic Nappamerri Formation and unconformably (?) underlain by the Permian Merrimelia Formation (Fig. 3). Where the Nappamerri Formation is absent the Gidgealpa Group is unconformably overlain by the Hutton Sandstone. Where the Merrimelia Formation is absent, the Gidgealpa Group lies unconformably on pre-Permian rocks. Formations included in this group are the Tirrawarra Sandstone at its base, the Patchawarra Formation, Murteree Shale, Epsilon Formation, Roseneath Shale, Daralingie Beds, and at the top of the group, the Toolachee Formation.

The age of the group ranges from Lower through Upper Permian with a disconformity generally present between the Lower and Upper parts. Palynologically, the age ranges from Permian Stage 3 (and possibly Upper Stage 2) up to and including Upper Stage 5 (Evans 1967), with a hiatus occurring between Lower and Upper Stage 5 (Paten 1969).

The Gidgealpa Group is at least 4500 feet thick in the Nappamerri trough (Fig. 4) according to geophysical data. Towards the edge of the basin the group and its subdivisions thin to an erosional edge.

Martin (1967), defined the Gidgealpa Formation as being conformably overlain by the Nappamerri Formation, however, this does not indicate the position of the boundary within the section.

According to Wopfner (1969), the Nappamerri Formation should be considered as part of the "Permo-Carboniferous depositional phase" as it forms "the cap rock above the late Permian, gas-bearing, fresh-water strata and thus is an integral part of the trapping mechanism for hydrocarbons in that basin".

The lithological differences between the Nappamerri and Toolachee formations are discussed under the description of the Toolachee Formation. Certainly, the "last coal" near the top of the Toolachee Formation is not the last depositional phase of the Gidgealpa Group because shales containing Upper Stage 5 flora conformably underlie shales of the Nappamerri Formation bearing Triassic spores.

Toolachee Formation

The name Toolachee Formation was published with a brief description and no definition by Kapel (1972).

The Toolachee Formation is here defined as that series of sandstones, shales, siltstones and coals which are overlain by the Triassic Nappamerri Formation or in its absence by the Hutton Sandstone and which disconformably overlie the Roseneath Shale or Daralingie Beds where present.

The name of the formation is derived from nearby Toolachee Water Hole on the Strzelecki Creek in South Australia. The type section is the Delhi-Santos-Vamgas Toolachee No. 1 well at:

Latitude: 28° 25' 58" South
Longitude: 140° 46' 54" East

in the Toolachee field, where it occurs between 5878 and 6257 feet and is 379 feet thick. The thickest known interval of this formation is 519 feet at Burley No. 1 and the average from the 79 wells which contain apparently complete sections is 276 feet.

Discussion

In general, Toolachee Formation lithologies are: sandstone, grey to grey-brown, fine grained, occasionally conglomeratic, rounded to sub-angular quartz with a kaolinitic matrix; siltstone, dark grey, and carbonaceous; shale, dark grey to black, occasionally with thin streaks of sandstone, carbonaceous, sometimes micromicaceous, grading to siltstone; coal, black, brittle, grading to carbonaceous shale.

The age of the Toolachee Formation is Upper Permian, Upper Stage 5 (Evans 1967). Paten (1969), has fully discussed the palynological characterization of this floral zone.

The Toolachee Formation is the youngest unit of the Gidgealpa Group in the Cooper Basin. Throughout most of the basin this formation appears to be conformably overlain by the Nappamerri Formation. However, toward the margin of the basin erosion has taken place and the Jurassic Hutton Sandstone unconformably overlies the eroded Toolachee Formation and older Permian strata.

In many wells, the Nappamerri-Toolachee contact occurs within a sandstone-shale sequence. Sandstones of the Triassic Nappamerri Formation are buff to pale brown, fine to medium grained, well sorted, friable and moderately hard. The quartz grains are sub-rounded with minor red-brown and green lithic grains. Shales and siltstones are light coloured, micaceous, carbonaceous and sandy.

Electric log characteristics of the uppermost part of the Toolachee Formation are as follows: above the "top coal", where the section is present, is an interval containing shales and occasionally sandstones; the shales have a gamma count of about 145-150 API units, whereas shales of the Nappamerri average 125 units; the sonic log indicates a steadily decreasing value from the coal base from about 180 to 170 micro-seconds per foot. This is best illustrated in the Delhi-Santos-Vamgas-Pursuit Della No. 4 well (Fig. 2) located at:

Latitude: 28° 04' 56" South
Longitude: 140° 39' 33" East

in the Della field. Frequently this part of the section is not well developed and the "top coal" may be completely absent as at the Delhi-Santos-Vamgas Brumby No. 1 well (Fig 2) in the Brumby field.

Where sandstones have been developed above the coal and are of Toolachee rather than Nappamerri character they are included within the Toolachee Formation. An example is the sandstone present from 6884 to 6902 feet which lies above the top coal in Gidgealpa No. 13 in the Gidgealpa Field.

The top of the Toolachee Formation is defined by a combination of several criteria. These are: 1) the change of sandstone type; 2) the change of shale colour; 3) the change of electric log characteristics, in particular the sonic and gamma ray logs.

Daralingie Beds

The Daralingie Beds are defined as that series of sandstones, shales, and minor coals which occur above the Roseneath Shale and below the disconformity with the overlying Toolachee Formation.

The base of the unit is well-defined as the first sandstone above the Roseneath Shale. The top of the Daralingie, however, is an erosional surface and a definite pick for its top is difficult. It appears to be represented either by the base of a coal or a change of log-character of the sandstones. The Daralingie Beds are named from the Daralingie Water Hole on Strzelecki Creek. The type section is in the Delhi-Santos-Vamgas Daralingie No. 1 well, located at:

Latitude: 28° 21' 41" South
Longitude: 139° 58' 03" East

in the Daralingie field, where it occurs in the interval between 6440 and 6524 feet. It is, therefore, 84 feet thick. The greatest known thickness is 311 feet at the Burley No. 1 well, but the average thickness from 31 wells is 73 feet.

Discussion

Sandstones in the Daralingie Beds are white to light brown, fine grained, sub-angular to sub-rounded and with a kaolinitic matrix. The siltstones are brown, carbonaceous, and micaceous. The shales are dark grey, carbonaceous and generally have interbedded lamellae of fine to medium grained cross-bedded sandstone.

The age of the Daralingie Beds is Lower Stage 5 and they are the youngest known Lower Permian in the Cooper Basin. Sediments of this age occur at Toolachee No. 6 and at Brumby No. 1 according to P. Price, Mines Administration Pty. Ltd. (personal communication, 1972).

The Daralingie Beds is an incompletely known mappable unit because the top is a surface of erosion and it is not known what is a complete section.

Sedimentation occurred in the trough areas and may not have been deposited on the high ridges and in the Patchawarra trough (Fig. 4).

Roseneath Shale

The Roseneath Shale is defined and described as a series of shales and minor siltstones, conformably overlain by the Daralingie Beds, or in their absence disconformably overlain by the Toolachee Formation. They conformably overlie the Epsilon Formation.

The Roseneath Shale is named from the parish of Roseneath in Carruthers County as shown on the Queensland four mile series 4m18 pastoral map. In the Delhi-Santos-Vamgas-Total Roseneath No. 1 well, located at:

Latitude: 28° 10' 10" South
Longitude: 141° 14' 32" East

in the Roseneath field. This unit occurs in the interval between 6420 and 6642 feet. It is 222 feet thick in this the type section. The unit is recognizable in 37 wells within the basin and the maximum known thickness is 266 feet. This thickness is in the Brumby No. 1 well, with the average interval 180 feet from a total of 28 "complete" sections.

Discussion

The Roseneath Shale was first termed the upper Middle Member of the Gidgealpa Formation and later as the upper shale unit of the Moomba Formation (Kapel 1972). The unit is mappable, can be recognized in 37 wells, and is now raised to formation status.

"Complete" sections are regarded here as those in which the main shale sequence is overlain by a sandstone, siltstone, coal section to which the name Daralingie Beds has been applied. The Daralingie Beds may be regarded as a transitional interval - perhaps one which heralded the weak to moderate tectonic reactivation of the Cooper Basin after the long period of quiescence during deposition of the Roseneath Shale.

The Roseneath Shale is composed of dark grey and black micaceous and carbonaceous shales.

The Permian Roseneath Shale has a palynologic dating of Lower Stage 5 age over most of the basin, however, toward the northeast the base of the unit may be older than it is further southwest.

Epsilon Formation

The Epsilon Formation is defined as a series of sandstones, shales, and occasionally coals overlain by the Roseneath Shale and underlain by the Murteree Shale in the Cooper Basin.

The type section is in the Delhi-Santos-Vamgas-Total Epsilon No. 1 well, located at:

Latitude: 28° 08' 45" South
Longitude: 141° 09' 24" East

in the Epsilon field. The unit is named after the parish of Epsilon in Carruthers County as shown on the Queensland four mile series 4m18 pastoral map. The Epsilon Formation occurs between 6874 feet and 7011 feet and is 137 feet thick at the type section. Recognizable in some 40 wells in the Cooper Basin, the unit has a maximum known thickness of 251 feet at Burley No. 1 and an average of 197 feet for all complete sections.

Discussion

The sandstone of the Epsilon Formation is light brown and is very fine to fine grained, grading to siltstone. The grains are quartzose, sub-angular to sub-rounded and are well sorted. The shale is dark grey to grey-brown and carbonaceous.

The palynologic age of the formation ranges from lowermost Stage 5 to Upper Stage 4. The unit appears to be diachronous, being youngest towards the southwest. When the uppermost sands of the Epsilon Formation were being deposited in the southwest the Roseneath Shale deposition had already commenced in the deeper parts of the basin.

Murteree Shale

The Murteree Shale is defined as that series of shales overlain by the Epsilon Formation and underlain by the Patchawarra Formation.

The type section occurs in the Delhi-Santos-Vamgas-Pursuit Murteree No. 1 well (Fig. 2) at a depth of between 6309 and 6466 feet. This well is located at:

Latitude: 28° 23' 48" South
Longitude: 140° 34' 22" East

The name of the well and formation is derived from nearby Lake Murteree on Strzelecki Creek.

The shale is medium and dark grey to grey-brown, slightly micromicaceous and hard. In the type section it is 157 feet thick, and its average is 148 feet for all complete sections. The thickest known section is 263 feet in the Burley No. 1 well.

Discussion

The Murteree Shale was the lower part of the Middle Member of the Gidgealpa Formation under the old terminology, or the lower shale unit of the Moomba Formation of Kapel (1972). This unit can be recognized in 62 wells of which 39 have complete sections. The Murteree Shale is an easily recognizable unit from electric logs (Fig. 5), and is a mappable unit. It is here given formation status.

The age of the Murteree Shale is wholly within palynologic Upper Stage 4, however, if the overlying and underlying units can be regarded as diachronous, it too may be diachronous.

Patchawarra Formation

The Patchawarra Formation is defined as a succession of sandstones, shales, siltstones, and coals overlain by the Murteree Shale and underlain by either the Tirrawarra Sandstone, the Merrimelia Formation, or by rocks of pre-Permian age depending on the depositional - erosional terrane.

The upper contact appears to be conformable while the lower contact, which is probably conformable with the Tirrawarra Sandstone, may not be conformable with the Merrimelia Formation and is non-conformable with pre-Permian rocks.

Discussion

Kapel (1972), described the Patchawarra Formation in the Patchawarra trough where it may be possible to subdivide it into three mappable units. These units are not readily identifiable in other parts of the basin, presumably because syndepositional faulting divided the area into separate river valleys between which correlation may be difficult.

The Patchawarra Formation ranges in age from palynologic Stage 3 to Upper Stage 4. The boundary between this formation and the overlying Murteree Shale appears to be diachronous. It is youngest near the southwest edge of the basin.

Further stratigraphic analysis of this unit will be required before any subdivision can be attempted. In particular, stratigraphic knowledge of the Patchawarra Formation in trough areas is sketchy and it is possible that one or more disconformities may occur within the unit.

The contact between Patchawarra and the underlying Merrimelia Formation is open to interpretation as discussed under the Merrimelia Formation.

Tirrawarra Sandstone

The Tirrawarra Formation is composed of a brown to white, fine to medium grained, moderately well sorted sandstone with a clay matrix (Kapel 1972). According to the Stratigraphic Code, a rock which is dominantly of one lithology should be named with a geographic name and lithologic type. It is, therefore, considered that the Tirrawarra Formation would be more correctly termed the Tirrawarra Sandstone.

The Tirrawarra Sandstone is known to occur in the Patchawarra trough, particularly in the Fly Lake and Tirrawarra fields. A sandstone of similar lithology occurs in the Gidgealpa Field and as far southeast as Big Lake No. 1 in the Big Lake field. At the Gidgealpa No. 5 well, it overlies the Merrimelia Formation, and at the Gidgealpa No. 7 well, it overlies pre-Permian rocks. This Sandstone is considered to be a correlative of the Tirrawarra Sandstone. Elsewhere in the basin, particularly in its deeper parts, there are sandstones which may be depositional equivalents of the Tirrawarra Sandstone.

Merrimelia Formation

The Merrimelia Formation, according to Martin (1967) consists of a series of sandstones, conglomerates, conglomeratic shales, shales, and siltstones. Recent drilling indicates that dark grey varve-like sediments should also be included. Opinions on the origin and environment of deposition of the sediments have not significantly altered since 1967.

The problem of the Gidgealpa Group - Merrimelia Formation contact is one which needs more detailed investigation. The differences between the two units can be summarized as follows:

Formation Character	Merrimelia	Tirrawarra	Patchawarra
Bedding	Poor, occ. good.	Poor.	Good, very good.
Colour	Light grey, dark grey, white.	Buff-dark grey.	Light-dark grey, black, brown.
Sorting	Very poor to occ. very good.	Moderate to poor.	Moderate to poor.
Roundness	Ang, very angular, sub-rounded.	Sub-angular to sub-rounded.	Sub-angular to sub-rounded.
Matrix	Silt and clay.	Kaolinitic.	Kaolinitic.
Structures	Channel fill, graded bedding, cross-bedding, slickensides.	Stylolites, grain over-growths.	Festoon cross-bedded, cut and fill.
Grainsize	Very coarse to very fine.	Fine to medium.	Fine to medium.
Rock types	Conglomerate, sandstone, shale, siltstone, varves?	Quartzarenite	Sandstone, shale, siltstone, coal.

Formation Character	Merrimelia	Tirrawarra	Patchawarra
Dip	5° - 35°	0° - 10°	0° - 10°
Thickness	0 -1300'	0 - 400'	0 -2000'
Lithotypes in pebbles	Chloritized tuff, volcanics, orthoquartzite, metamorphic sedimentary types.	-	-
Environment of deposition	Cold? glacial, periglacial.	?	Warm, humid? valley-fill.

Representative samples of all cores, ditch cuttings, and electric logs from each of the type sections have been deposited at the South Australian Department of Mines, Adelaide, South Australia.

Exploratory drilling for hydrocarbons within the Cooper Basin continues to provide information on the subsurface Permian strata. The present paper employs data available to the beginning of June 1972 and is a report on a stage in the history of the economic development of the Cooper Basin as a significant hydrocarbon source within South Australia.

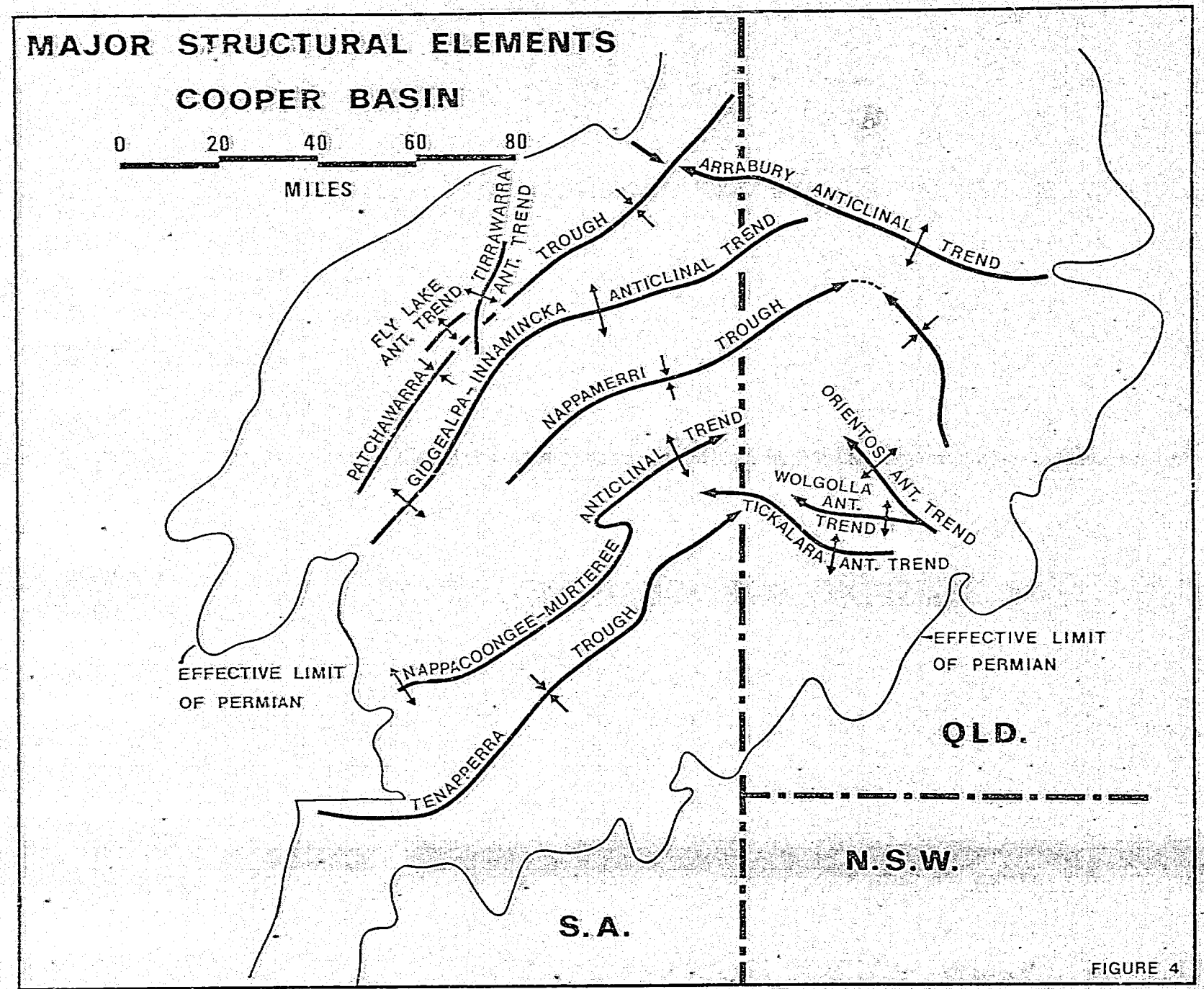
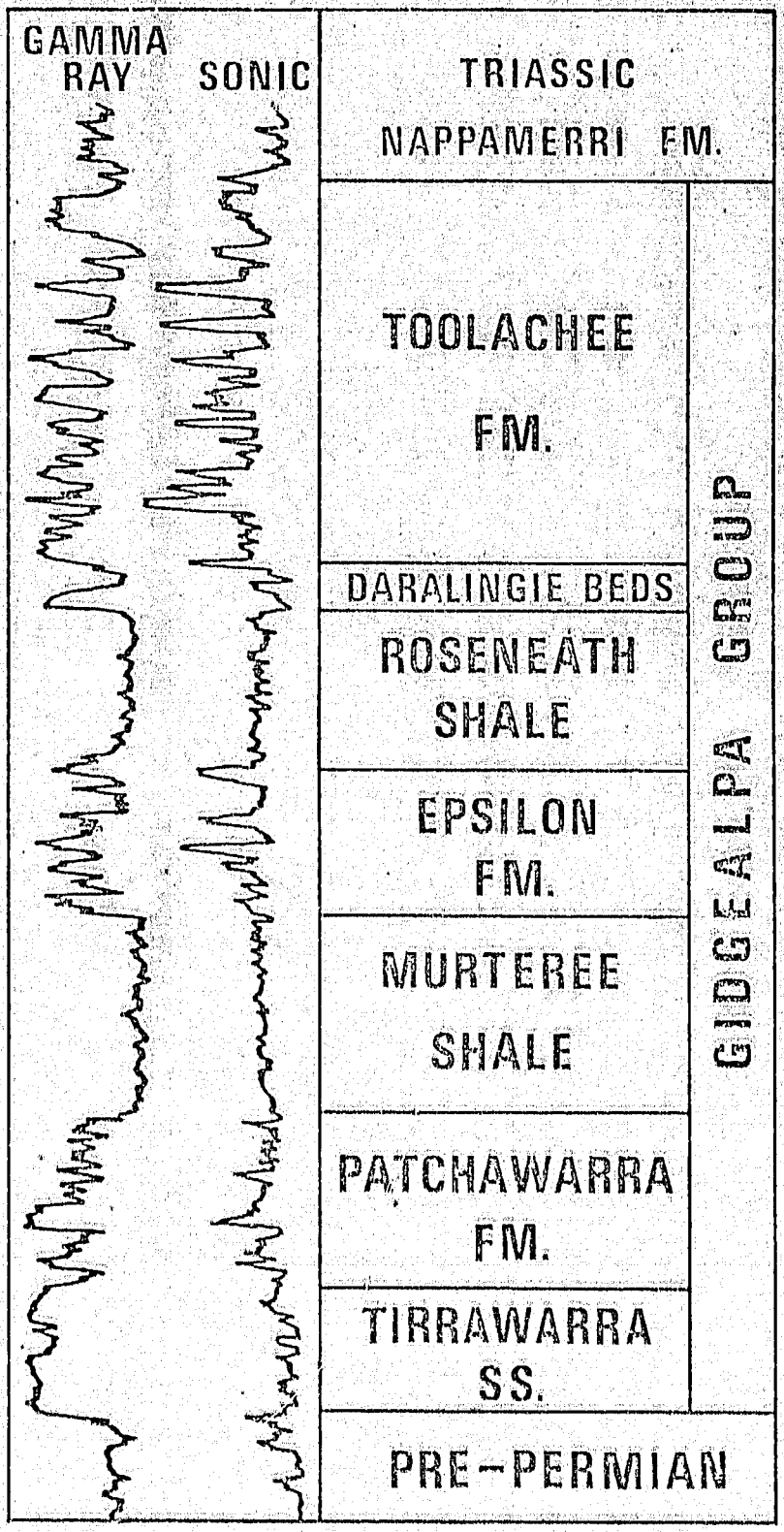


FIGURE 4

COMPOSITE SECTION

GIDGEALPA GROUP

COOPER BASIN



NOTE:
THE MERRIMELIA FM. WHICH MAY BE PRESENT BELOW THE TIRRAWARRA SS. IS NOT ILLUSTRATED.

FIGURE 5

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Well Completion Reports

Big Lake No. 1	1972	Delhi-Santos-Vamgas
Brumby No. 1	1972	Delhi-Santos-Vamgas
Burley No. 1	1971	Delhi-Santos-Vamgas
Daralingie No. 1	1967	Delhi-Santos
Della No. 4	1971	Delhi-Santos-Pursuit-Vamgas
Epsilon No. 1	1972	Santos-Delhi-Vamgas-Total
Gidgealpa No. 2	1964	Delhi-Santos
Gidgealpa No. 5	1964	Delhi-Santos
Gidgealpa No. 7	1965	Delhi-Santos
Gidgealpa No. 13	1971	Delhi-Santos-Vamgas
Innamincka No. 1	1959	Delhi Aust Pet.-Frome-Santos
Murteree No. 1	1970	Pursuit-Delhi-Santos-Vamgas

Roseneath No. 1	1970	Delhi-Vamgas-Santos-Total
Toolachee No. 1	1969	Delhi-Santos
Toolachee No. 6	1972	Delhi-Santos-Vamgas

OPEN FILE

EPSILON AREA - STRATIGRAPHIC STUDY

THE GIDGEALPA GROUP

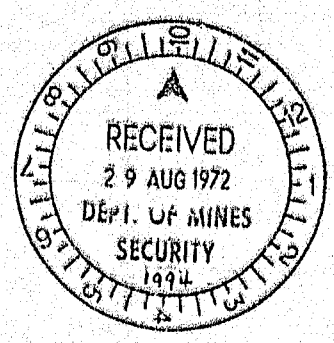
IN THE

COOPER BASIN

A.T.P. 66/67P, QUEENSLAND

and portions of

P.E.L. 5 & 6, SOUTH AUSTRALIA



D.G. Battersby,
July, 1972

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INTRODUCTION

Permian stratigraphy in the southeastern portion of the Cooper Basin has been studied to further our understanding of its depositional environments and to attempt to establish depositional trends. If relationships between depositional environments and hydrocarbon accumulation can be established this will enable us to upgrade and concentrate exploration in the most prospective areas. Because well control in the study area is limited it has been necessary to incorporate into most of the attached maps data from the South Australian portion of the Cooper Basin, where there is a greater density of well control. Hydrocarbon production from the Patchawarra Formation has been found in the Epsilon, Roseneath and Brumby structures, while the Toolachee and Epsilon formations also produce from the Epsilon structure.

Up to June 1972 six wells have been drilled in the study area. Each has been sited on a prominent feature thus giving a bias to the data obtained. Seismic data over much of the area, particularly east of Orientos and south of Brumby, is either poor or inadequate. In consequence, most of the maps constructed contain a large degree of interpretation.

CONCLUSIONS AND RECOMMENDATIONS

1. Patchawarra Formation

The success ratio of hydrocarbon discoveries from this formation in the study area is good (50%). Structures along the Wills, Stokes, Epsilon and Wolgolla trends (Fig. 1) are favourable for hydrocarbon accumulation. Structures on the Orientos trend require further evaluation but if reservoir conditions improve relative to the Orientos wells hydrocarbon potential is good.

East of the Orientos trend more seismic data is required. Stratigraphic traps may also exist toward the southern margin of the basin and along the flanks of structures such as Tickalara and Naryilco. A stratigraphic cross-section of the Gidgealpa Group from Orientos North No. 1 to Tickalara No. 1 (Fig. 2), illustrates the potential for stratigraphic traps in this area.

Fault traps along the major faults such as Tickalara, Murteree South and Toolachee East (Fig. 1) may also be significant. The possibility of oil accumulation in these situations should not be discounted.

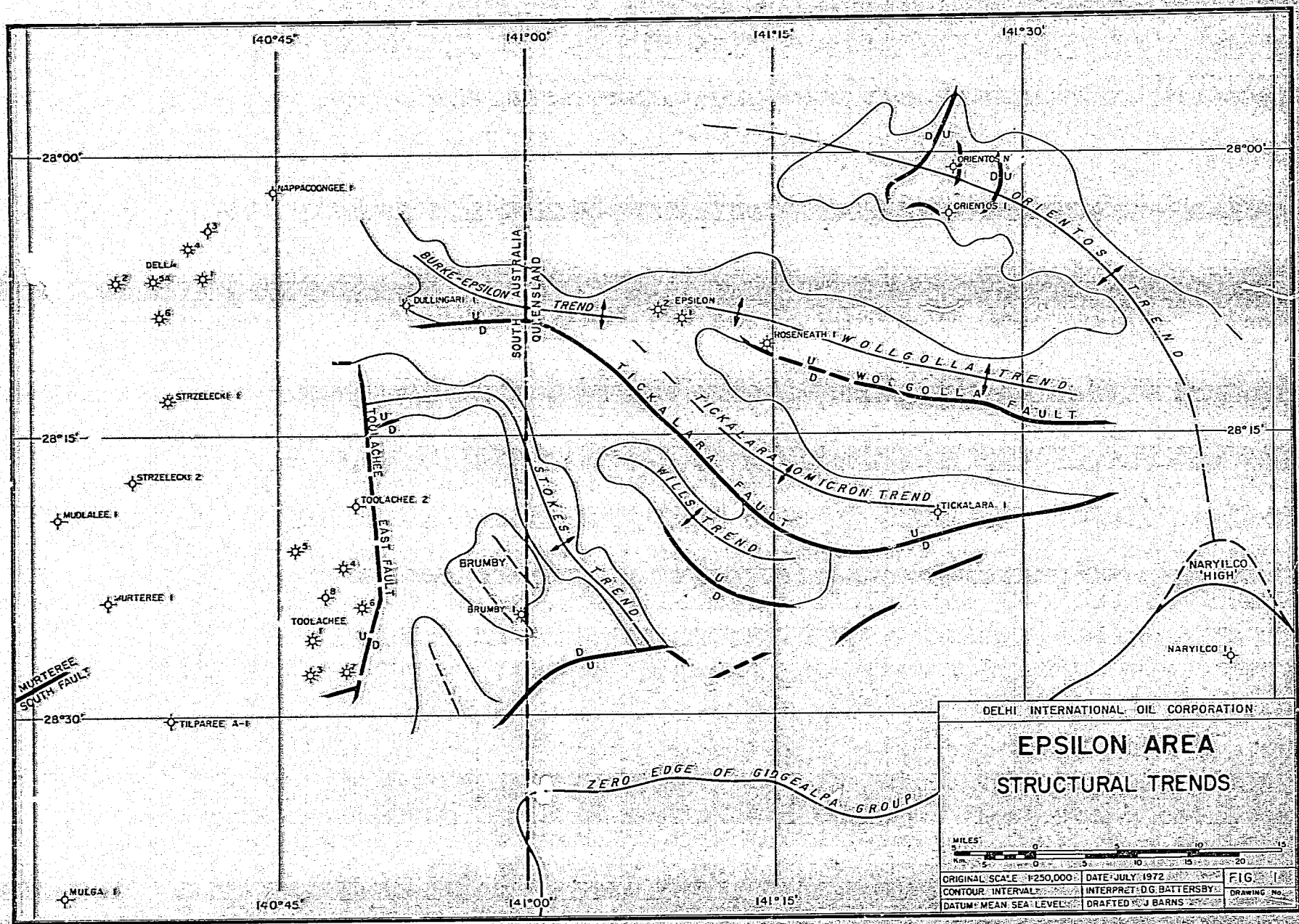
2. Epsilon Formation

The area in the vicinity of the Epsilon structure and in particular to the east of this feature should have good potential for hydrocarbons. The area immediately north of the Toolachee feature also has potential for Epsilon Formation production. Elsewhere in the basin hydrocarbon accumulation could occur where local conditions resulted in deposition of thicker and better sorted sandstones.

3. Toolachee Formation

Because it does not develop the same degree of thinning as the Patchawarra Formation, the Toolachee Formation may have less hydrocarbon potential than the Patchawarra in the study area. However, the structures on the upthrown side of the Wolgolla fault have a fair degree of potential. The Wills structure also gives indications of being prospective, i.e. "C-P" thinning plus probable Nappamerri Formation capping. Features along the Orientos trend, particularly the Lambda structure should, reservoir conditions permitting, be reasonable targets. Elsewhere, Toolachee Formation production could be found on the downthrown side of the Toolachee East fault. Toolachee East No. 1 should test this potential.

Apart from drilling along the anticlinal trends outlined, fault traps should be next examined and then stratigraphic traps. More seismic data is necessary east of Orientos to permit the assessment of potential in that area.


140°45'
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DELEA
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
MURTEREE 1
TILPAREE A-1
MULGA 1
DULLINGARI 1
BURKE-EPSILON TREND
SOUTH AUSTRALIA
QUEENSLAND
EPSILON
EPSILON 1
ROSENEATH 1
WOLLGOLLA TREND
WOLLGOLLA FAULT
ORIENTOS N
ORIENTOS 1
ORIENTOS TREND
TICKALARA-OMICRON TREND
TICKALARA 1
TICKALARA FAULT
TOOLACHEE
TOOLACHEE 2
TOOLACHEE EAST FAULT
STOKES TREND
WILLS TREND
BRUMBY
BRUMBY 1
NARYILCO 'HIGH'
NARYILCO 1
MURTEREE SOUTH FAULT
ZERO EDGE OF GIDGEALPA GROUP
D U
U D
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
STRUCTURAL TRENDS
MILES
KM.
ORIGINAL SCALE 1:250,000
CONTOUR INTERVAL
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: D.G. BATTERSBY
DRAFTED: J BARNS
FIG. 1
DRAWING No.

TOTAL - DELHI - SANTOS
ORIENTOS NTH. No. 1

DELHI - SANTOS
ORIENTOS No. 1

TOTAL - DELHI - SANTOS
TICKALARA No. 1

A — 3·6 Miles — 19·5 Miles — A'

Patchawarra Formation Prospect strat-structural trap.

Area of Patchawarra Formation-stratigraphic trap potential.

Permian "P" Reflecting Horizon

GIDGEALPA GROUP

TOOLACHEE FORMATION

Disconformity

ROSENEATH SHALE

EPSILON FORMATION

MURTEREE SHALE

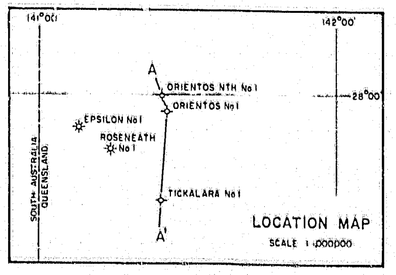
PATCHAWARRA FORMATION

TD 7345

TD 5765'

Disconformity to Nonconformity

TD 11,522?



NOTES: 1. Thickness of Gidgealpa Group established from Seismic Map Gidgealpa Isopach by A.G.M. Moore.
2. That part of the Roseneath Shale below the Disconformity in the Orientos and Orientos North Wells and indicated as [ ] is illustrated as Facies within the Roseneath Shale. It may, however, be that this section lies above the Roseneath Shale recognised elsewhere. This could affect Toolachee Formation Isopach.

LEGEND

GIDGEALPA GROUP
- TOOLACHEE FORMATION
- ROSENEATH SHALE
- EPSILON FORMATION
- MURTEREE SHALE
- PATCHAWARRA FORMATION

- MERRIMELIA FORMATION OR GRANITE WASH
- PRE-PERMIAN UNDIFFERENTIATED

DELHI INTERNATIONAL OIL CORPORATION

DIAGRAMMATIC CROSS SECTION ORIENTOS NTH. No. 1 – TICKALARA No. 1

COOPER BASIN, QUEENSLAND

HORIZONTAL SCALE: 1" = 5000'	DATE: MAY 1972	FIG. 2
VERTICAL SCALE: 1" = 200'	INTERPRETATION BY C.A. MARTIN	
VERTICAL EXAGGERATION x 25	DRAFTED A.G. HALSE	

0039

CONSTRUCTION AND INTERPRETATION OF ENCLOSED MAPS

Isopach maps, sandstone percentage maps, sandstone isolith and lithofacies maps have been constructed for the Toolachee, Epsilon and Patchawarra formations. The Gidgealpa Group isopach for the Epsilon and Wolgolla map sheets was made by A. Moore and was, together with well data, used to construct a Patchawarra Formation isopach. A large proportion of the interval variation present in the Gidgealpa Group is believed to have occurred in the Patchawarra Formation. In constructing the Toolachee Formation isopach map, depositional trends interpreted from the "C-P" isopachs and "P" structure maps of the study area were relied upon. The "Roseneath-Epsilon-Murteree" isopach map was made by subtracting the Toolachee and Patchawarra Formation isopachs from the Gidgealpa Group isopachs.

In the construction of the sandstone and lithofacies maps, use was made of the corresponding isopach as a guide to depositional trends beyond areas of well control.

Two lithofacies maps were prepared for each formation studied. With construction of the first or Phase I map the same clastic lithofacies diagram was used for all three formations. This diagram permits only a broad classification of depositional environments, and does not indicate the more subtle changes in environment necessary to define depositional trends in the relatively uniform deltaic (?) sequences present in the study area.

After plotting the position of each well on the Phase I diagram, groups of wells which fell close together were separated into units, independent of the Phase I depositional boundaries, to form the Phase II lithofacies subdivision. This subdivision is different for each formation studied. The sub-

sequent Phase II maps, although more detailed than the corresponding Phase I map, must be interpreted having due regard for the general depositional environment indicated by the Phase I map.

Faults which affected the thicknesses of the various formations, have been used extensively to control both isopach and facies trends. There can be little doubt that faulting contemporaneous with deposition, particularly as related to major faults such as Tickalara and Wolgolla, had a major influence on depositional trends and patterns.

PATCHAWARRA FORMATION

Isopach Map (Fig. 3)

Most of the thickening of the Gidgealpa Group is believed to occur within the Patchawarra Formation. The thickness of this unit ranges from zero on top of the Epsilon structure to possibly 1200 feet in lows located immediately south of the Tickalara Fault. A rapid thickening of the formation off structures has been observed from both well and seismic control. The following trends can be seen from the Patchawarra Formation isopach.

1. A general thickening of the formation northwards into the Nappamerri trough with a region of thick sedimentation in the triangular graben bounded by the Tickalara fault, the Toolachee East fault and an unnamed fault to the south.

2. Within this graben several depositional trends roughly parallel to the Tickalara Fault can be seen:

   (a) Wills thin area: This includes the elongate Wills structure and possibly an additional structure or structures to the northwest.

   (b) Stokes thin: This consists of a series of probably fault controlled NNW-SSE thins which appear to swing around to the west and terminate against the Toolachee East fault; approximately parallel to the Tickalara fault.

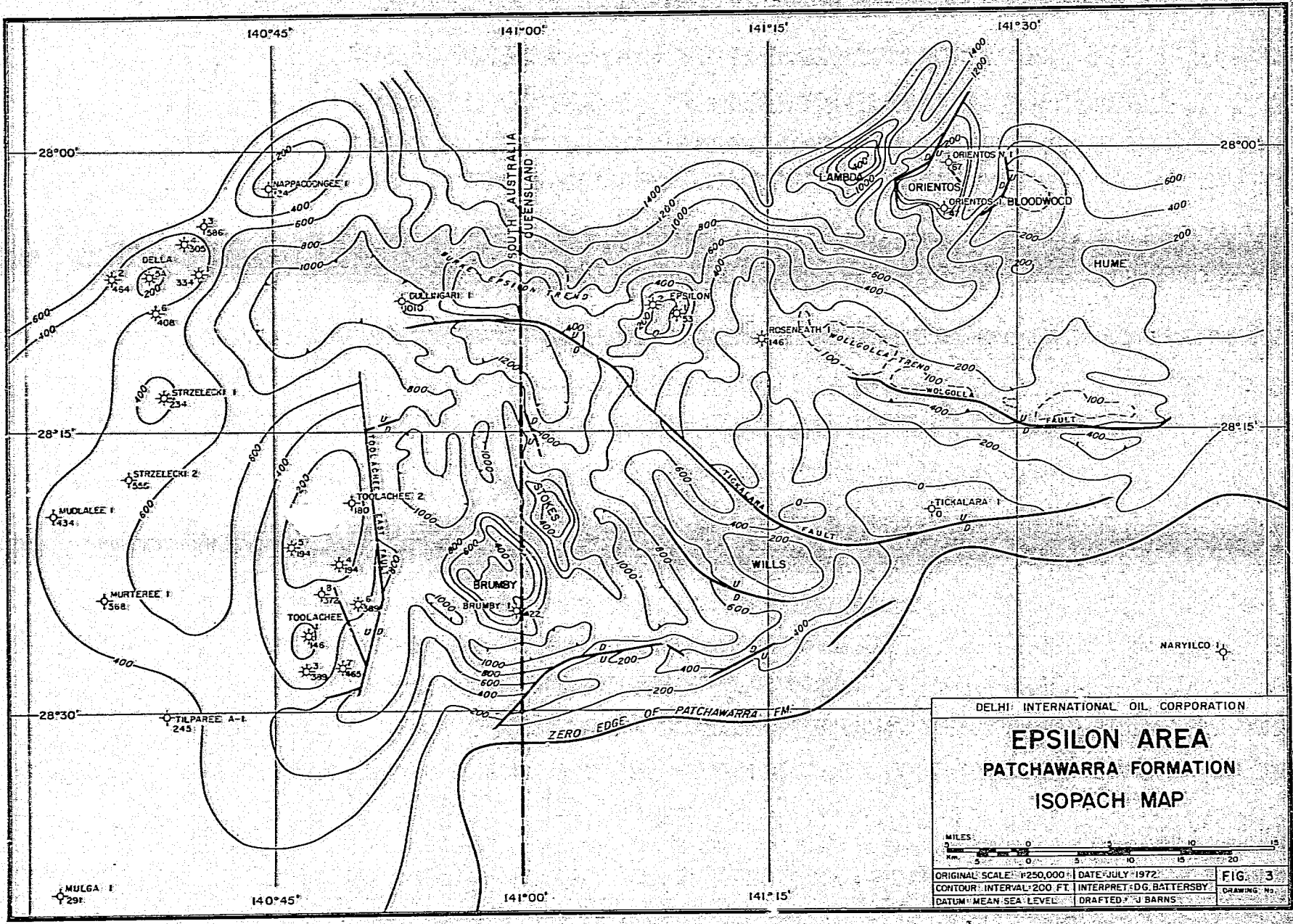
(c) Brumby is mapped as a large oval shaped structure in the central part of a graben onto which the Patchawarra Formation thins. Additional seismic work may resolve the structure into two or more NNW trending features parallel with the Stokes thin.

3. There are two main regions of thick Patchawarra Formation accumulation; one is immediately south of the northwest end of the Tickalara fault and the other lies east of the Toolachee East fault.

4. On the upthrown side of the Tickalara fault there is a general depositional thin related to a series of sharp structures subparallel with the fault. This thin bifurcates so that thin areas lie to the north of both the Tickalara and Wolgolla faults.

5. Thinning of the Patchawarra Formation is evident over the Lambda-Orientos-Bloodwood-Hume structural trend. This trend possibly connects to the south with the Naryilco "basement high" (Fig. 1). Fault control along this Orientos trend is not apparent although seismic data is poor. Permian structural growth in the Patchawarra Formation appears more prominent along the trend to the northwest, and additional structures may be present in that direction.

6. East of the Orientos trend seismic data is poor and there is little indication of Permian structural growth. If this indication is correct, the Orientos trend may relate to some pre-existing structural trend and could represent an eastern margin of Permian movement in this part of the Cooper Basin. Higher resolution seismic work and greater coverage may alter this conclusion.


140°45'
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SOUTH AUSTRALIA
QUEENSLAND
NAPPACOONGEE 1
DELLA
GULLENGARI 1
EPSILON
EPSILON TREND
LAMBDA
ORIENTOS
ORIENTOS N 1
ORIENTOS-1, BLOODWOOD
HUME
ROSENEATH 1
WOLGOLLA TREND
WOLGOLLA FAULT
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
TOOLACHEE 2
TOOLACHEE EAST FAULT
TOOLACHEE
MURTEREE 1
STOKES
BRUMBY
BRUMBY 1
WILLS
TICKALARA 1
TICKALARA FAULT
NARYILCO 1
TILPAREE A-1
MULGA 1
ZERO EDGE OF PATCHAWARRA FM.
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
PATCHAWARRA FORMATION
ISOPACH MAP
MILES
Km.
ORIGINAL SCALE: 1:250,000
DATE: JULY 1972
FIG. 3
CONTOUR INTERVAL: 200 FT.
INTERPRET: D.G. BATTERSBY
DRAWING No.
DATUM: MEAN SEA LEVEL
DRAFTED: J. BARNS

Sandstone Percentage Map (Fig. 4)

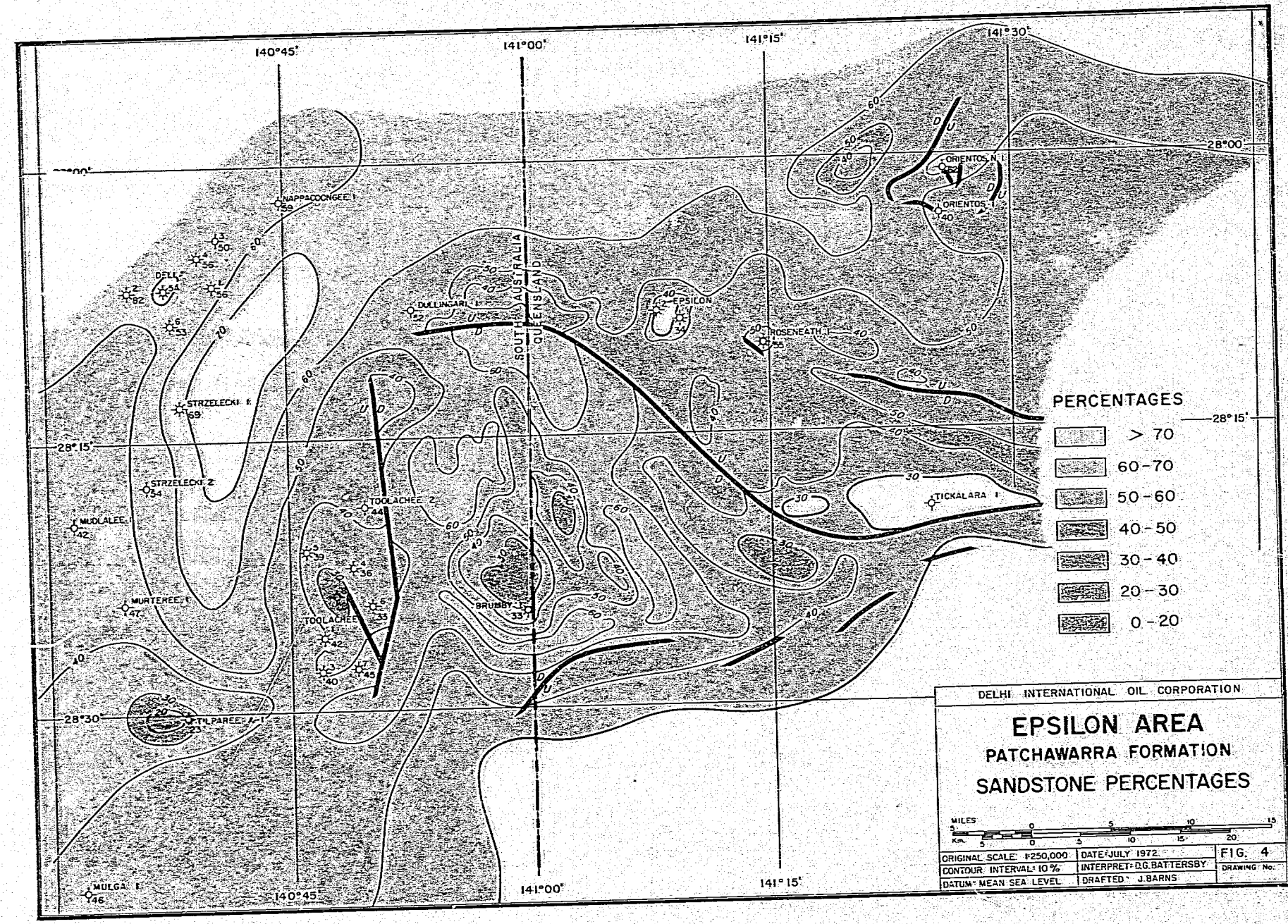
The most important aspect of this map is the apparent increase in the Patchawarra sandstone percentage into areas of thick sedimentation. For the Patchawarra Formation this percentage is greater than for the Epsilon Formation and is equal to or greater than that for the Toolachee Formation. Sandstone bodies are generally thicker in the Patchawarra Formation and while most of those in the Toolachee and Epsilon formations appear to have been deposited in channels and point bars it appears that at least some of the Patchawarra Formation sandstones are alluvial.

From the above we can infer that:

1. Patchawarra Formation deposition began on an irregular, probably fault controlled, pre-Permian to early Permian (Merrimelia Formation) surface. At the beginning of Patchawarra deposition topographic relief would have been close to a maximum for the Permian.

2. Stream activity would have concentrated in the low areas with coarse clastics being deposited. Deposition would have probably been in both alluvial and fluvial environments. The onset of sedimentation may have been related to either a change in climate increasing run-off, or an uplift of areas outside the Cooper Basin providing a sediment source.

3. After this "valley fill" phase of deposition had levelled the area to a large degree, normal floodplain sedimentation extended across the basin.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NAPPACOONGEE 1
DELHI
DULLINGARI 1
EPSILON
ROSENEATH 1
ORIENTOS N 1
ORIENTOS 1
STRZELECKI E
STRZELECKI 2
MUDLALEE 1
MURTEREE 1
TOOLACHEE 2
TOOLACHEE
BRUMBY 1
TICKALARA 1
THAREEA A-1
MULGA 1
SOUTH AUSTRALIA
QUEENSLAND
PERCENTAGES
> 70
60-70
50-60
40-50
30-40
20-30
0-20
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
PATCHAWARRA FORMATION
SANDSTONE PERCENTAGES
MILES
Km.
ORIGINAL SCALE: 1:250,000
DATE: JULY 1972
FIG. 4
CONTOUR INTERVAL: 10 %
INTERPRET: D.G. BATTERSBY
DRAWING No.
DATUM: MEAN SEA LEVEL
DRAFTED: J. BARNS

Sandstone Isolith Map (Fig. 5)

This map, constructed from the sandstone percentage map and the isopach map, illustrates these Patchawarra Formation features:

(a) Sandstone increases into thick areas to a maximum of about 800 feet.

(b) Near the crest of some features the amount of sandstone decreases sharply, e.g. 18 feet in Epsilon No. 1.

(c) The source of the sandstone appears to be from the south into the triangular graben area. Another sediment source may have been off the Murteree high.

Lithofacies Maps

Phase I (Fig. 6)

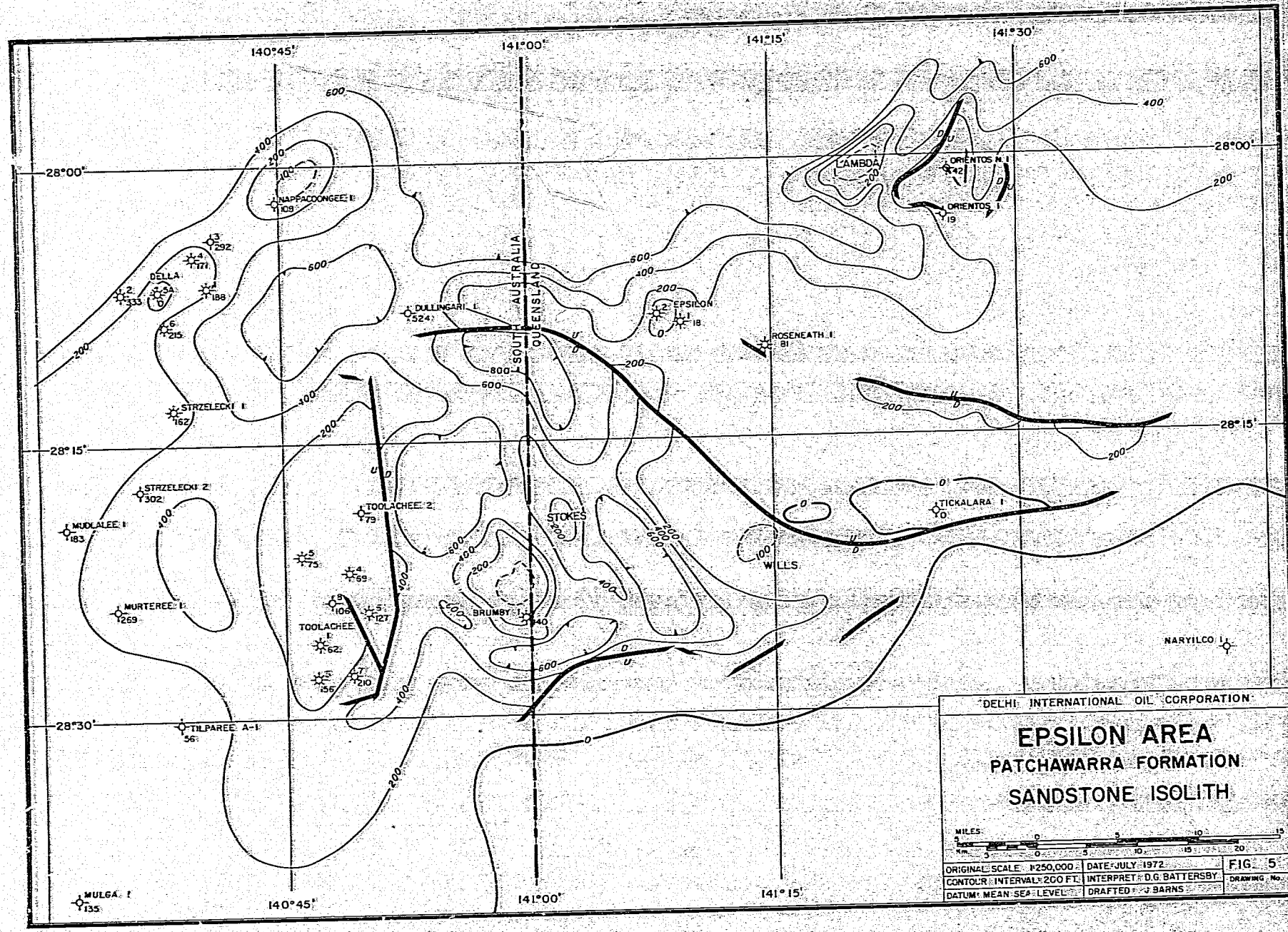
This indicates the following facies trend:

1. Higher energy environments (fluvial-floodplain) were present on the upthrown side of the Tickalara fault and in the region of the Della-Nappacoongee structural trend during Patchawarra Formation deposition.

2. The Toolachee-Brumby area has a lower energy environment.

Phase II (Fig. 7)

As no wells have been drilled in lows, the construction of this map is based on an interpretation of the Patchawarra Formation sedimentation pattern. The map depicts the following features:


140°45'
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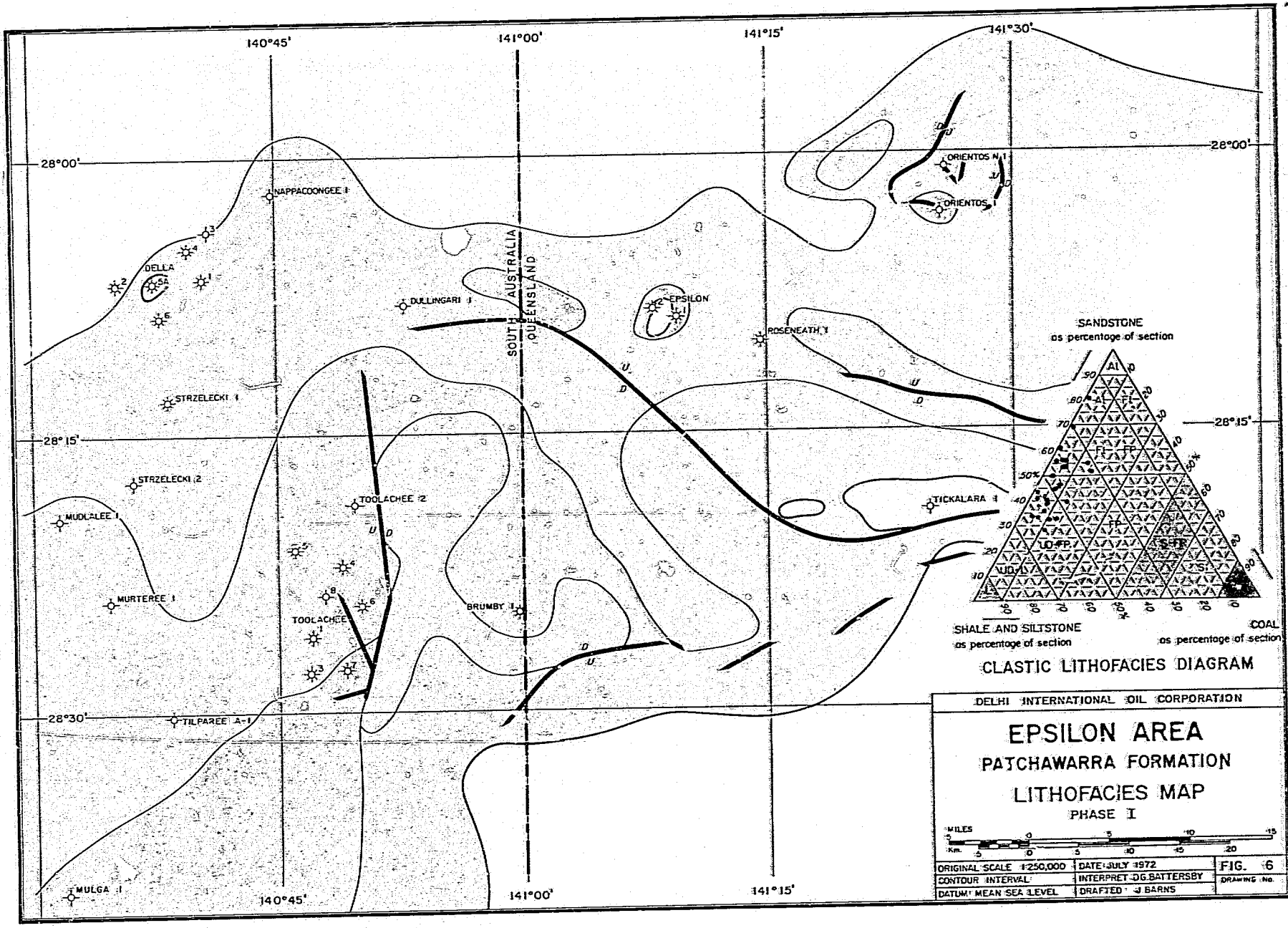
SOUTH AUSTRALIA
QUEENSLAND
NAPPACOONGEE 1
109
DELLA
DULLINGARI 1
524
LAMBDA 1
ORIENTOS N 1
42
ORIENTOS 1
19
EPSILON 1
18
ROSENEATH 1
81
STRZELECKI 1
162
STRZELECKI 2
302
MUDLALEE 1
183
TOOLACHEE 2
79
STOKES
TICKALARA 1
0
WILLS
MURTEREE 1
269
TOOLACHEE 1
62
BRUMBY 1
140
NARYILCO 1
TILPAREE A-1
56
MULGA 1
135
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
PATCHAWARRA FORMATION
SANDSTONE ISOLITH
MILES
KMS
ORIGINAL SCALE 1:250,000
DATE JULY 1972
FIG. 5
CONTOUR INTERVAL 200 FT.
INTERPRET D.G. BATTERSBY
DRAWING No.
DATUM MEAN SEA LEVEL
DRAFTED J. BARNS


140°45'
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NAPPACOONGEE 1
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ROSENEATH 1
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STRZELECKI 2
MUDLALEE 1
MURTEREE 1
TOOLACHEE 2
TOOLACHEE 1
BRUMBY 1
TICKALARA 1
TILPAREE A-1
MULGA 1
SOUTH AUSTRALIA
QUEENSLAND
SANDSTONE
as percentage of section
SHALE AND SILTSTONE
as percentage of section
COAL
as percentage of section
CLASTIC LITHOFACIES DIAGRAM
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
PATCHAWARRA FORMATION
LITHOFACIES MAP
PHASE I
MILES
Km.
ORIGINAL SCALE 1:250,000
CONTOUR INTERVAL
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: D.G. BATTERSBY
DRAFTED: J. BARNS
FIG. 6
DRAWING No.

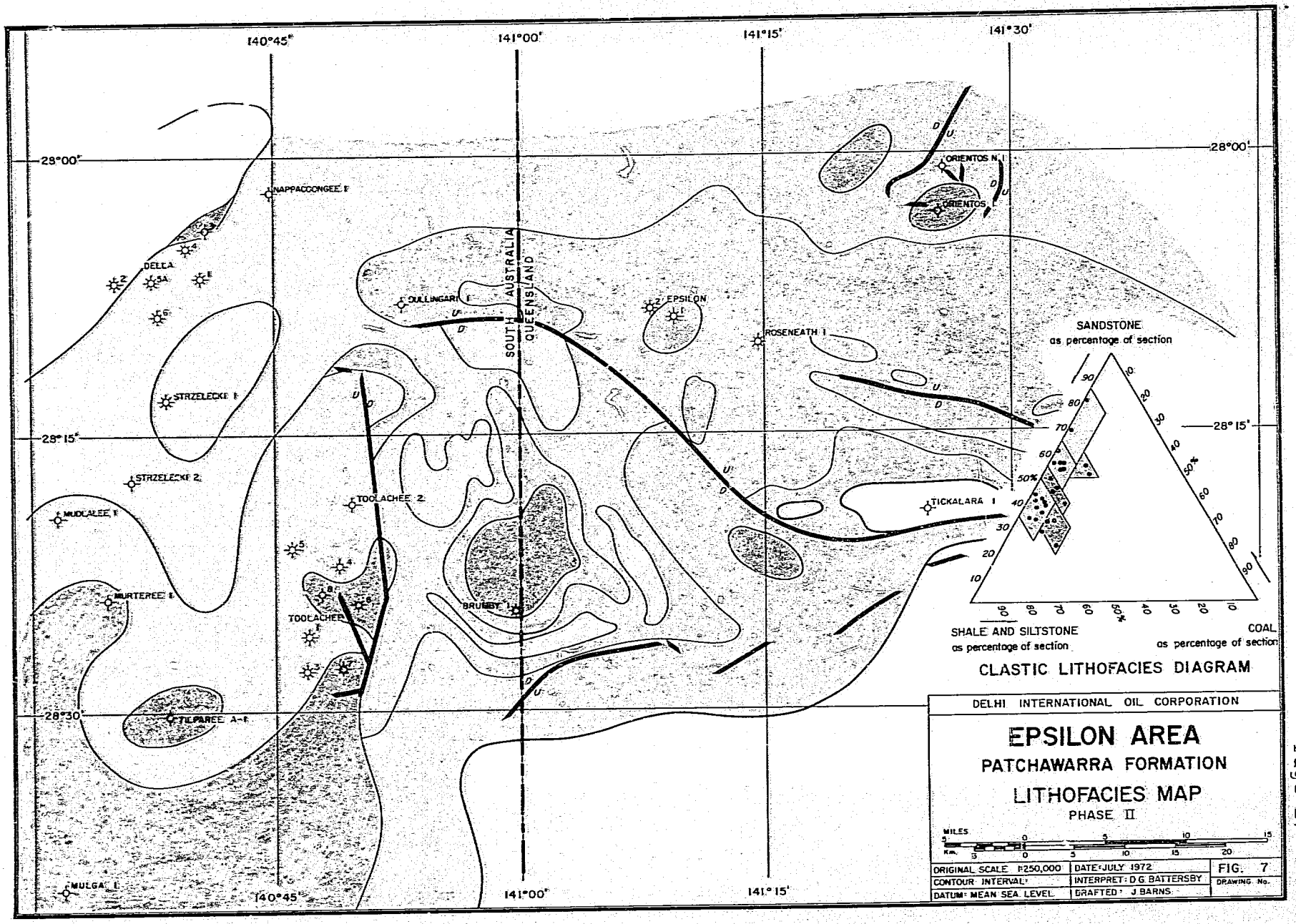
1. Energy of environment of deposition increased into areas of thick sedimentation, e.g. a higher energy floodplain environment in areas surrounding Brumby-Stokes going to an alluvial-fluvial environment in areas of thick sedimentation south of the Tickalara fault.

2. Energy of environment of deposition decreased to the southwest through the Mulga area.

Comment

An explanation of the more fluvial or higher energy sediments on the Della-Nappacoongee feature as compared with other areas of relatively thin sedimentation is necessary.

The high sandstone percentages are considered to be diagenetically related to the Murteree high. This high provided a source of sediment or an access through which sediment flowed into the basin. As such, the relatively "lower" areas of Della and Nappacoongee received sediment off Murteree, although most of the sediment was deposited off "structure" in the lows to the east, west and north. It is probable that Permian sediments were never deposited on the Murteree high and thus this structure provided detritus throughout the Permian. In this way it is possible that sediments immediately off this feature might have a higher sandstone percentage than in the lower areas further from the sediment source. As well, it should always be recognized that areas of maximum deposition, e.g. the Nappamerri low, probably would have an entirely different sedimentary sequence than that existing closer to the source areas.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MULGA 1
OULLINGARIE 1
SOUTH AUSTRALIA
QUEENSLAND
EPSILON 1
ROSENEATH 1
BRUMBY 1
TICKALARA 1
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ORIENTOS 1
U
D
SANDSTONE
as percentage of section
SHALE AND SILTSTONE
as percentage of section
COAL
as percentage of section
CLASTIC LITHOFACIES DIAGRAM
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
PATCHAWARRA FORMATION
LITHOFACIES MAP
PHASE II
MILES
KM.
ORIGINAL SCALE 1:250,000
CONTOUR INTERVAL:
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: D.G. BATTERSBY
DRAFTED: J. BARNS.
FIG. 7
DRAWING No.

EPSILON FORMATION

Isopach Map (Fig. 8)

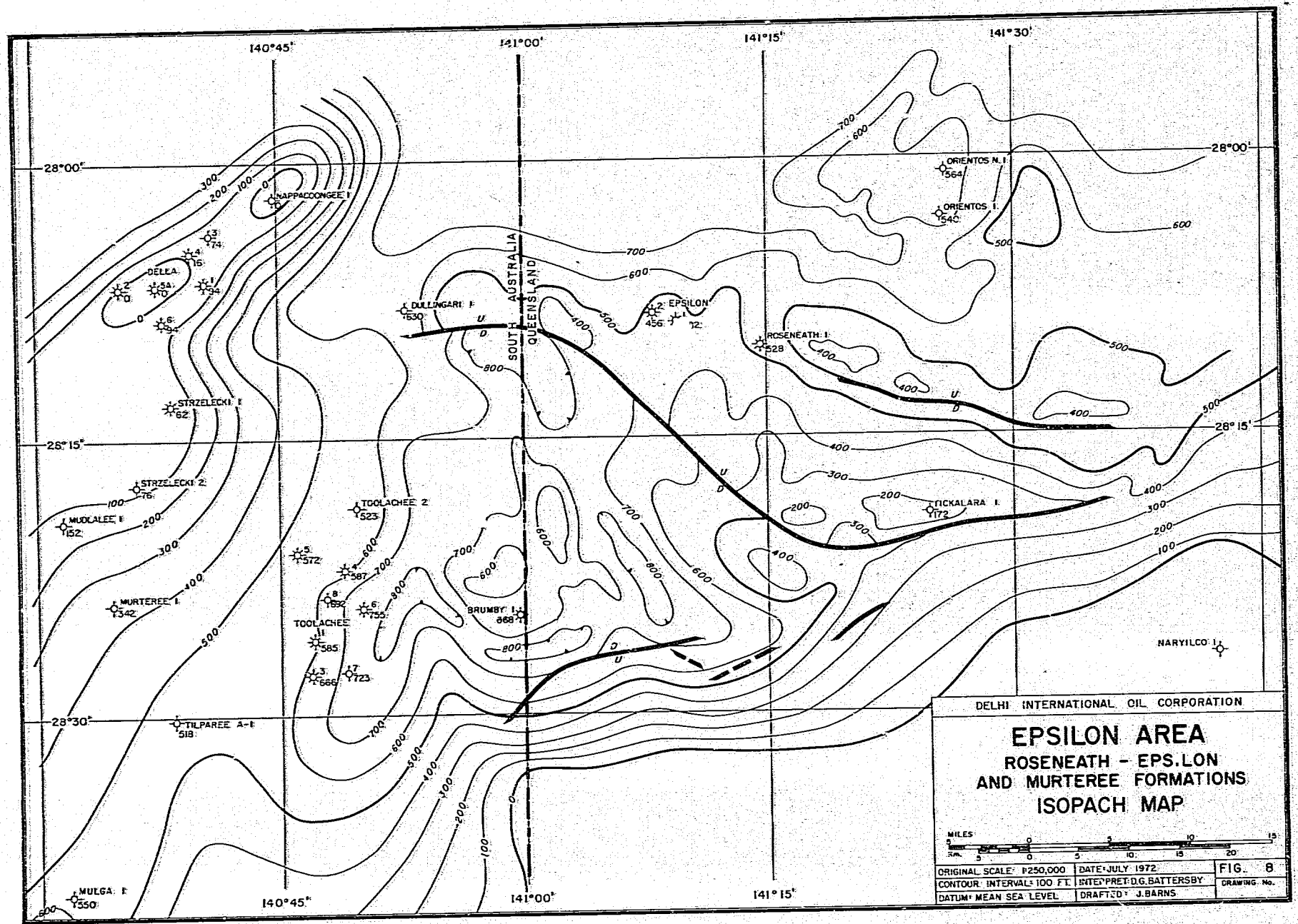
Because there is insufficient well control to adequately separate the Epsilon Formation from the Roseneath-Epsilon-Murteree formations they have been combined and are presented as Figure 8.

The zero edge of the combined unit isopach is difficult to position. It is believed, however, that the three formations were deposited further south than the Patchawarra Formation. This indicates a southeasterly tilt to the basin following deposition of the Patchawarra. The evidence for this conclusion is:

1. Epsilon Formation and Roseneath Shale onlap the Patchawarra Formation in Tickalara No. 1. This is the well drilled closest to the southern edge of the basin.

2. On studying regional isopachs it becomes apparent that the centre of deposition has shifted from the Patchawarra low during Patchawarra deposition, southeast toward the Dullingari-Brumby region during Toolachee deposition.

The isopach of the combined Roseneath, Epsilon and Murteree formations illustrates the roughly north-south trending thick towards the Nappamerri low similar to that observed on the Patchawarra isopach. This low extends from immediately west of Dullingari No. 1, through both the Toolachee area and Mulga No. 1. Again, a significant increase in thickness east of the Della-Nappacoongee structures is present. Also, the trend of relatively thin deposition related to the Tickalara and Wolgolla faults can be seen.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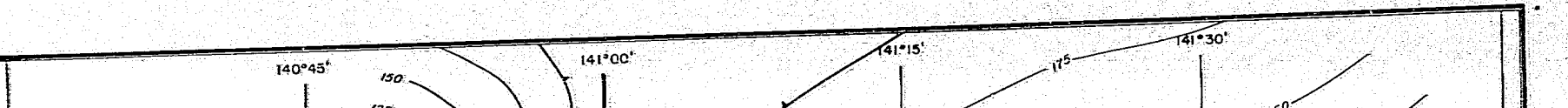
SOUTH AUSTRALIA
QUEENSLAND
NAPPACOONGEE 1
DELEA
DULLINGARI 1
EPSILON 1
EPSILON 2
ROSENEATH 1
ORIENTOS N. 1
ORIENTOS 1
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
MURTEREE 1
TOOLACHEE 1
TOOLACHEE 2
BRUMBY 1
TICKALARA 1
NARYILCO 1
TILPAREE A-1
MULGA 1
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
ROSENEATH - EPSILON AND MURTEREE FORMATIONS
ISOPACH MAP
MILES
KM.
ORIGINAL SCALE: 1:250,000
DATE: JULY 1972
FIG. 8
CONTOUR INTERVAL: 100 FT.
INTERPRET: D.G. BATTERSBY
DRAWING No.
DATUM: MEAN SEA LEVEL
DRAFTED: J. BARNS



DELHI INTERNATIONAL OIL CORPORATION

EPSILON AREA

EPSILON FORMATION

ISOPACH MAP

MILES 0 5 10 15

Km. 0 5 10 15 20

ORIGINAL SCALE: 1:250,000	DATE: JULY 1972	FIG. 9
CONTOUR INTERVAL: 25 FT.	INTERPRET: D.G. BATTERSBY	DRAWING No.
DATUM: MEAN SEA LEVEL	DRAFTED: J. BARNS	

An Epsilon Formation isopach has been compiled and is included in this report (Fig. 9). This map, however, is considered to be unreliable for the following reasons:

1. The top and bottom of the Epsilon Formation are not clearly distinguishable in many wells.

2. As the thickness ranges from 90 feet to 250 feet a small error in picking the top or bottom of the interval is critical.

However, three general observations regarding the Epsilon Formation depositional trends can be made:

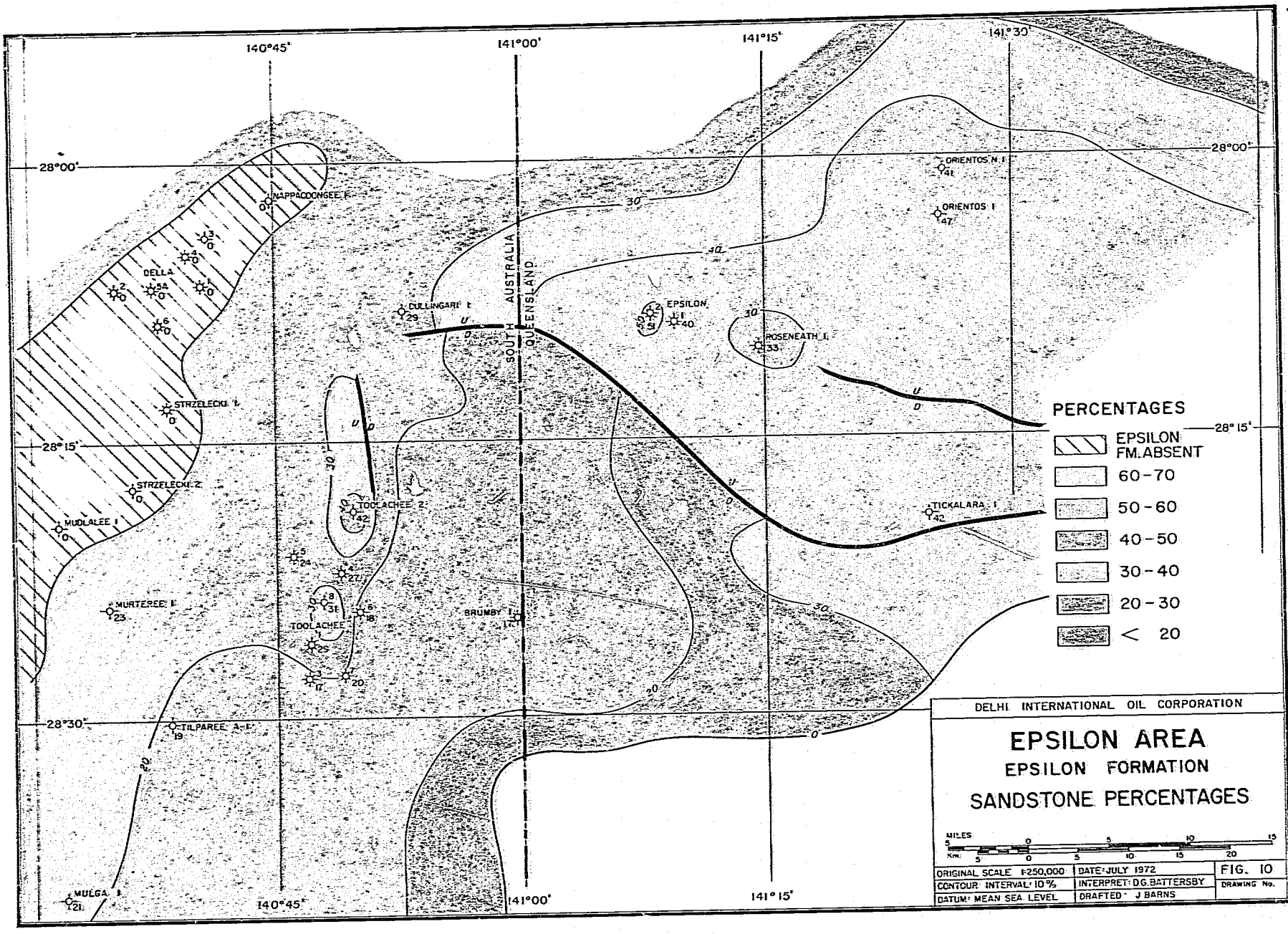
1. There is a general NNE-SSW thick trend with the axis running through Dullingari, Toolachee, and Mulga. In this trend the Epsilon averages about 200 feet thick.

2. A general east-west thin trend can be observed in the Epsilon-Roseneath-Tickalara-Orientos region where the thickness of the Epsilon averages about 120 feet.

3. To the east of the study area the Epsilon Formation has been removed by erosion along the Della-Nappacoongee trend.

Sandstone Percentage Map (Fig. 10)

Sandstone percentages in the Epsilon Formation are generally lower than those in the Toolachee and Patchawarra formations at any one control point. Reservoir characteristics are also markedly poorer and sandstone units are significantly thinner in the Epsilon Formation. Observations which can be made from the sandstone percentage map are as follows:


140°45'
141°00'
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28°00'
28°15'
28°30'
SOUTH AUSTRALIA
QUEENSLAND
NAPPACOONSEE 1
DELLA
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
MURTEREE 1
MULGA 1
TILPAREE A-1
CULLINGARI 1
TOOLACHEE 2
TOOLACHEE 1
BRUMBY 1
EPSILON 1
ROSENEATH 1
ORIENTOS N.1
ORIENTOS 1
TICKALARA 1
PERCENTAGES
EPSILON FM. ABSENT
60-70
50-60
40-50
30-40
20-30
< 20
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
EPSILON FORMATION
SANDSTONE PERCENTAGES
MILES
Km.
ORIGINAL SCALE 1:250,000
CONTOUR INTERVAL: 10%
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: D.G. BATTERSBY
DRAFTED: J BARNS
FIG. 10
DRAWING No.

1. A high sandstone percentage locale coincides with the isopach thin along the Epsilon-Tickalara trend.

2. There is a suggestion of a minor increase in sandstone percentage northwards from the Toolachee field.

Other general comments are:

1. Epsilon Formation sandstones in the Orientos wells were tight as were those in the Patchawarra Formation.

2. Epsilon Formation hydrocarbon production has been obtained from Epsilon wells Nos. 1 and 2. In these wells sandstone units are thicker than usual and have better reservoir characteristics. Significant gas flows have been obtained from two Toolachee wells, Toolachee Nos. 1 and 3.

Sandstone Isolith Map

No isolith map has been constructed due to a lack of variation in total sandstone found throughout the study area. Total sandstone present in wells ranges from 29 to 77 feet with most wells penetrating the Epsilon Formation having 40 to 55 feet of sandstone.

Lithofacies Maps

Phase I (Fig. 11)

This map illustrates the floodplain environment north of the Tickalara fault as distinct from the area to the south which has a lower energy upper deltaic-lake environment. A north-south floodplain environment in the Toolachee region may connect up with the similar environment north of the Tickalara fault. The region of Epsilon No. 2 is indicated as a locally higher energy fluvial-floodplain environment. It should be

noted that environments indicated are lower energy than those occurring in similar regions in the Patchawarra Formation.

Phase II (Fig. 12)

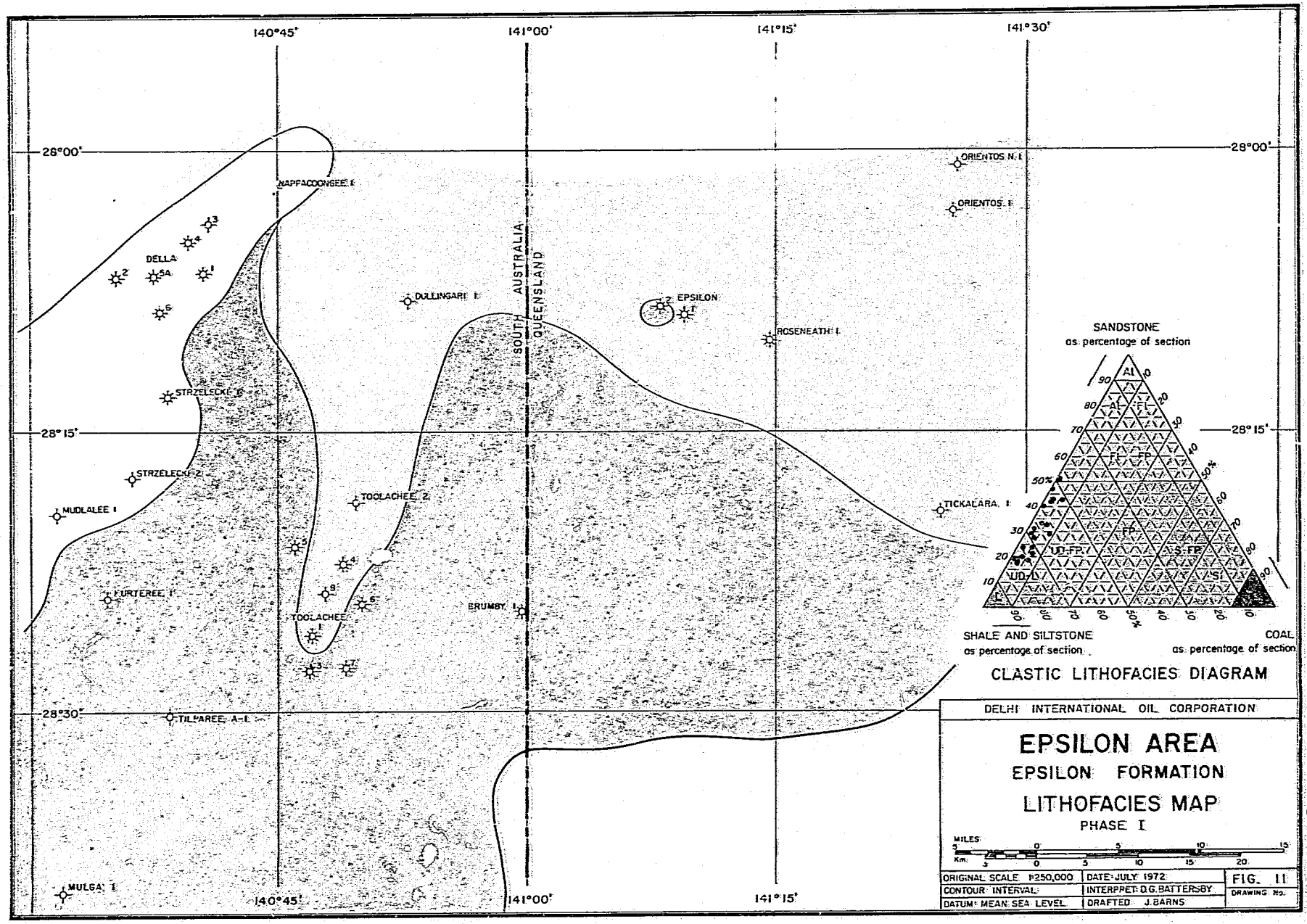
The following observations can be made:

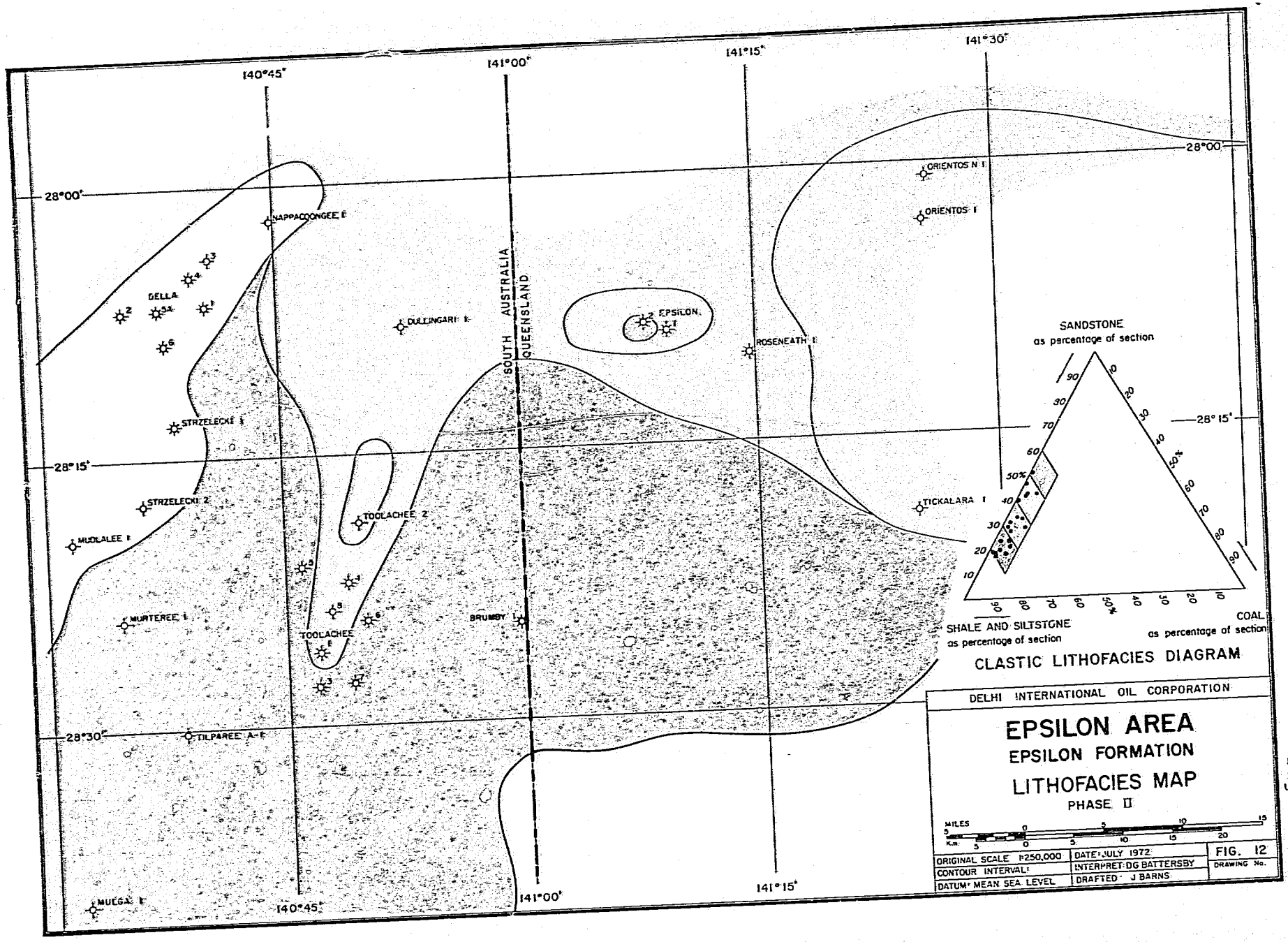
1. The suggestion that the higher energy environment in the Toolachee region connects with the Epsilon trend is reinforced by this map.

2. The more fluvial environments of the Orientos-Tickalara area continue either eastwards to the basin margin or swing south through Naryilco. However, in the absence of well control and with the evidence of structural trends the latter suggestion is favoured. This would thus be a direction of sediment source for the Epsilon Formation.

Overall, the general trends found present during Patchawarra Formation deposition appear to have been present, but less obviously so, during deposition of the Epsilon Formation. However, there is little evidence of any effect of the Murteree high on depositional environment of the Epsilon Formation. Perhaps erosion has removed the Epsilon Formation to a distance far enough from this high for its affect to be insignificant. Finally, the general similarity of thickness, sandstone percentages and depositional environment throughout the study area leads to the conclusion that over most of the area the Epsilon Formation represents a minor deltaic phase possibly due to a lull in basin sinking, allowing the return of a higher level of depositional energy. Sources of sediment would be from the margins of the basin with no one source dominant although a source east of Orientos or from the Naryilco area is inferred from most maps. One might expect sandstone percentages to show a general increase towards the

margins of the basin. Also the Epsilon Formation might be unrecognizable as such due to facies changes in regions of thick "Roseneath-Epsilon-Murteree" sedimentation.


140°45'
141°00'
141°15'
141°30'
28°00'
28°15'
28°30'
NAPPACOONGEE 1
DELLA
DULLINGARI 1
EPSILON
ROSENEATH 1
ORIENTOS N. 1
ORIENTOS 1
STRZELECKI 6
STRZELECKI 2
MUDLALEE 1
TOOLACHEE 2
TICKALARA 1
KURTEREE 1
TOOLACHEE 1
BRUMBY 1
TILPAREE A-1
MULGA 1
SOUTH AUSTRALIA
QUEENSLAND
SANDSTONE
as percentage of section
SHALE AND SILTSTONE
as percentage of section
COAL
as percentage of section
CLASTIC LITHOFACIES DIAGRAM
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
EPSILON FORMATION
LITHOFACIES MAP
PHASE I
MILES
Km.
ORIGINAL SCALE 1:250,000
DATE: JULY 1972
CONTOUR INTERVAL:
INTERPRET: D.G. BATTERSBY
DATUM: MEAN SEA LEVEL
DRAFTED: J. BARNS
FIG. 11
DRAWING No.


140°45'
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141°30'
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NAPPACOONGEE 1
ORIENTOS N 1
ORIENTOS 1
DELLA
DULLINGARI 1
EPSILON
ROSENEATH 1
SOUTH AUSTRALIA
QUEENSLAND
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
TOOLACHEE 2
TOOLACHEE E
MURTEREE 1
BRUMBY 1
TICKALARA 1
TILPAREE A-1
MULGA 1
SANDSTONE
as percentage of section
SHALE AND SILTSTONE
as percentage of section
COAL
as percentage of section
CLASTIC LITHOFACIES DIAGRAM
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
EPSILON FORMATION
LITHOFACIES MAP
PHASE II
MILES
Km.
ORIGINAL SCALE 1:250,000
CONTOUR INTERVAL:
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: DG BATTERSBY
DRAFTED: J BARNS
FIG. 12
DRAWING No.

TOOLACHEE FORMATION

Isopach Map (Fig. 13)

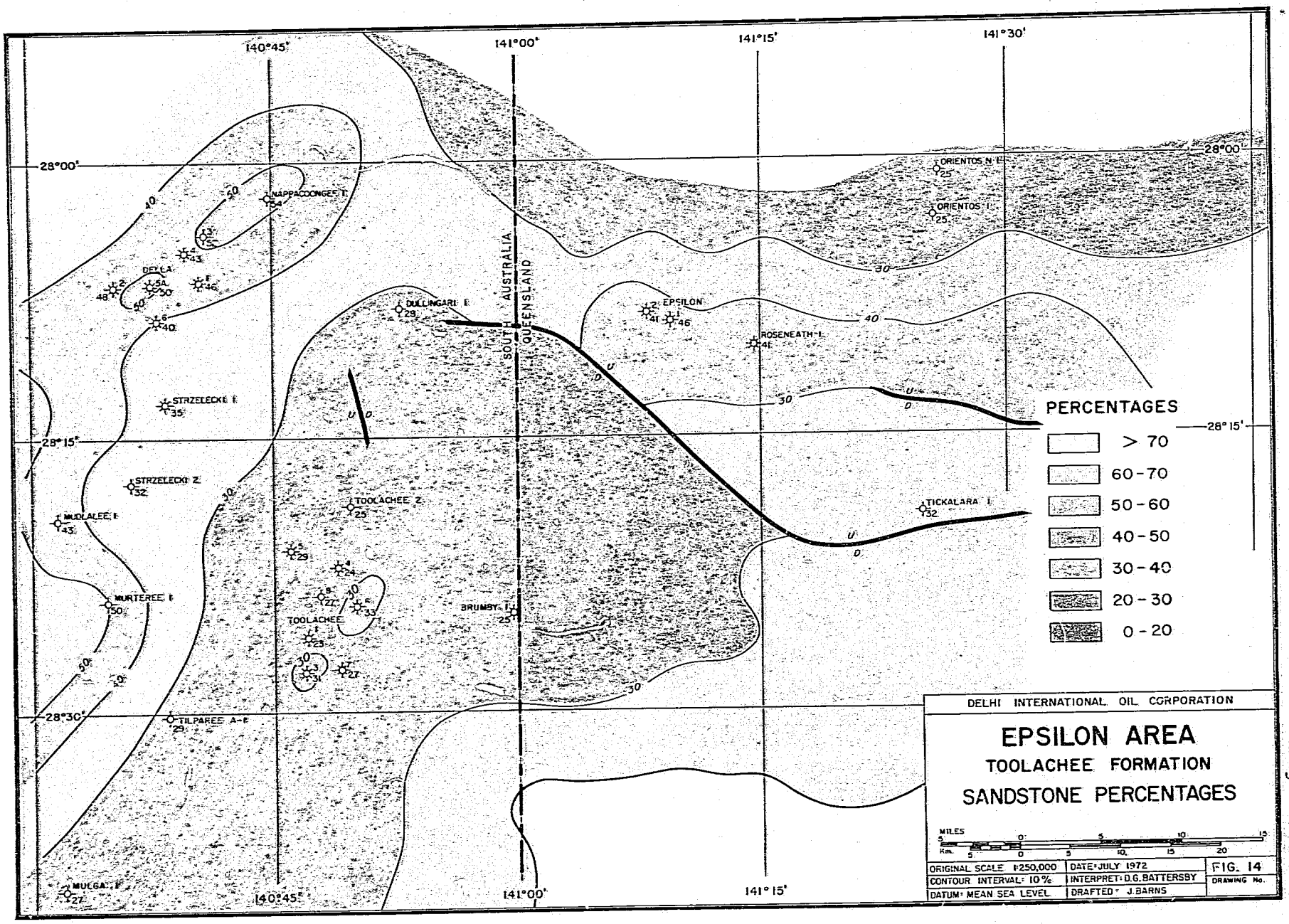
The main axis of deposition remains approximately north-south with major thicks between Della and Dullingari and in the triangular graben area south of the Tickalara fault. There is also a general thickening northwards into the Nappamerri trough. Again, there is a suggested east-west thin superimposed across the main north-south depositional axis which appears to be related to the Tickalara and Wolgolla faults; possibly also to the Naryilco high.

The Toolachee Formation isopach map, although affected by some of the faults which also affected the Patchawarra and Epsilon formations, indicates a marked diminishing of the influence of these faults. The thickness of the Toolachee Formation in the study area varies from about 200 feet to about 600 feet and in general most structures show significantly less thinning than was observed with the underlying formations.

Sandstone Percentage Map (Fig. 14)

The depositional trends indicated by the isopach map have, together with well control, been used to construct the sandstone percentage map. In the study area, the Epsilon-Roseneath region has the highest sandstone percentages, coinciding with the thin trend of the isopach. Accordingly, the 40% contour has been carried eastward paralleling the Wolgolla fault and was terminated immediately east of the end of this fault. As discussed previously, this trend may well continue eastward to the basin edge or swing south into the Naryilco basement high. This latter suggestion is most favoured because of the structural evidence of a trend from Orientos through


140°45'
141°00'
141°15'
141°30'
28°00'
28°15'
28°30'
SOUTH AUSTRALIA
QUEENSLAND
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
TOOLACHEE FORMATION
ISOPACH MAP
ORIENTOS N. 1
477
ORIENTOS 1
484
EPSILON 2
469
EPSILON 1
DULLINGARI 1
438
ROSENEATH 1
456
TICKALARA 1
206
NARYILCO 1
DELLA
TOOLACHEE 2
387
TOOLACHEE 1
380
BRUMBY 1
529
MURTEREE 1
212
MUDLALEE 1
206
STRZELECKI 1
204
STRZELECKI 2
226
TILPAREE A-1
280
MULGA 1
198
MILES
ORIGINAL SCALE 1:250,000
DATE: JULY 1972
FIG. 13
CONTOUR INTERVAL: 100 FT.
INTERPRET: DG BATTERSBY
DRAWING No.
DATUM: MEAN SEA LEVEL
DRAFTED: J BARNS


140°45'
141°00'
141°15'
141°30'
28°00'
28°15'
28°30'
SOUTH AUSTRALIA
QUEENSLAND
NAPPACOONGEE 1
ORIENTOS N 1
ORIENTOS 1
DELLA
DULLINGARI 1
EPSILON
ROSENEATH 1
STRZELECKI 1
STRZELECKI 2
TOOLACHEE 2
TICKALARA 1
MUDLALEE 1
MURTEREE 1
TOOLACHEE
BRUMBY 1
TILPAREE A-1
MULGA 1
PERCENTAGES
> 70
60-70
50-60
40-50
30-40
20-30
0-20
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
TOOLACHEE FORMATION
SANDSTONE PERCENTAGES
MILES
Km.
ORIGINAL SCALE 1:250,000
CONTOUR INTERVAL: 10%
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: D.G. BATTERSBY
DRAFTED: J. BARNS
FIG. 14
DRAWING No.

to Naryilco. The Orientos area has a low (25%) percentage of sandstone which, as was the case with the underlying sandstone units, shows very poor reservoir character. Reasons for the poor reservoir character for all formations in both Orientos No. 1 and Orientos North No. 1, are not known although both wells were drilled close to faults. In any case, a well should be drilled on one of the other structures along this trend to establish whether the Orientos structure is anomalous or if these "low sandstone", poor reservoir conditions can be expected further along the trend.

South of the Tickalara fault sandstone percentages are relatively low, ranging from 23 to 33 percent. As this area has a thick Toolachee Formation sequence, the premise that areas of thick sedimentation would have been depressional at the time of deposition, containing a strong fluvial element and hence higher sandstone percentages, is not apparent, although well control is rather limited.

West of the study area the sandstone percentage increases on to the Della-Nappacoongee thin where it reaches a high value of 54% in Nappacoongee No. 1. Also, data from eight wells drilled on the Toolachee structure, depicts no trend of increasing sandstone percentages off structure, in fact the reverse is indicated.

Thus, the overall picture is one of higher sandstone percentages in areas where structural growth, contemporaneous with deposition, resulted in regions where the Toolachee Formation is relatively thin. One might interpret from this that these areas represent a concentration of stream activity relative to the areas of thicker sedimentation. Another possibility is that, as was suggested for the Patchawarra Formation, the Murteree "high" represented a prolific source of sediment but that major stream

activity also existed in regions of thick sedimentation.

Another possibility is as follows:

1. Major streams with fast currents flowed off the Murteree high through Della and Nappacoongee. Another major area of stream activity was possibly off the Naryilco high.

2. These streams diverged "off" these trends into a number of smaller distributories and finally disappeared into swampy areas with minor lakes.

3. Periodically these major channels swept across the floodplain area depositing coarser grained sands.

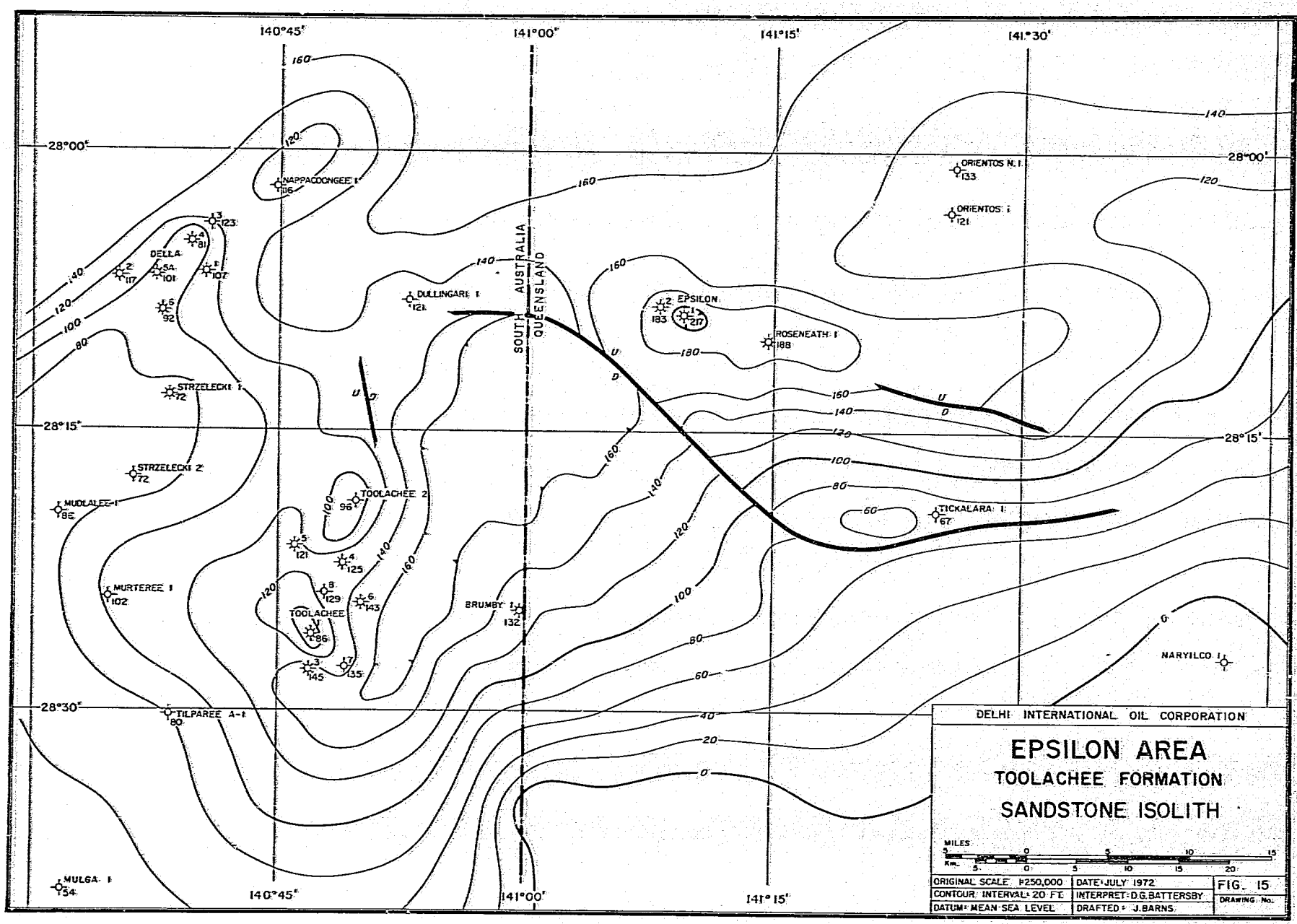
4. Subsidence of these lows kept pace with sedimentation, the bulk of the sediments and in particular finer grained sands and silts being deposited here. The higher energy channel areas would have had a lower rate of deposition.

Sandstone Isolith Map (Fig. 15)

Two features are illustrated by this map:

1. A general increase in the amount of sandstone into the areas of thick sedimentation, to a known maximum of over 200 feet as in the Epsilon No. 1 area.

2. This increased amount of sandstone in the Epsilon-Roseneath area is due to a combination of reasonably high sandstone percentages together with a thick Toolachee Formation interval.


140°45'
141°00'
141°15'
141°30'
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28°15'
28°30'
SOUTH AUSTRALIA
QUEENSLAND
NAPPACOONGEE 1
DELLA
DULLINGARI 1
EPSILON
ROSENEATH 1
ORIENTOS N. 1
ORIENTOS 1
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
TOOLACHEE 2
TOOLACHEE
MURTEREE 1
BRUMBY 1
TICKALARA 1
NARYILCO 1
TILPAREE A-1
MULGA 1
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
TOOLACHEE FORMATION
SANDSTONE ISOLITH
MILES
Km.
ORIGINAL SCALE: 1:250,000
DATE: JULY 1972
FIG. 15
CONTOUR INTERVAL: 20 FT.
INTERPRET: D.G. BATTERSBY
DRAWING No.
DATUM: MEAN SEA LEVEL
DRAFTED: J. BARNS.

Lithofacies Maps

Phase I (Fig. 16)

This map outlines the more fluvial nature of sedimentation at Della-Nappacoongee and at Murteree, compared with the floodplain environment elsewhere.

Phase II (Fig. 17)

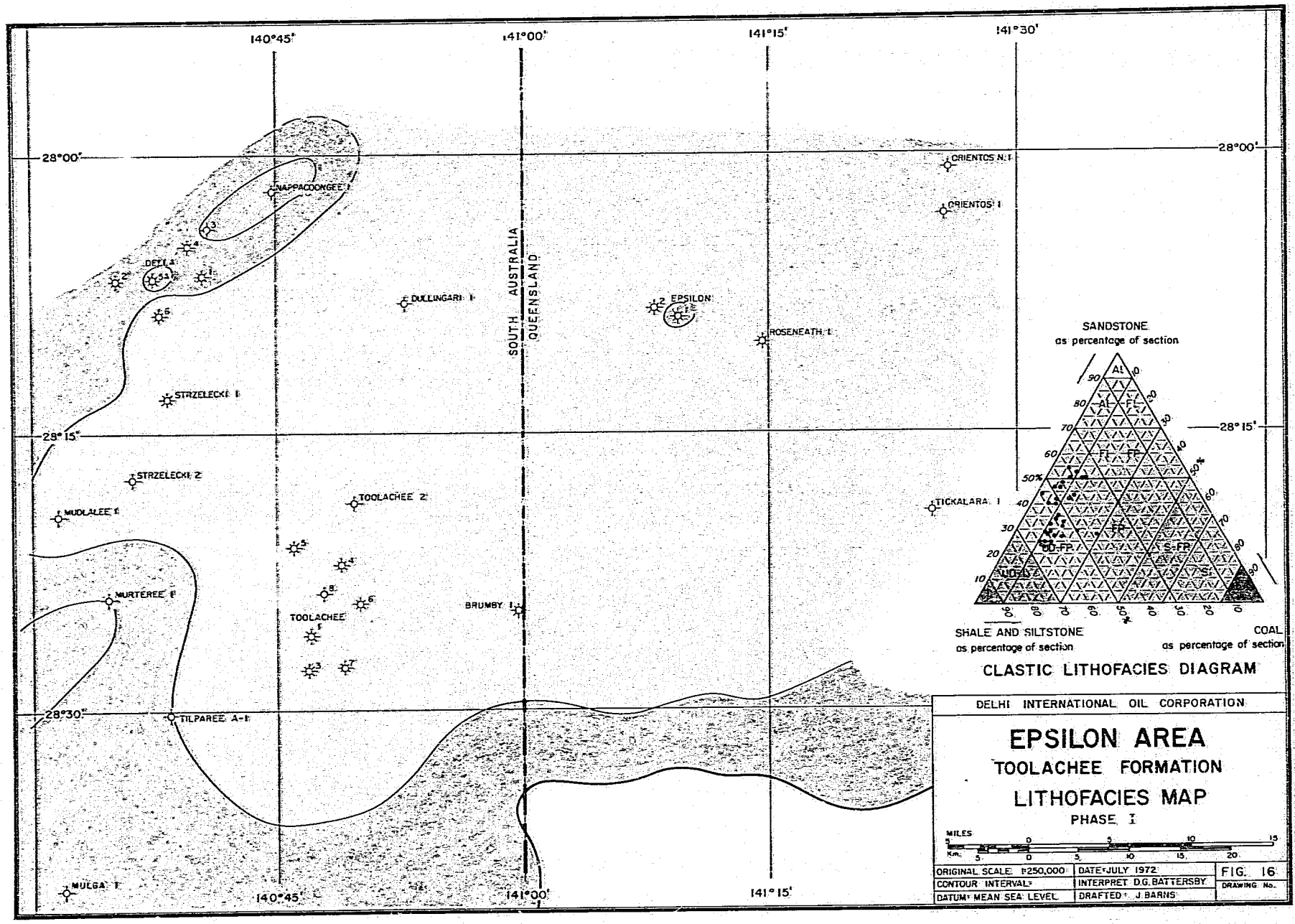
1. Fluvial environments off the Murteree high are inferred together with a decrease in energy of the depositional environment off structure.

2. The higher energy Roseneath-Epsilon fluvial trend is illustrated.

3. The Tilparee-Mulga wells can be separated from the remainder of the area. Each has a low sandstone percentage plus a high coal percentage indicative of a low energy floodplain environment.

4. The distribution of depositional environments, as interpreted in the lithofacies maps, tends to support the previously outlined belief of major stream channels being distributary onto floodplains.

In summary, major sediment sources appear to be off the Murteree structure, off the Naryilco feature and possibly also from the southeast basin margin. The floodplain nature of sedimentation in the Tilparee-Mulga region seems to preclude it as a direction of sediment source.


140°45'
141°00'
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141°30'
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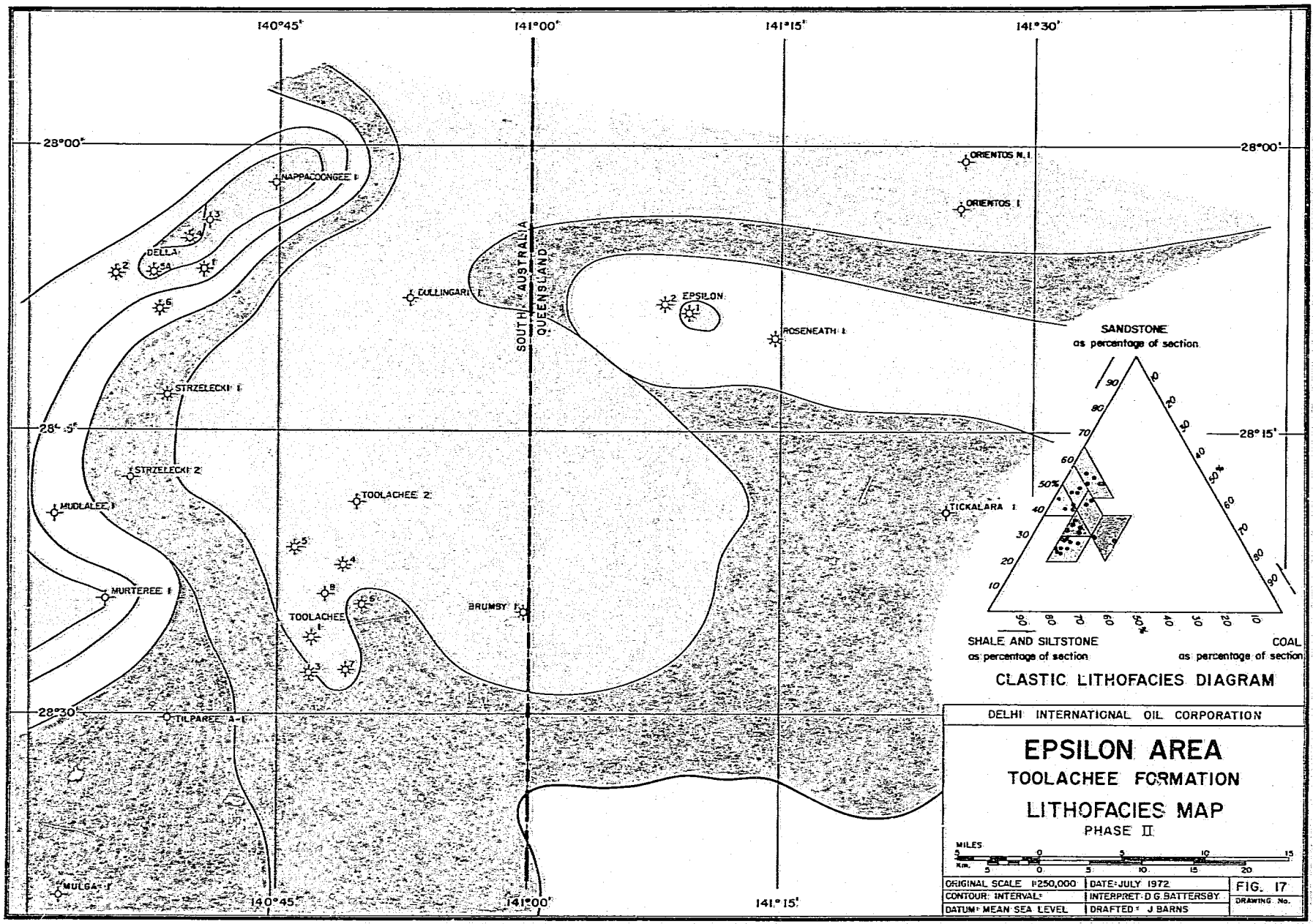
SOUTH AUSTRALIA
QUEENSLAND
NAPPACOONGEE 1
DELTA 1
DULLINGARI 1
EPSILON 1
ORIENTOS N.1
ORIENTOS 1
ROSENEATH 1
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
TOOLACHEE 2
TOOLACHEE
MURTEREE 1
BRUMBY 1
TICKALARA 1
TILPAREE A-1
MULGA 1
SANDSTONE
as percentage of section
SHALE AND SILTSTONE
as percentage of section
COAL
as percentage of section
CLASTIC LITHOFACIES DIAGRAM
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
TOOLACHEE FORMATION
LITHOFACIES MAP
PHASE I
MILES
Km.
ORIGINAL SCALE: 1:250,000
CONTOUR INTERVAL:
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: D.G. BATTERSBY
DRAFTED: J. BARNS
FIG. 16
DRAWING No.


140°45'
141°00'
141°15'
141°30'
28°00'
28°15'
28°30'
NAPPACOONGEE 1
DELLA
ORIENTOS N.1
ORIENTOS 1
DULLINGARI 1
EPSILON
ROSENEATH 1
SOUTH AUSTRALIA
QUEENSLAND
STRZELECKI 1
STRZELECKI 2
MUDLALEE 1
TOOLACHEE 2
TICKALARA 1
MURTEREE 1
TOOLACHEE
BRUMBY 1
TILPAREE A-1
MULGA 1
SANDSTONE
as percentage of section
SHALE AND SILTSTONE
as percentage of section
COAL
as percentage of section
CLASTIC LITHOFACIES DIAGRAM
DELHI INTERNATIONAL OIL CORPORATION
EPSILON AREA
TOOLACHEE FORMATION
LITHOFACIES MAP
PHASE II
MILES
Km.
ORIGINAL SCALE 1:250,000
CONTOUR INTERVAL:
DATUM: MEAN SEA LEVEL
DATE: JULY 1972
INTERPRET: D.G. BATTERSBY
DRAFTED: J. BARNS
FIG. 17
DRAWING No.

Ew 1994 R 3

OPEN FILE

TABLE OF PERMIAN FORMATION TOPS

COOPER BASIN WELLS

TO AUGUST 1972

WELL NAME LOCATION	K.B.E. G.G.Thick	TOOLACHER FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
Arrabury No. 1 27°11'35" S: 141°04'50" E:	+430 (166)	8574 166 -8144 WELL INDEX NO. 300-83-Q	———	———	Undifferentiated TOTAL DEPTH 9,660'	———	DATE COMPLETED 14.1.70		?8740 -8310	?
# Big Lake No. 1 28°12'35" S: 140°20'07" E:	+137 (2170)	7520 322 -7383 WELL INDEX NO. 300-132-SA	7842 58 -7705	7900 157 -7763 TOTAL DEPTH 10,068'	8057 229 -7920	8286 197 -8149 DATE COMPLETED 28.12.71	8483 1081 -8346	9564 126 -9427	— —	9690 -9553
# Big Lake No. 2 28°13'47" S: 140°17'17" E:	+119 (839+)	7362 322 -7243 WELL INDEX NO. 300-142-SA	7684 65 -7565	7749 144 -7630 TOTAL DEPTH 8,201'	7893 261 -7774	8154 47+ -8035 — DATE COMPLETED 21.5.72				
# Big Lake No. 3 28°13'44" S: 140°19'00" E:	+136 (2380)	7610 352 -7474 WELL INDEX NO. 300-153-SA	7962 73 -7826	8035 170 -7899 TOTAL DEPTH 10,298'	3205 268 -8069	8473 207 -8337 DATE COMPLETED 4.7.72	8680 1195 -8544	3875 115 -9739	29990 251 -9854	10241 -10105
Foxwood No. 1 28°31'23" S: 139°50'44" E:	+ 91 (+01)	— — WELL INDEX NO. 300-76-SA	5495 67 -5404	5562 40 -5471 TOTAL DEPTH 6,342'	5602 206 -5511	5808 105 -5717 DATE COMPLETED 30.4.68	5913 183 -5822	— —	6096 61 -6005	6157 -6066
# Brolga No. 1 27°35'36" S: 140°01'28" E:	+130 (952)	8672 122 -8542 WELL INDEX NO. 300-152-SA	— —	— — TOTAL DEPTH 9,700'	8794 34 -8664	8828 30 -8698 DATE COMPLETED 27.5.72	8858 716 -8728	9574 50 -9444	9624 -9494	
# Brumby No. 1 28°24'37" S: 140°59'35" E:	+274 (1710)	5958 537 -5684 WELL INDEX NO. 300-148-SA	6495 88 -6221	6583 266 -6309 TOTAL DEPTH 7,713'	6849 166 -6575	7015 217 -6741 DATE COMPLETED 12.4.72	7232 436 -6958	— —	— —	7668 -7394
Burley No. 1 27°48'16" S: 140°39'40" E:	+173 (3252+)	8722 521 -8549 WELL INDEX NO. 300-124-SA	9243 315 -9070	9558 192 -9385 TOTAL DEPTH 11,974'	9750 457 -9577	10207 263 -10034 DATE COMPLETED 21.10.71	10470+1504+ -10297			
Cherri No. 1 27°07'21" S: 140°12'45" E:	+117 (527)	— — — — WELL INDEX NO. 300-90-SA	— —	— — TOTAL DEPTH 4,596'	3971 147' -3854	4118 66 -4001 DATE COMPLETED 17.1.70	4184 113 -4067	4297 201 -4180	— —	4498 -4381
# Coonatie No. 1 27°29'06" S: 140°20'15" E:	+155 (979)	9325 259 -9170 WELL INDEX NO. 300-119-SA	— —	— — TOTAL DEPTH 10,405'	9584 89 -9429	9673 91 -9518 DATE COMPLETED 5.7.71	9764 380 -9609	10144 160 -9989	10304 73 -10149	10377 -10222
Coongie No. 1 27°12'03" S: 140°06'56" E:	+111 (263)	7786 56 -7675 WELL INDEX NO. 300-89-SA	— —	— — TOTAL DEPTH 11,947'	— — — — DATE COMPLETED 15.4.70	— —	7842 66 -7731	7908 141 -7797	— —	8049 -7938
Coopers Creek No. 1 27°48'22" S: 140°01'38" E:	+121 (2099)	8326 214 -8205 WELL INDEX NO. 300-127	— —	— — TOTAL DEPTH 10,515'	8540 216 -8419	8756 103 -8535 DATE COMPLETED 26.7.71	8859 1221 -8738	10080 345 -9959	10425 -10304	

NOTE: # Gas Well * Oil Well

WELL NAME LOCATION	K.B.E. G.G.Thick	TOOLACHEE FORMATION Depth Thick R.L.	PARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
# Daralingie No. 1 28°21'41" S; 139°38'50" E;	+ 95 (862)	6294 146 -6199	6440 84 -6345	6524 149 -6429	6673 147 -6578	6820 141 -6755	6961 195 -6866	– –	7156 147 -7061	7303 -7208
		WELL INDEX NO. 300-68-SA		TOTAL DEPTH 7,434'		DATE COMPLETED 10.12.67				
# Daralingie No. 2 28°23'21" S; 139°38'01" E;	+ 90 (1229)	6398 148 -6308	6546 110 -6456	6656 195 -6566	6851 193 -6761	7044 195 -6954	7239 388 -7149	– –	?7627 109 -7537	?7736 -7646
		WELL INDEX NO. 300-75-SA		TOTAL DEPTH 7,924'		DATE COMPLETED 26.3.70				
# Daralingie No. 3 28°20'26" S; 139°36'29" E;	+ 95 (1048)	6412 168 -6317	6580 94 -6485	6674 176 -6579	6850 153 -6755	7003 137 -6908	7140 320 -7045	– –	7460 43 -7365	7503 -7408
		WELL INDEX NO. 300-125-SA		TOTAL DEPTH 7,526'		DATE COMPLETED 29.6.72				
# Della No. 1 29°06'34" S; 140°40'25" E;	+208 (678)	6394 249 -6186	– –	– –	– –	6643 95 -6435	6738 334 -6530	– –	– –	7072 -6864
		WELL INDEX NO. 300-105-SA		TOTAL DEPTH 7,147'		DATE COMPLETED 22.8.70				
# Della No. 2 29°06'44" S; 140°35'17" E;	+149 (620)	6491 255 -6342	– –	– –	– –	– –	6746 365 -6597	– –	7111 37 -6962	7148 -6999
		WELL INDEX NO. 300-110-SA		TOTAL DEPTH 7,222'		DATE COMPLETED 4.11.70				
Della No. 3 29°03'54" S; 140°40'46" E.	+222 (818)	6574 256 -6352	– –	– –	– –	6830 73 -6608	6903 489 -6681	– –	7392 54 -7170	7446 -7224
		WELL INDEX NO. 300-115-SA		TOTAL DEPTH 7,520'		DATE COMPLETED 23.10.71				
# Della No. 4 29°04'56" S; 140°39'43" E;	+213 (527)	6398 206 -6185	– –	– –	– –	6604 16 -6391	6620 305 -6407	– –	– –	6925 -6712
		WELL INDEX NO. 300-136-SA		TOTAL DEPTH 7,115'		DATE COMPLETED 26.12.71				
# Della No. 5A 29°06'44" S; 140°37'27" E;	+167 (220)	6186 220 -6019	– –	– –	– –	– –	– –	– –	– –	6406 -6239
		WELL INDEX NO. 300-145-SA		TOTAL DEPTH 6,492'		DATE COMPLETED 25.3.72				
# Della No. 6 29°08'37" S; 140°37'52" E;	+172 (744)	6452 248 -6280	– –	– –	– –	6700 94 -6528	6794 402 -6622	– –	– –	7195 -7024
		WELL INDEX NO. 300-147-SA		TOTAL DEPTH 7,227'		DATE COMPLETED 25.4.72				
Dullingari No. 1 29°07'56" S; 140°52'30" E;	+320 (2090)	6840 456 -6520	– –	7296 228 -6976	7524 192 -7204	7716 210 -7396	7926 1004 -7606	– –	8930 120 -8610	9050 -8730
		WELL INDEX NO. 300-2-SA		TOTAL DEPTH 11,588'		DATE COMPLETED 21.9.62				
# Epsilon No. 1 28°08'45" S; 141°09'24" E;	+428 (1028)	6127 495 -5701	6622 30 -6194	6652 207 -6224	6859 152 -6431	7011 93 -6583	7104 53 -6676	– –	– –	7157 -6729
		WELL INDEX NO. 300-91-Q		TOTAL DEPTH 7,252'		DATE COMPLETED 6.1.72				
# Epsilon No. 2 28°08'35" S; 141°08'05" E;	+403 (922)	6130 479 -5747	6616 32 -6213	6648 234 -6245	6882 90 -6479	6972 100 -6569	– –	– –	– –	7072 -6669
		WELL INDEX NO. 300-92-Q		TOTAL DEPTH 7,190		DATE COMPLETED 10.5.72				

NOTE: # Gas Well * Oil Well

WELL NAME LOCATION	K.B.E. G.G.Thick	TOOLACHEE FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
Fly Lake No. 1 27°39'13" S: 139°56'48" E:	+114 (1022)	8408 119 -8294	– –	– –	– –	8527 31 -8413	8558 774 -8444	9332 98 -9218	9430 -9316	
		WELL INDEX NO. 300-127-SA		TOTAL DEPTH 9,675'		DATE COMPLETED 18.10.71				
Fly Lake No. 2 27°37'24" S: 139°59'50" E:	+133 (969)	8631 108 -8498	– –	– –	– –	8739 30 -8606	8769 762 -8636	9531 69 -9398	9600 -9467	
		WELL INDEX NO. 300-139-SA		TOTAL DEPTH 7,669'		DATE COMPLETED 24. 1.72				
Fly Lake No. 3 27°39'45" S: 139°56'31" E:	+120 (1164)	8514 113 -8394	– –	– –	8627 47 -8507	8674 46 -8554	8720 862 -8600	9582 96 -9462	9678 -9558	
		WELL INDEX NO. 300-144-SA		TOTAL DEPTH 9,754'		DATE COMPLETED 9. 3.72				
Gidgealpa No. 1 27°56'46" S: 140°04'56" E:	+181 (1050)	7690 290 -7509	27980 72 -7799	– –	– –	– –	8052 688 -7871	– –	8740 358 -8559	9108 -8927
		WELL INDEX NO. 300-29-SA		TOTAL DEPTH 13,114'		DATE COMPLETED 27.11.63				
Gidgealpa No. 2 27°54'44" S: 140°03'02" E:	+178 (117)	6751 117 -6573	– –	– –	– –	– –	– –	– –	– –	6868 -6690
		WELL INDEX NO. 300-30-SA		TOTAL DEPTH 9,020'		DATE COMPLETED 10. 2.64				
Gidgealpa No. 3 27°58'27" S: 140°03'05" E:	+176 (472)	7088 148 -6912	– –	– –	– –	7236 82 -7060	7318 242 -7142	– –	7560 132 -7384	7692 -7516
		WELL INDEX NO. 300-31-SA		TOTAL DEPTH 10,934'		DATE COMPLETED 14. 5.64				
Gidgealpa No. 4 27°58'37" S: 140°00'34" E:	+165 (380)	6866 152 -6701	– –	– –	– –	– –	7018 228 -6853	– –	– –	7246 -7081
		WELL INDEX NO. 300-32-SA		TOTAL DEPTH 7,783'		DATE COMPLETED 11. 7.64				
Gidgealpa No. 5 28°01'21" S: 139°28'56" E:	+166 (555)	6857 138 -6691	– –	– –	– –	– –	6995 291 -6829	7286 126 -7120	7412 208 -7246	7620 -7454
		WELL INDEX NO. 300-36-SA		TOTAL DEPTH 8,723'		DATE COMPLETED 16. 9.64				
Gidgealpa No. 6 27°55'24" S: 140°02'38" E:	+177 (516)	7049 171 -6872	– –	– –	– –	7220 54 -7043	7274 291 -7097	– –	– –	7565 -7388
		WELL INDEX NO. 300-38-SA		TOTAL DEPTH 7,805'		DATE COMPLETED 19.10.64				
Gidgealpa No. 7 28°02'19" S: 140°00'10" E:	+168 (780)	6829 176 -6661	– –	– –	– –	– –	7005 239 -6837	7244 365 -7076	– –	7609 -7441
		WELL INDEX NO. 300-44-SA		TOTAL DEPTH 10,582'		DATE COMPLETED 3. 2.65				
Gidgealpa No. 8 27°57'02" S: 140°01'40" E:	+198 (226)	6870 167 -6672	– –	– –	– –	7037 12 -6839	7049 47 -6851	– –	– –	7096 -6898
		WELL INDEX NO. 300-80-SA		TOTAL DEPTH 7,163'		DATE COMPLETED 18. 9.68				
Gidgealpa No. 9 27°59'25" S: 140°01'19" E:	+191 (467)	6920 143 -6729	– –	– –	– –	7063 31 -6872	7094 293 -6903	– –	– –	7387 -7196
		WELL INDEX NO. 300-81-SA		TOTAL DEPTH 7,533'		DATE COMPLETED 1.10.68				
Gidgealpa No. 10 27°57'42" S: 140°03'19" E:	+176 (265)	6900 133 -6724	– –	– –	– –	– –	7033 132 -6857	– –	– –	7165 -6989
		WELL INDEX NO. 300-82-SA		TOTAL DEPTH 7,231'		DATE COMPLETED 21.10.68				

NOTE: # Gas Well * Oil Well

WELL NAME LOCATION	K.B.E. G.G.	TOOLACHEE FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
# Gidgealpa No. 11 27°56'45" S: 140°02'26" E:	+178 (118)	6741 118 -6563 WELL INDEX NO. 300-91-SA	— —	— —	— —	— —	— —	— —	— —	6859 -6581 TOTAL DEPTH 6,950 DATE COMPLETED 23. 2.70
# Gidgealpa No. 12 27°58'37" S: 140°01'34" E:	+186 (230)	6748 167 -6562 WELL INDEX NO. 300-92-SA	— —	— —	— —	— —	6915 63 -6729 TOTAL DEPTH 7,050' DATE COMPLETED 20. 3.70	— —	— —	6978 -6792
# Gidgealpa No. 13 27°55'52" S: 140°02'46" E:	+198 (287)	6884 160 -6686 WELL INDEX NO. 300-118-SA	— —	— —	— —	7044 12 -6846 TOTAL DEPTH 7,320' DATE COMPLETED 12. 6.71	7056 115 -6858	— —	— —	7171 -6973
Gilpeppee No. 1 26°25'25" S: 141°33'17" E:	+337 (102)	9396 -9059 WELL INDEX NO. 300-86-Q	Undifferentiated Gidgealpa Group TOTAL DEPTH 10,690' DATE COMPLETED 24. 2.70					9498 -9161		
Gurra No. 1 29°01'23" S: 140°16'33" E:	+115 (257)	— —	4126 20 -4010	4146 211 -4030	4357 26 -4241 WELL INDEX NO. 300-95-SA TOTAL DEPTH 4,686' DATE COMPLETED 14. 4.70	— —	— —	— —	— —	4383 -4267
Ingamincka No. 1 27°29'21" S: 140°55'08" E:	+412 (327)	— —	— —	— —	— —	— —	6723 327 -6311 WELL INDEX NO. 300-1-SA TOTAL DEPTH 12,637' DATE COMPLETED 27.11.59	— —	— —	7050 -6638
Ingamincka No. 2 27°27'10" S: 141°03'17" E:	+334 (2452)	8370 215 -8036 WELL INDEX NO. 300-49-Q	— —	— —	8585 257 -8251 TOTAL DEPTH 11,763' DATE COMPLETED 6. 9.65	8842 44 -8508	8886 1936 -8552	— —	10822 480 -10488	11302 -10968
Kudrieke No. 1 27°28'56" S: 140°10'50" E:	+141 (901)	9296 202 -9155 WELL INDEX NO. 300-133-SA	— —	— —	— —	9498 90 -9357 TOTAL DEPTH 10,567' DATE COMPLETED 6.12.71	9588 520 -9447	10108 89 -9967	10197 -10056	
Kurbarie No. 1 29°54'55" S: 140°11'00" E:	+ 95 (765)	— —	— —	— —	4545 86 -4450 WELL INDEX NO. 300-97-SA TOTAL DEPTH 5,534' DATE COMPLETED 11. 5.70	4631 91 -4536	4722 281 -4627	25003 307 -4908	5310 80 -5215	5390 -5295
Lake Hope No. 1 29°07'22" S: 139°38'10" E:	+ 52 (1366)	— —	6652 16 -6600	6668 92 -6616 WELL INDEX NO. 300-123-SA TOTAL DEPTH 8,176' DATE COMPLETED 17. 9.71	6760 80 -6708	6840 727 -6788	27567 451 -7515	8018 -7966		
Merrimelia No. 1 27°49'05" S: 140°05'55" E:	+180 (829)	7782 156 -7602 WELL INDEX NO. 300-45-SA	— —	— —	— —	— —	7938 546 -7758 TOTAL DEPTH 10,332' DATE COMPLETED 24. 9.64	8484 126 -8304	8610 1190 -8430	29800 -9620
Merrimelia No. 2 27°41'58" S: 140°14'04" E:	+208 (0)	WELL INDEX NO. 300-46-SA			TOTAL DEPTH 13,011' DATE COMPLETED 16. 4.65					7650 -7442
Merrimelia No. 3 27°37'25" S: 140°21'26" E:	+194 (204)	7790 54 -7596 WELL INDEX NO. 300-47-SA	— —	— —	— —	— —	7844 74 -7650 TOTAL DEPTH 8,981' DATE COMPLETED 4. 4.65	7918 76 -7724	7994 148 -7800	8142 -7948

NOTE: # Gas Well * Oil Well

WELL NAME LOCATION	K.B.E. G.G.Thick	TOOLACEE FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
Merrimelia No. 4 27°47'03" S: 140°07'51" E:	+206 (442)	7530 122 -7324 WELL INDEX NO. 300-48-SA	– – TOTAL DEPTH 8,511'	– – – – – – DATE COMPLETED 26. 5.65			7652 212 -7446	7864 108 -7658	7972 540 -7766	28512 -8306
# Merrimelia No. 5 27°46'30" S: 140°09'20" E:	+134 (2 9)	7395 89 -7261 WELL INDEX NO. 300-101-SA	– – TOTAL DEPTH 8,989'	– – – – – – DATE COMPLETED 14. 9.70			7524 200 -7350	7684 110 -7550	7794 1136 -7660	8930 -8796
# Moomba No. 1 28°09'09" S: 140°16'11" E:	+123 (1720)	7602 254 -7479 WELL INDEX NO. 300-43-SA	7856 316 -7733 TOTAL DEPTH 9,519'	8172 208 -8049 DATE COMPLETED 25. 7.66	8380 265 -8257	8645 200 -8522	8845 477 -8722	– –	– –	9322 -9199
# Moomba No. 2 28°10'56" S: 140°13'36" E:	+110 (1355)	7410 402 -7300 WELL INDEX NO. 300-52-SA	7812 62 -7702 TOTAL DEPTH 9,858'	7874 233 -7764 DATE COMPLETED 10. 7.66	8107 217 -7997	8324 173 -8214	8497 268 -8387	– –	– –	8765 -8655
Moomba No. 3 28°08'08" S: 140°12'26" E:	+152 (1741)	7705 396 -7553 WELL INDEX NO. 300-55-SA	8100 63 -7948 TOTAL DEPTH 9,508'	8163 248 -8011 DATE COMPLETED 2. 3.67	8411 258 -8259	8669 187 -8517	8856 590 -8704	– –	– –	9446 -9294
Moomba No. 4 28°12'56" S: 140°15'06" E:	+120 (602+)	7709 374 -7589 WELL INDEX NO. 300-58-SA	8083 11? -7963 TOTAL DEPTH 8,311'	8194 -8074 DATE COMPLETED 13. 5.67						
# Moomba No. 5 28°02'32" S: 140°13'07" E:	+160 (470+)	7936 358 -7776 WELL INDEX NO. 300-61-SA	8294 -8134 TOTAL DEPTH 8,406'	DATE COMPLETED 25. 5.67						
# Moomba No. 6 28°02'04" S: 140°09'39" E:	+135 (1286+)	8004 351 -7869 WELL INDEX NO. 300-63-SA	8355 89 -8220 TOTAL DEPTH 9,290'	8444 173 -8309 DATE COMPLETED 1.12.67	8617 251 -8482	8868 180 -8733	9048 -8913			
# Moomba No. 7 28°05'46" S: 140°19'04" E:	+138 (1852)	7868 349 -7730 WELL INDEX NO. 300-70-SA	8217 210 -8079 TOTAL DEPTH 9,955'	8427 191 -8289 DATE COMPLETED 9. 2.68	8618 245 -8480	8853 181 -8725	9044 676 -8906	– –	– –	9720 -9582
# Moomba No. 8 28°06'44" S: 140°07'48" E:	+118 (1421)	7641 303 -7523 WELL INDEX NO. 300-73-SA	7944 61 -7826 TOTAL DEPTH 9,099'	8005 181 -7887 DATE COMPLETED 27.7.68	8186 208 -8068	8394 153 -8276	8547 515 -8429	– –	– –	9052 -8944
# Moomba No. 9 28°09'11" S: 140°09'49" E:	+134 (528+)	7632 358 -7498 WELL INDEX NO. 300-117-SA	7990 116 -7856 TOTAL DEPTH 8,160'	8106 -7972 DATE COMPLETED 17. 7.71						
# Moomba No. 10 28°11'05" S: 140°10'43" E:	+135 (577+)	7563 385 -7428 WELL INDEX NO. 300-140-SA	7948 115 -7813 TOTAL DEPTH 8,140'	8063 -7928 DATE COMPLETED 2. 2.72						
# Moomba No. 11 28°11'05" S: 140°09'02" E:	+138 (571+)	7736 396 -7598 WELL INDEX NO. 300-149-SA	8132 116 -7994 TOTAL DEPTH 8,307'	8248 -8110 DATE COMPLETED 19. 6.72						
* Moorari No. 1 27°34'19" S: 140°07'43" E:	+154 (934)	8812 105 -8658 WELL INDEX NO. 300-114-SA	– – TOTAL DEPTH 9,918'	– – – – DATE COMPLETED 19. 3.71	8917 45 -8763	8962 54 -8808	9016 540 -8862	9556 190 -9402	9746 -9592	

NOTE: # Gas Well * Oil Well

WELL NAME LOCATION	K.B.E. G.G.Thick	TOOLACHEE FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
Moorari No. 2 27°33'09" S: 140°07'49" E:	+136 (1152)	9048 157 -8906	– – 	– – 	9205 61 -9069	9266 80 -9130	9346 668 -9210	10014 166 -9878	10200 -10064	
		WELL INDEX NO. 300-130-SA		TOTAL DEPTH 9,950'		DATE COMPLETED 22.10.71				
Mount Howitt No. 1 26°37'27" S: 142°28'17" E:	+472 (458)	6900 ——— Undifferentiated Gidgealpa Group ———							7358 68 -6886	7426 -6954
		WELL INDEX NO. 300-63-Q		TOTAL DEPTH 7,719'		DATE COMPLETED 20.10.66				
Mudlalee No. 1 28°19'22" S: 140°31'31" E:	+182 (749)	5854 198 -5672	– – 	– – 	6052 11 -5870	6063 153 -5881	6216 387 -6034	– – 	6603 177 -6421	6780 -6598
		WELL INDEX NO. 300-71-SA		TOTAL DEPTH 6,829'		DATE COMPLETED 17. 1.68				
# Mudrangie No. 1 27°37'48" S: 140°16'45" E:	+145 (1235)	8916 106 -8771	– – 	– – 	9022 74 -8877	9096 106 -8951	9202 904 -9057	10106 45 -9961	– – 	10151 -10006
		WELL INDEX NO. 300-109-SA		TOTAL DEPTH 10,452'		DATE COMPLETED 26. 2.71				
Mudrangie No. 2 27°39'58" S: 140°13'39" E:	+196 (1524)	8820 227 -8624	– – 	– – 	29047 105 -8[illegible]	9152 54 -8956	9206 999 -9010	10205 139 -10009	10344 -10148	
		WELL INDEX NO. 300-157-SA		TOTAL DEPTH 10,440'		DATE COMPLETED 4. 8.72				
Mulga No. 1 28°39' 35" S: 140°31'50" E:	+145 (1039)	5320 198 -5175	5518 65 -5373	5583 89 -5438	5672 207 -5527	5879 189 -5734	6068 291 -5923	– – 	– – 	6359 -6214
		WELL INDEX NO. 300-84-SA		TOTAL DEPTH 6,480		DATE COMPLETED 22. 4.69				
Murteree No. 1 28°23'48" S: 140°34'22" E:	+148 (1124)	5910 214 -5762	– – 	6124 14 -5976	6138 171 -5990	6309 157 -6161	6466 568 -6318	– – 	7034 130 -6886	7164 -7016
		WELL INDEX NO. 300-108-SA		TOTAL DEPTH 7,231'		DATE COMPLETED 23. 9.70				
Nappacoongee No. 1 28°01'53" S: 140°44'39" E:	+277 (405)	6163 221 -5886	– – 	– – 	– – 	– – 	6384 184 -6107	– – 	– – 	6568 -6291
		WELL INDEX NO. 300-39-SA		TOTAL DEPTH 9,890'		DATE COMPLETED 6.11.65				
Naryilco No. 1 28°27'04" S: 141°42'23" E:	+449									
		WELL INDEX NO. 300-27-SA		TOTAL DEPTH 4,847'		DATE COMPLETED 16. 2.63				
Orientos No. 1 28°03'20" S: 141°25'38" E:	+474 (1113)	6060 524 -5586	6584 81 -6110	6665 255 -6191	6900 110 -6426	7010 113 -6536	7123 50 -6649	– – 	– – 	7173 -6699
		WELL INDEX NO. 300-26-Q		TOTAL DEPTH 11,527'		DATE COMPLETED 17.12.62				
Orientos North No. 1 28°00'58" S: 141°25'48" E:	+448 (1154)	6160 520 -5712	6680 96 -6232	6776 242 -6328	7018 130 -6570	7148 96 -6700	7244 70 -6796	– – 	– – 	7314 -6866
		WELL INDEX NO. 300-88-Q		TOTAL DEPTH 7,345'		DATE COMPLETED 16. 6.70				
# Packsaddle No. 1 27°32'40" S: 140°45'37" E:	+442 (1434)	8240 99 -7798	– – 	– – 	– – 	– – 	8339 1335 -7897	– – 	29674 645 -9232	10319 -9877
		WELL INDEX NO. 300-94-SA		TOTAL DEPTH 10,396'		DATE COMPLETED 22. 6.70				
Pando No. 1 28°24'58" S: 139°48'25" E:	+ 98 (63)	– – 	– – 	– – 	– – 	5620 63 -5527	– – 	– – 	– – 	5683 -5585
		WELL INDEX NO. 300-42-SA		TOTAL DEPTH 6,343'		DATE COMPLETED 22. 2.66				
Pando No. 2 28°25'48" S: 139°49'44" E:	+141 (251)	– – 	– – 	5672 86 -5531	5758 128 -5617	5886 37 -5745	– – 	– – 	– – 	5923 -5782
		WELL INDEX NO. 300-77-SA		TOTAL DEPTH 6,229'		DATE COMPLETED 10. 2.69				

NOTE: # Gas Well * Oil Well

WELL NAME LOCATION	R.B.E. G.G.Thick	TOOLACHEE FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELLIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
Pando North No. 1 29°23'26" S; 139°49'04" E;	+125 (447)	– –	5906 23 -5781	5929 82 -5804	6011 160 -5886	6171 88 -6046	6259 94 -6134	– –	– –	6353 -6228
		WELL INDEX NO. 300-104-SA		TOTAL DEPTH 6,460'		DATE COMPLETED 1. 8.70				
Roseneath No. 1 29°10'19" S; 141°14'32" E;	+437 (1164)	5860 490 -5423	6350 53 -5913	6403 239 -5966	6642 107 -6205	6749 129 -6312	6878 146 -6441	– –	– –	7024 -6587
		WELL INDEX NO. 300-85-Q		TOTAL DEPTH 7,208'		DATE COMPLETED 26.12.69				
Spencer No. 1 29°10'02" S; 139°51'49" E;	+117 (502)	– –	– –	– –	– –	– –	6124 446 -6007	– –	6570 56 -6453	6626 -6509
		WELL INDEX NO. 300-50-SA		TOTAL DEPTH 6,756'		DATE COMPLETED 3. 1.66				
Strzelecki No. 1 28°13'07" S; 140°38'16" E;	+219 (517)	6212 221 -5993	– –	– –	– –	6433 62 -6214	6495 234 -6276	– –	– –	6729 -6510
		WELL INDEX NO. 300-116-SA		TOTAL DEPTH 6,815'		DATE COMPLETED 16.12.70				
Strzelecki No. 2 29°17'27" S; 140°36'06" E;	+198 (865)	6094 233 -5896	– –	– –	– –	6327 78 -6129	6405 554 -6207	– –	– –	6959 -6761
		WELL INDEX NO. 300-134-SA		TOTAL DEPTH 7,050'		DATE COMPLETED 29.11.71				
Tallalia No. 1 27°23'00" S; 141°15'00" E;	+442 (1651)	– –	– –	– –	– –	7486 54 -7044	7540 1597 -7098	– –	9137 -8695	
		WELL INDEX NO. 300-87-Q		TOTAL DEPTH 10,471'		DATE COMPLETED 5.10.70				
Tickalara No. 1 29°19'20" S; 141°24'50" E;	+433 (393)	5135 205 -4702	– –	5340 48 -4907	5388 140 -4955	– –	– –	– –	5528 85 -5095	5613 -5180
		WELL INDEX NO. 300-78-Q		TOTAL DEPTH 5,765'		DATE COMPLETED 4. 9.68				
Tilparee A-1 28°30'10" S; 140°38'20" E;	+151 (1073)	5782 288 -5631	6070 78 -5919	6148 98 -5997	6246 192 -6095	6438 172 -5287	6610 245 -6459	– –	6855 132 -6704	6987 -6836
		WELL INDEX NO. 300-128-SA		TOTAL DEPTH 7,022'		DATE COMPLETED 16. 9.71				
Tindilpie No. 1 27°54'27" S; 139°56'07" E;	+173 (2457)	8403 221 -8230	– –	8624 83 -8451	8707 198 -8534	8905 105 -8732	9010 1575 -8837	10585 275 -10412	10860 -10687	
		WELL INDEX NO. 300-106-SA		TOTAL DEPTH 11,131'		DATE COMPLETED 12.11.70				
Tinga Tingana No. 1 29°00'45" S; 140°05'38" E;	+101 (1170)	– –	– –	4586 44 -4485	4630 224 -4529	4854 43 -4753	4897 625 -4796	5522 234 -5421	5756 367 -5655	6123 -6022
		WELL INDEX NO. 300-72-SA		TOTAL DEPTH 7,552'		DATE COMPLETED 27. 2.68				
* Tirrawarra No. 1 27°40'33" S; 140°07'29" E;	+129 (1284)	8412 186 -8283	– –	– –	8598 86 -8469	8684 38 -8555	8722 831 -8593	9553 143 -9424	9696 223 -9567	9919 -9790
		WELL INDEX NO. 300-98-SA		TOTAL DEPTH 10,226'		DATE COMPLETED 20. 7.70				
* Tirrawarra No. 2 27°41'17" S; 140°05'48" E;	+123 (1428)	8428 231 -8305	– –	– –	8659 72 -8536	8731 42 -8608	8773 978 -8650	9751 105 -9628	9856 -9733	
		WELL INDEX NO. 300-120-SA		TOTAL DEPTH 9,976'		DATE COMPLETED 16. 8.71				
# Tirrawarra No. 3 27°37'24" S; 140°06'54" E;	+127 (1207)	8602 191 -8475	– –	– –	8793 119 -8666	8912 40 -8785	8952 753 -8825	9705 104 -9578	9809 -9682	
		WELL INDEX NO. 300-121-SA		TOTAL DEPTH 9,900'		DATE COMPLETED 17.12.71				

NOTE: # Gas Well * Oil Well

WELL NAME LOCATION	K.B.E. G.G.Thick	TOOLACHEE FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
* Tirrawarra No. 4 27°39'15" S; 140°08'51" E;	+129 (1220)	8546 149 -8417 WELL INDEX NO. 300-138-SA	– – TOTAL DEPTH 9,784'	– – DATE COMPLETED 19. 1.72	8695 104 -8566	8799 60 -8670	8859 805 -8730	9664 102 -9535	9766 -9637	
Tirrawarra No. 5 27°42'11" S; 140°07'23" E;	+127 (1518)	8504 226 -8377 WELL INDEX NO. 300-143-SA	– – TOTAL DEPTH 10,099'	– – DATE COMPLETED 6. 3.72	8730 84 -8603	8814 70 -8687	8884 1012 -8757	9896 126 -9769	10022 -9895	
# Tirrawarra No. 6 27°37'54" S; 140°08'38" E;	+131 (1170)	8578 206 -8447 WELL INDEX NO. 300-150-SA	– – TOTAL DEPTH 9,880'	– – DATE COMPLETED 9. 4.72	8784 50 -8653	8834 72 -8703	8906 760 -8775	9666 82 -9535	9748 9617	
Tirrawarra No. 7 27°40'18" S; 140°09'41" E;	+132 (1384)	8528 172 -8496 WELL INDEX NO. 300-151-SA	– – TOTAL DEPTH 10,098'	– – DATE COMPLETED 30. 5.72	8800 92 -8668	8892 70 -8760	8962 940 -8830	9902 110 -9770	10012 -9880	
* Tirrawarra No. 8 27°39'49" S; 140°06'52" E;	+129 (1201)	8453 165 -8324 WELL INDEX NO. 300-155-SA	– – TOTAL DEPTH 9,735'	– – DATE COMPLETED 16. 7.72	8618 44 -8489	8662 67 -8533	8729 831 -8600	9560 94 -9431	9654 -9525	
# Toolachee No. 1 28°25'56" S; 140°46'54" E;	+185 (1110)	5878 379 -5693 WELL INDEX NO. 300-83-SA	6257 29 -6072 TOTAL DEPTH 7,232'	6286 195 -6101	6481 190 -6296	6671 171 -6486	6842 146 -6657 DATE COMPLETED 30. 3.69	– – 	6988 32 -6803	7020 -6835
Toolachee No. 2 28°18'48" S; 140°49'32" E;	+237 (1103)	6042 400 -5805 WELL INDEX NO. 300-85-SA	– – TOTAL DEPTH 7,203'	6442 222 -6205	6664 135 -6427	6799 166 -6562	6965 180 -6728 DATE COMPLETED 21. 5.69	– – 	– – 	7145 -6908
# Toolachee No. 3 28°27'52" S; 140°46'46" E;	+221 (1519)	6036 464 -5815 WELL INDEX NO. 300-86-SA	– – TOTAL DEPTH 7,710'	6500 246 -6279	6746 218 -6525	6964 202 -6743	7166 389 -6945 DATE COMPLETED 3. 9.71	– – 	7555 60 -7334	7615 -7394
# Toolachee No. 4 28°22'09" S; 140°48'44" E;	+208 (1220)	6092 440 -5884 WELL INDEX NO. 300-126-SA	6532 25 -6324 TOTAL DEPTH 7,424'	6557 189 -6349	6746 194 -6538	6940 179 -6732	7119 193 -6911 DATE COMPLETED 28. 9.71	– – 	7312 50 -7104	7362 -7154
# Toolachee No. 5 28°21'14" S; 140°45'52" E;	+221 (1178)	6238 415 -6017 WELL INDEX NO. 300-131-SA	6653 15 -6432 TOTAL DEPTH 7,474'	6668 192 -6447	6860 190 -6639	7050 175 -6829	7225 191 -7004 DATE COMPLETED 2.11.71	– – 	– – 	7416 -7195
# Toolachee No. 6 28°24'14" S; 140°50'03" E;	+238 (1578)	6116 432 -5878 WELL INDEX NO. 300-135-SA	6548 112 -6310 TOTAL DEPTH 7,724'	6660 212 -6422	6872 228 -6634	7100 205 -6862	7305 389 -7067 DATE COMPLETED 1.12.71	– – 	– – 	7694 -7456
Toolachee No. 7 28°27'43" S; 140°48'59" E;	+221 (1701)	6084 428 -5863 WELL INDEX NO. 300-137-SA	6512 106 -6291 TOTAL DEPTH 7,799'	6618 238 -6397	6856 234 -6635	7090 214 -6869	7304 481 -7083 DATE COMPLETED 6. 2.72	– – 	7785 -7564	
# Toolachee No. 8 28°23'44" S; 140°48'02" E;	+201 (1520)	6144 432 -5943 WELL INDEX NO. 300-146-SA	6576 48 -6375 TOTAL DEPTH 7,761'	6624 216 -6423	6840 251 -6639	7091 223 -6890	7314 350 -7113 DATE COMPLETED 6. 3.72	– – 	7664 22 -7463	7686 -7485
Toolachee East No. 1 28°21'44" S; 140°51'56" E;	+253 (2072)	6298 492 -6045 WELL INDEX NO. 300-156-SA	6790 125 -6537 TOTAL DEPTH 8,411'	6915 288 -6662	7203 197 -6950	7400 198 -7147	7598 772 -7345 DATE COMPLETED 4. 8.72	– – 	– – 	8370 -8117

NOTE: # Gas Well * Oil Well

62000.)

WELL NAME LOCATION	K.B.E. G.G.Thick	TOOLACHEE FORMATION Depth Thick R.L.	DARALINGIE BEDS Depth Thick R.L.	ROSENEATH FORMATION Depth Thick R.L.	EPSILON FORMATION Depth Thick R.L.	MURTEREE FORMATION Depth Thick R.L.	PATCHAWARRA FORMATION Depth Thick R.L.	TIRRAWARRA FORMATION Depth Thick R.L.	MERRIMELIA FORMATION Depth Thick R.L.	PRE-PERMIAN Depth R.L.
Topwee No. 1 28°15'40" S: 139°59'09" E:	+109 (776)	6514 231 -6405	6745 94 -6636	6839 169 -6730	7006 122 -6897	7128 100 -7019	7228 62 -7119	– –	– –	7290 -7181
		WELL INDEX NO. 300-88-SA			TOTAL DEPTH 7,310'	DATE COMPLETED 15.12.69				
Wancoocha No. 1 29°31'45" S: 139°59'07" E:	+123 (639)	– –	– –	5613 92 -5490	5705 130 -5582	5835 127 -5712	5962 290 -5839	– –	– –	6252 -6129
		WELL INDEX NO. 300-74-SA			TOTAL DEPTH 6,515'	DATE COMPLETED 24. 3.68				
Weena No. 1 29°05'38" S: 139°50'51" E:	+100 (703)	– –	– –	– –	– –	– –	4284 703 -4184	– –	4987 371 -4887	5358 -5258
		WELL INDEX NO. 300-100-SA			TOTAL DEPTH 5,392'	DATE COMPLETED 29. 6.70				
Wirrarie No. 1 28°15'04" S: 139°54'32" E:	+ 96 (491)	6263 115 -6167	6378 18 -6282	6396 105 -6300	6501 95 -6405	6596 94 -6500	6690 64 -6594	– –	– –	6754 -6658
		WELL INDEX NO. 300-87-SA			TOTAL DEPTH 7,258'	DATE COMPLETED 19.10.69				
Yanpurra No. 1 27°20'19" S: 140°49'15" E:	+367 (576)	8972 113 -8605	– –	– –	9085 38 -8718	9123 31 -8756	9154 331 -8787	9485 63 -9118	9548 72 -9181	9620 -9253
		WELL INDEX NO. 300-107-SA			TOTAL DEPTH 9,716'	DATE COMPLETED 6.12.70				

NOTE: # Gas Well * Oil Well

TOTAL - DELHI - SANTOS
ORIENTOS NTH. No. 1

DELHI - SANTOS
ORIENTOS No. 1

TOTAL - DELHI - SANTOS
TICKALARA No. 1

A — 3·6 Miles — 19·5 Miles — A'

Patchawarra Formation Prospect strat-structural trap.

Area of Patchawarra Formation-stratigraphic trap potential.

Permian "P" Reflecting Horizon

GIDGEALPA GROUP

TOOLACHEE FORMATION

ROSENEATH SHALE

EPSILON FORMATION

MURTEREE SHALE

PATCHAWARRA FORMATION

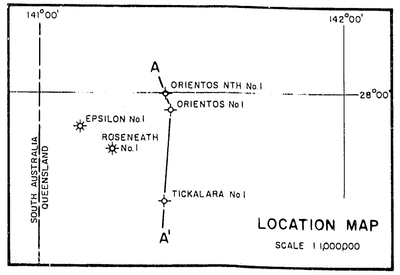
Disconformity

Disconformity to Nonconformity

TD 7345

TD 11,527'

TD 5765



LEGEND

GIDGEALPA GROUP
- TOOLACHEE FORMATION
- ROSENEATH SHALE
- EPSILON FORMATION
- MURTEREE SHALE
- PATCHAWARRA FORMATION

MERRIMELIA FORMATION OR GRANITE WASH

PRE-PERMIAN UNDIFFERENTIATED

NOTES:
1. Thickness of Gidgealpa Group established from Seismic Map Gidgealpa Isopach by A.G.M. Moore.
2. That part of the Roseneath Shale below the Disconformity in the Orientos and Orientos North Wells and indicated as [ ] is illustrated as Facies within the Roseneath Shale. It may, however, be that this section lies above the Roseneath Shale recognised elsewhere. This could affect Toolachee Formation Isopach.

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DELHI INTERNATIONAL OIL CORPORATION

DIAGRAMMATIC CROSS SECTION
ORIENTOS NTH. No. 1 – TICKALARA No. 1

COOPER BASIN, QUEENSLAND

HORIZONTAL SCALE: 1"= 5000'	DATE: MAY 1972
VERTICAL SCALE: 1"= 200'	INTERPRETATION BY: C.A.MARTIN
VERTICAL EXAGGERATION: x 25	DRAFTED: A.G.HALSE

FIG. 2