

PETROLEUM DIVISION

TURRUM-1.

INTERPRETATIVE

REVIEW OF PALYNOLOGY OF BARRACOUTA
AND MARLIN FIELDS AND TURRUM -1

by

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INTRODUCTION

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The following report is the last of a series in which checks have been made of the palynological sequence in groups of wells across the northern region of the off-shore Gippsland Basin. Previous reports covered Kingfish (1970/12), Tuna (1970/29), Flounder (1970/31), Snapper (1970/33) and the section Flounder-Batfish-Tuna (1970/32).

Samples from the Barracouta and Marlin fields were among the first to be studied from the Gippsland Basin (EPR 69-ES16). Further information about the Barracouta field was obtained from the -A3 development well (1969/5) and the -3 wildcat (1969/12). No useful material has been obtained from development wells at Marlin. However, data from the nearby Turrum -1 well (1969/14) are relevant to interpreting the Marlin field. Previously unreported data from Marlin -2, 5121-5158 feet are also available. Studies of dinoflagellates from Turrum -1 are summarized in palyn. rept. 1970/22.

COMMENT

Subdivisions of wells at Barracouta and Marlin from which spores and pollen have been obtained are illustrated in the accompanying figures.

A. Barracouta Field

Barracouta -1, 8,700 feet yielded an abundant microflora on which the concept of the T. lilliei assemblage was initially based (see comment below on the T. lilliei Zone at Marlin). A large gap between this horizon and the overlying samples precluded accurate determination of the top of the T. lilliei Zone and a "Transition Zone" was proposed, in this instance to include samples at 8679 and 8695 feet.

The better data from the -A3 well showed the T. lilliei Zone in that well extends at least up to a depth of 8080 feet. Lack of adequate samples again prevented acceptably adequate choice of boundary for the top of the zone, but the data are sufficient to indicate that the "Transition Zone" of Barracouta -1 is part of the lilliei zone. A similar sample gap in the -3 well also

prevents accurate choice of zone boundary. However, a combination of data from the -3 and -A3 wells suggests that the boundary runs through the latter in the vicinity of depths 7800-7900 feet.

The top of the L. balmei Zone overlies Barracouta -1, 5663 feet and -3, 5714 feet and underlies -1, 5263 feet and -A3, 5388 feet. It thus runs close to 5500 feet in the -A3 well.

The base of the P. asperopolus Subzone is identified with fair confidence in the -3 well at close to 4491 feet. The M. diversus Zone is thus about 1,100 feet thick at Barracouta.

On the basis of first appearance of e.g. S. caincozicus, M. parvus, T. adelaidensis and a dominance of P. grandis/orantus over P. dilwynensis, an upper division of the diversus Zone is separated from a lower. The upper division is about 320 feet thick in the -3 well, and correlates into a major portion of the Flounder Formation at Flounder. However, no dinoflagellates were recognized in this interval (see Snapper and Marlin at the diversus/asperopolus boundary).

The N. goniatus Zone is about 900 feet thick in the -3 well, consisting mostly of the N. asperus subzone. A thicker development was probably encountered in the -A3 well.

Very rare specimens of the dinoflagellate Deflandrea extensa were present in -3 well, 3604-3608 feet (LES ident.).

B. Marlin Field & Turrum

Turrum -1 is included with the Marlin wells because of its proximity to the Marlin field and because it has supplied better data relevant to the top of the lilliei zone.

The T. lilliei zone is identified at least as high as 9660 feet in Turrum -1. The overlying samples at 9360 and 9210 feet are of uncertain position, although some data favour their inclusion in the L. balmei Zone so that the top of the lilliei Zone appears to lie between 9360 and 9660 feet at Turrum.

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Previous records (EPR 69-ES 16) showed the lilliei Zone in Marlin -2 at 9877 feet. New data from this horizon indicate it should be placed in basal L. balmei Zone and that none of the Marlin wells encountered the Upper Cretaceous. The course of the approximate top of the lilliei zone below Marlin -1 demonstrated on the chart parallels log correlation markers within the balmei zone.

No useful estimate of the top of the L. balmei Zone is possible from Marlin on account of very large sample gaps in Marlin -1 and -2. The top of the zone depicted on the chart is based on the assumption that little variation has taken place in the thickness of the M. diversus Zone between Snapper and Marlin (vide constant thickness of this zone across the fault between Snapper -1 and -3 compared to variations in the balmei zone). This choice of boundary may be somewhat high because of the presence of "upper" L. balmei zone assemblages in the highest fossiliferous examples of the zone in Marlin -1 and -2, which suggest proximity to the base of the diversus Zone.

If these choices of upper and lower boundaries of the balmei Zone are acceptable, the zone is of the order of 4,200 feet thick at Marlin. About 1000 feet of this sequence has been eroded by the Marlin channel at Turrum.

Only the upper division of the M. diversus Zone appears to have been sampled at Marlin, but there is sufficient section in which the lower diversus Zone could be present (cf. Snapper and Barracouta).

The P. asperopolus Zone is well represented by samples in Marlin -1, -2 and -3. Cores at 5127 and 5146 feet were previously assigned to the upper M. diversus Zone (EPR 69-ES16), but additional observations favour allocation of these horizons to the basal P. asperopolus Subzone.

Core from the P. asperopolus Zone in Marlin -2, 5121, 5128 feet was notable for its dinoflagellate content. Taylor had previously reported benthonic foraminifera from this level. The occurrence of these fossils is to be linked with the dinoflagellates of the u. M. diversus/P. asperopolus Zone at Snapper -1 and -3 and within the Flounder Formation at Tuna and Flounder.

Adequate examples of the succeeding N. asperus Subzone are known in Marlin -1 and -2. However, the zone is also present at the base of the channel at Turrum, 2000 feet deeper than the zone at Marlin -1. At Turrum the asperus Zone includes the D. extensa and O. dictyoplokus dinoflagellate zones (1970/22). Neither of these zones have been identified at Marlin. However, the D. extensa Zone is present in Snapper -2 at 4232 feet, i.e. 2300 feet above its occurrence at Turrum, and within 100 feet of horizons referred to the P. asperopolus Subzone (1970/33). The possibility that some of the N. asperus Subzone at Marlin may represent the D. extensa dinoflagellate Zone should be born in mind.

Similarly the overlying O. dictyoplokus dinoflagellate Zone at Turrum is present at Snapper, towards the top of the N. asperus Subzone. It also may be present, but undetected at Marlin.

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