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COMMENTS ON FAUNA IN ZUMERALLA NO.1 WELL

A detailed examination has been made on cores, side-wall cores and cuttings below 900 feet in Frome broken Hill's Zumeralla No.1 well. The fauna obtained from the rotary cutting samples were difficult and often impossible to interpret due to extreme contamination. This contamination occurred because the marl section (above 1000 feet) was not cased off when the lower Tertiary and marine Cretaceous section was being drilled. This contamination could have been reduced if the mud had been successfully treated.

Core No.1 at 341 to 361 feet contained a fauna assignable to Carter's (1958) Faunal Unit 6. Globoquadrina dehiscens and Globigerina cipercoensis are present but other planktonic forms which appear higher in the sequence are absent. This core consists of a grey bryozoal marl.

Core No.2 at 1160 to 1180 feet consists of a highly fossiliferous clayey siltstone, brown in colour. The rich planktonic is mainly of the Globigerina ouachitaensis - G.bulloides Group. The benthonic fauna includes Anomalina perthensis, Ceratobulimina westraliensis and Cibicides pseudoconvexus. The biostratigraphic position of this fauna is problematical. The first appearance of Globigerina sp. of the G.ouachitaensis - G.bulloides Group marks the base of Carter's Faunal Unit 4. However the listed benthonic species were not found by Carter above Faunal Unit 3. Victoriella conoidea was not found in this fauna. The planktonic content of this fauna suggests that it represents Faunal Unit 4 or 5 and is definitely no older than 4.

Rotary cuttings below 1400 feet contain Globigerina linaperta indicating that Faunal Unit 3 (or earlier faunal units) is present below 1400 feet.

Rotary cuttings at 2000 feet contain Globorotalia chapmani which is a characteristic planktonic form in the Victorian Paleocene.

Core No.3 at 2101 to 2121 feet consisted of grey unconsolidated sand which was barren of fauna.

Side wall cores at 2765 feet and 2780 feet contained purely arenaceous foraminiferal faunas consisting of typical Victorian Cretaceous species of Aplophragmoides (described in manuscript by Taylor, 1962).

Such a fauna is typical of the highest marginal-marine Cretaceous sediments in the Port Campbell wells.

Core No.4 at 2435 to 2849 feet consists of a green-grey silty sand in which no fauna was found.

Side wall core at 2970 feet was also barren of fauna.

Side wall core at 3000 feet consisted of a dark grey mudstone which contained little glauconite. The fauna comprised Ostracoda, Gastropoda, and molluscan fragments, as well as Foraminifera including Marssonella oxycona, Hoeglundina supracretacea, Lenticulina sp., and the Victorian Cretaceous Haplophragmoides spp.

Side wall cores at 3030 feet and 3050 feet are lithologically similar to the side wall core at 3000 feet but contain more abundant foraminiferal faunas. The species present includes Alabamina australis, Ceratobulimina sp.nov. (described in manuscript by Taylor, 1962), Dorothia filiformis, Frondicularia cf. mucronata, Gyroidinoides nitida, Lenticulina (Robulus) navarroensis, Textularia anceps, T. semicomplanata, Valvulineria lenticula as well as the species noted from the side wall core at 2970 feet. A gastropod present is similar to the species listed as Eriptcha by Kenley (1959) from the marine Cretaceous of the Belfast No.4 bore.

No fauna was found in cores (or side wall cores) below 3050 feet, although Miocene Foraminifera are abundant, in rotary cutting samples down to and below 3500 feet.

Suggested lithological correlations:-

It is difficult to delineate accurate lithological or biostratigraphic boundaries because of the contaminated cutting samples.

The same lithological unit names are used for this well as were used by Glenie and Taylor (1962) for the Pretty Hill No.1 well.

Heywood Marl Member is certainly present at 961 feet where the fauna represents the Longfordian Stage.

Nelson Formation may be present as the sediment of core no.2 (1160 to 1180 feet) is fairly typical of this Formation. It is noted that in Pretty Hill No.1 the equivalent of the Nelson Formation was apparently missing as were faunas indicative of the Janjukian Stage. Janjukian faunas are probably present in Mueralla No.1 well.

Knight Group is present below 1400 feet. Ludbrook (1961) records Globigerina linaperta at the top of the Knight Group in the Cambier sub-basin. G. linaperta first appears at 1400 feet in the Mueralla well.

It is impossible to subdivide this unit into Formations. The Dartmoor Formation is certainly present and the record of the Paleocene species Globorotalia chapmani at 2000 feet indicates that the Bengallah Formation is represented.

Parratte Formation is within this section. Arenaceous foraminiferal faunas of Cretaceous age are in side wall cores 2835 and 2849 feet. These faunas as well as the sediment which contain them, are typical of this formation.

Belfast Mudstone is definitely identified at and below 3000 feet. The fauna is similar to that of the upper part of the Belfast Mudstone in the Port Campbell wells, the Flaxman's well and the Belfast No.4 Bore, but the facies differs. The Eumeralla faunas suggest that water circulation was restricted in the depositional environment, as planktonic faunas are absent and the percentage of calcareous Foraminifera to arenaceous forms is low. The upper part of the Belfast Mudstone in the other bores listed was deposited in an open marine environment. In Eumeralla the fauna at 3000 feet is a shallow water fauna, whilst those at 3030 and 3050 feet suggest deeper water (between 60 and 100 fathoms). The side wall core at 3100 feet consisted mainly of quartz and glauconite. No fauna was found. This sediment is identical to that in a core from 5383 feet in Heywood No.10 Bore. This sediment is regarded as being part of the Belfast Mudstone.

The top of the non-marine Mesozoic is believed to be at 3108 feet in Eumeralla No.1 whilst it is at 2922 feet in Pretty Hill No.1. Adjusting these to drilled depths (datum being height of rotary table) to sea level, the top of the non-marine Mesozoic is 2941 feet below sea level in Eumeralla and 2720 feet below sea level in Pretty Hill No.1. Therefore the top of the non-marine Mesozoic section is 221 feet deeper in Eumeralla No.1. The presence of the Nelson Formation in Eumeralla No.1 could account for the thicker section in this well as this formation is absent in Pretty Hill No.1.

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