

Boobyalla Plains area showed a large gravity low (Fig. 2) with coincident magnetic highs (Leaman, 1973). Leaman's interpretation of the gravity data inferred the presence of a basin approximately 800 m deep with the western margin having a near vertical contact against granitic rocks and the eastern margin being a series of step faults. The rock types of the eastern margin were interpreted as Mathinna Beds (Ordovician-Devonian), which represent a metamorphosed basement, overlain by Permian sedimentary rocks, Jurassic dolerite and Tertiary sediments. Further seismic work was followed by cable tool and rotary drilling on the site of Boobyalla 1 to a depth of 306 m. Moore and Leaman (1974) defined the southern edge of the basin by means of gravity and refraction seismic surveys followed by drilling.

Seismic lines between Durroon 1 and the onshore Boobyalla Sub-basin indicate no faulting of sediments younger than the Eastern View Coal Measures, i.e. Oligocene and younger. Major faulting occurred in the Early Cretaceous with the formation of rapidly subsiding fault-angled depressions in which sediment accumulated (Brown, 1976). Gravity studies indicate that at least 300 m of Cretaceous sediment are present below the drilled sections on Boobyalla Plains (Leaman, 1973).

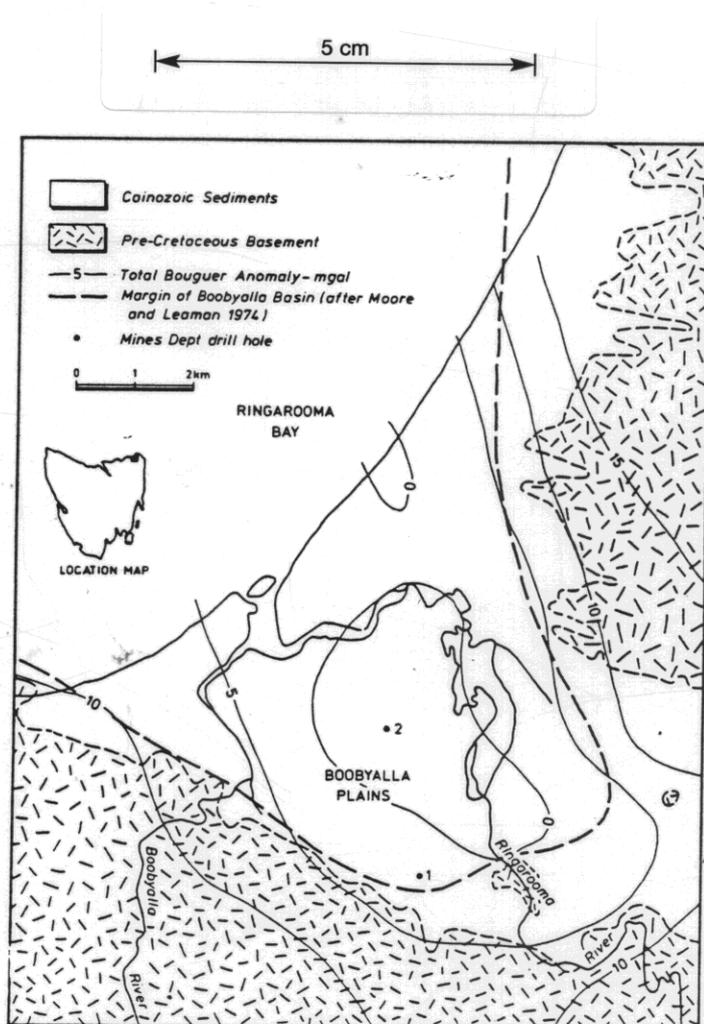


Figure 2 — Geological map of the Boobyalla Plains area (after Baillie *et al.*, 1979) also showing Total Bouguer Anomaly (after Leaman, 1973).

In late 1979 the Tasmanian Department of Mines recorded single fold reflection seismic along the axis of the basin. Richardson (1981) interpreted the results as showing the presence of channelling and channel-fill in the Cretaceous sequence and he stated that the unchanged average velocity across a number of reflectors in the sequence suggested that thin sand, conglomerate or basalt layers formed the basin infill. However, data quality is poor, and other interpretations are possible.

Two fully-cored diamond drill holes penetrated part of the onshore sequence. Borehole number 1 of Figure 2 (Boobyalla 1) was drilled by the Tasmanian Department of Mines in 1976 and reached a depth of 417 m before being terminated. Borehole number 2 of Figure 2 (Boobyalla 2) was drilled by the Shell Company of Australia (Hall, 1981) to a depth of 265 m and in 1982 was extended by the Department of Mines to 491 m where the hole was abandoned because of drilling problems associated with swelling clays.

STRATIGRAPHY OF BOOBYALLA SUB-BASIN FROM DRILL HOLES

Boobyalla 1 (Fig. 1) penetrated a sequence of interbedded granule to boulder conglomerate and fine to very coarse grained, often ferruginous, sandstone with occasional beds of brown, micaceous siltstone. Thickness of individual beds varies from a few centimetres in the finer grained sediments to several metres in the conglomerates. The conglomerate/sandstone ratio is greater than 1. Dolerite is by far the most common clast type present and one boulder drilled had a diameter of at least three metres. Other pebbles are also locally derived and include metamorphosed and unmetamorphosed rocks of the Mathinna Beds. Also present are clasts typical of the Parmeener Supergroup. Clast framework varies from continuous to matrix supported.

In contrast to the dolerite-dominated conglomerates, the sandstones have quartz as the dominant component. Thin-section examination shows that the sandstones are moderately well to very poorly sorted and fine to very coarse grained. Grains of quartz (dominantly plutonic but some vein) are most common, with fewer clasts of Mathinna Beds (dominantly metamorphosed), mudstone, lithic sandstone, variably textured dolerite, and rare feldspar. The sandstones are best described as sublitharenites (Folk, 1968).

Boobyalla 2, drilled some 3 km further out into the basin (Fig. 2) penetrated a less-coarse sequence than that penetrated by Boobyalla 1 (Fig. 3). Rocks from surface to 29 m consist of unconsolidated gravel with clasts of dolerite, Mathinna Beds and Parmeener Supergroup rocks as well as soft, brown organic silts. From 29–150 m the hole penetrated a sequence consisting dominantly of more consolidated, massive, grey mudstone or siltstone, sometimes with lignitic material, and minor, thin horizons of doleritic conglomerate.

From 150–250 m, interbedded mudstone and dolerite-conglomerate was penetrated. The mudstone/conglomerate ratio is about 5 to 1. Occasional beds of fine-grained sandstone are present. The thickness of individual conglomerate beds is less than three metres and individual dolerite clasts have a maximum diameter of 40 mm.

Conglomerate comprises the bulk of the sequence from 250–375 m, with brown or red mudstone forming only a minor part of the sequence. Dolerite is the dominant clast type in the conglomerate. Minor clasts of cleaved Mathinna Beds and Parmeener Supergroup rocks are also present. Maximum clast size observed was 1.8 m. Clast framework ranges from continuous to matrix supported. Much of the dolerite has a granophyric texture and many of the boulders display 'onion-skin' weathering.