

1. SUMMARY

SAGASCO Resources requested that the cored intervals from King #1 in the Bass Basin be logged with the view of interpreting the environment of deposition of those intervals. Consequently, the resin impregnated cored was inspected at Challenger Geological Services on 18th January, 1993.

An approximate one third split from the core was glued, using a clear resin, into 1m long split fibreglass barrel liners to protect the delicate core from further deterioration. While the core is now fully stabilized with most features visible, this presentation did provide some difficulties, particularly with respect to the assessment of sand grain size, the determination of carbonate content and some structures in the more porous intervals where air bubbles become trapped in the resin, turning it opaque white. Despite these problems, it was thought unnecessary to view the unconsolidated material as well.

The core was logged and a graphical presentation of grain size, lithology and sedimentary structures produced at a scale of 2cm:1metre or 1:50. This log is attached and forms the main part of the report. Lithofacies codes as described by Miall have been added but these duplicate, to a large extent, the information contained in graphic form supported with occasional notes.

The features observed within the core suggest that the environment of deposition is dominated by fluvial influences with some indications of marine character. Many of the sands appear muddy and therefore poorly sorted and are arranged in fining upwards packages 3 – 5 metres thick. Several of these packages start with a basal conglomerate and are capped with a silty top, with traces of coal. The conglomerates are largely intraformational with sand and mud clasts ripped up from the underlying units by relatively intense current activity. These currents have also introduced some new material in the form of quartz and granite granules. The allochthonous and intraformational clasts have been mixed with a mud matrix, probably locally derived. The final sediment can best be described as a diamictite (ie., a pebbly mudstone). The rip-up style and quick return to trough cross beds indicate strong currents probably confined within channels. The features described in this paragraph are all fluvial.

A marine influence was suggested by the abundance of bioturbation and a few current reversals (herringbone style) in a ripple cross laminated sandstone at 1431.5 metres. Most of the sands are slightly muddy which suggests that there was no wave activity in the environment of deposition. The current reversals may be an indicator of tidal activity but there is no corroborative evidence in the form of tidal bundle sequences. One large "hummocky" type ripple was observed at 1429.6m that may be indicative of storm activity. However, this ripple did not show any internal structure parallel to the convex upward surface which should characterize this type of storm feature. The degree of bioturbation is more extensive than expected from a purely fluvial environment and consists of Planolites, some examples of Skolithos and rare Teichichnus. This restricted suite of trace types can be indicative of a brackish environment.

Several thin, reddened intervals were observed at the tops of fining upward cycles. These may represent small hiatuses and possible exposure surfaces. A possible hiatus without exposure was observed at 1432.85m where intense burrowing occurs below a channel? sand.

A depositional environment which accounts for all the features observed is that of an estuary, fluvially dominated with minor marine influence, strong channelized currents with some exposure surfaces, well bioturbated but with a restricted suite of traces and possible tidal currents but no waves.

The entire cored section fines upward from 1440m to 1397m which may indicate that the section is transgressive. The only real coal seam is at the base of Core 4. Any sands below that might be expected to be purely fluvial. Cleaner shoreline sands might occur along depositional strike from this apparent estuary. Clean sands may also occur down depositional dip where storm activity sweeps shore sands into the mouth of the estuary.