

Sample: TSC47080; Location: Pelican-5, Core 1; 2790.5 m

Rock Name:

Compact lithic sandstone

Thin Section:

An optical estimate of the constituents gives the following:

	%
Quartz	70
Pores	10
Lithic fragments	7
Authigenic kaolinite	5-7
Carbonate	3-5
Mica	1
Feldspar	1

In textural terms this sample appears to be a distinctly tight and compact sandstone in that it shows the presence of authigenic kaolinite and carbonate, a moderate amount of lithic fragments and noticeably compact and intergrown quartz grains; nevertheless, the thin section retains about 10% porosity and many of these pores are relatively large. This being the case, it seems likely that the porosity is of secondary origin and is in some way related to a relatively late stage of dissolution of some particular component from the rock leaving numerous pores up to about 0.2 mm in size.

Although the average grain size of the rock is about 0.2 mm there are some variations from place to place in the thin section and there are isolated grains as much as 0.8 mm in size. In pressolved zones the average grain size of the quartz appears to be about 0.15 mm and these zones are characterised by the abundance of sutured and curved contacts between the grains, relatively abundant fine-grained authigenic carbonate and moderate amounts of apparently insoluble clays and detrital mica. These pressolved zones are generally not more than about 1 to 2 mm in thickness.

In other parts of the thin section the rock has a somewhat cleaner and more open texture and contacts between the quartz grains are generally long, tangential or, in a few cases, sutured and curved. In these parts of the rock carbonate is relatively less abundant but there are some aggregates of kaolinite ranging in size from about 0.1 to 0.3 mm. The heterogeneous patchy distribution of clay can also be seen in the more open parts of the rock and it is clear that the fine-grained material is derived entirely from original lithic fragments. Most of these appear to be aluminous lithologies, probably sedimentary and metasedimentary rocks. In this part of the rock there are also isolated instances of overgrowths on the quartz grains whereas these are not seen in the pressolved zones.

This is a tight rock characterised by what appear to be conformable zones in which pressure solution of quartz has been particularly thorough; in general the rock contains isolated patches of authigenic kaolinite and widely distributed small granules of an authigenic carbonate mineral. These features, together with the presence of relatively soft lithic fragments, are conducive to a sandstone with rather poor reservoir quality.