

Four other roll-over structures have been recorded, all on the eastern fault-bounded margin of the central portion of the Boobyalla Sub-Basin. These are the structures between:

- (1) S.P. 300-105, BB 88-162
- (2) S.Ps 350-600, BB 88-174 and S.Ps 550-350, BB 88-162
- (3) S.Ps 1450-1665, BB 88-165
- (4) S.Ps 2100-2250, BB 88-159

These structures, although recorded on isolated lines, are of enormous significance to the prospectiveness of the Sub-Basin. The tensional forces that detached sediments from the western bounding listric fault, allowing the sediments on the hanging wall to collapse towards the fault face, have detached and collapsed the hanging wall sediments juxtaposed against the eastern bounding fault of the graben as well. A number of roll-over structures may be found on both margins, perhaps with their axial positions aligned in a Tasman direction of pull-apart. The importance of these structures as traps can be judged from the paper by Schull (1988) on the rift basins of the interior of Sudan, where downthrown, roll-over anticlines resulting from rotation into listric faults, have trapped oil.

5.1.1 The Shape of the Growth Faults as a Means of Determining the Sand-shale Ratio

Xiao and Suppe (1989) have demonstrated that, based on knowledge of the initial sand and shale porosities of the compacting sediments on the downthrown side of a growth fault, the shape of the listric fault can be computed. By employing an inversion technique, it is possible to estimate the sand-shale ratio in compacting sediments on the downthrown side of growth faults, from the shape of the growth fault.

The post-depositional, detached, roll-over structures within the Boobyalla Sub-Basin are found adjacent to listric faults, within a depositional trough in which considerable thickness of Cenomanian and Turonian mudstones, silts, and claystones may be expected. It is important to estimate probable sand-shale ratios within each prospect. Xiao, Suppe, and latterly, Bischke, all of the Department of Geological and Geophysical Science, Princeton University, may agree to apply their experience with these techniques to the listric faults that the seismic data in the Boobyalla Sub-Basin display so well.

5.2 THE UPDIP CULMINATIONS OF ROTATED FAULT BLOCKS IN THE BOOBYALLA SUB-BASIN

Lateral closure against the updip culminations of rotated fault blocks form producing traps in many basins. Entrapment depends upon a seal on top of the fault block, and/or across the fault. There are several structures within the Boobyalla Sub-Basin that are formed by movement along listric faults. However, these structures are complex and often the interplay between movement along the listric fault and the younger generation of faults of Tasman age is difficult to interpret. The structure on the Turonian Unconformity that has been delineated by seismic lines BB 88-164, S.Ps 750-450, WB 82-37, S.Ps 800-1000, BB 88-165, S.P.s 850-1050, and WB 82-38, S.Ps 400-150 (Enclosure 18), illustrates the structural complexity that results from the interaction of two directions of faulting.

The other tilted fault blocks within this sub-basin require further detailing by seismic. The structures plunge to the northwest and critical closure is always to the southeast.