SEQUENCE STRATIGRAPHY OF THE GROUP J IN THE MALAY BASIN AND ITS IMPACT ON DEVELOPMENT OPPORTUNITIES

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In the southeastern part of the Malay Basin, the lower group J is seen as a series of sandy prograding lowstand clinoforms, which abruptly but conformably overlie the upper group K shale, a regionally extensive highstand offshore mud. The lower group J clinoforms (J-80, J-70, J-60, J-55, J-50) are overlain by a single transgressive parasequence (J-45), followed by a strongly progradational highstand parasequence set (J-40). The recognition of both the maximum flooding and transgressive surface facilitates meaningful correlation of units of the lower group J, which often exhibit quite different well log characters between wells.

The lower group J is overlain by two thin depositional sequences (J-35, J-30) which occasionally cut relatively shallow incised valleys. These are overlain by the major J-20 depositional sequence, which cuts incised valleys up to 100 m deep. The J-20 incised valleys are filled with good quality estuarine sandstone, which accounts for the biggest single oil reservoir in the Malay Basin. Towards the basin margin, the J-20 sequence boundary beveled out the older depositional sequences, resulting in a single massive, composite reservoir made up of the J-20 sandstone and those of the lower J clinoforms.

The upper group J overlying the J-20 is made up of seven thin high frequency cycles (J-18, J-15, J-10, J-7, J-5, J-3, J-2) typically exhibiting a layer cake-like stratigraphy. Each depositional sequence is made up of a sandy to silty subtidal/coastal plain lowstand unit overlain by one or more transgressive to highstand offshore shale parasequences. Reservoir, if present, is thin but laterally rather continuous having its own top and bottom seal. Like the J-20 sequence boundary, the group J to is a major sequence boundary which progressively bevels out the upper group J unit towards the basin margin.

Mapping of the lower J clinoforms and the J-20 incised valley indicate a sediment source to the southeast: an inverted half-graben called the Ledang-AR high which thrusted up pre-group J sedimentary rocks to be eroded and subsequently redeposited. This area ceased to be a major provenance post J-20 time after which sediments were derived from the former Sunda landmass to the northeast towards Vietnam.

The revised geological interpretations resulted from the sequence stratigraphic study contributed towards the locations of platforms in the Seligi field to optimise recovery, the explanation of North Seligi J-15/16 DHI and the recognition of additional development opportunities in Bekok and Tapis fields.

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