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Pore pressure prediction of some selected wells; Insight from the Southern Pletmos, Bredasdorp basin, Offshore South Africa

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An accurate prediction of pore pressure is an essential in reducing the risk involved in a well or field life cycle. This has formed an integral part of routine work for exploration, development and exploitation team in the oil and gas industries. Several factors such as sediment compaction, overburden, lithology characteristic, hydrocarbon pressure and capillary entry pressure contribute significantly to the cause of overpressure. Hence, understanding the dynamics associated with the above factors will certainly reduce the risk involved in drilling and production. This study examined three deep water drilled wells GA-W1, GA-N1, and GA-AA1 of lower cretaceous Hauterivian to early Aptian age between 112 to 117.5 (MA) Southern Pletmos sub-basin, Bredasdorp basin offshore South Africa. The study aimed to determine the pore pressure prediction of the reservoir formation of the wells. Eaton's resistivity and Sonic method are adopted using depth dependent normal compaction trendline (NCT) has been carried out for this study. The variation of the overburden gradient (OBG), the Effective stress, Fracture gradient (FG), Fracture pressure (FP), Pore pressure gradient (PPG) and the predicted pore pressure (PPP) has been study for the selected wells. The overburden change slightly as follow: 2.09g/cm3, 2.23g/cm3 and 2.24g/cm3 across the selected intervals depth of wells. An accurate mud-weights of 1.98g/cm3, 2.12g/cm3 and 2.6g/cm3 are observes for the wells which are within the ranges of least mud-weights constant value (200psi/ 0.461 g/cm3) at hydrostatic level required in drilling hole to avoid loss of circulations or kicks. The predicted pore pressure calculated for the intervals selected depths of wells GA-W1, GA-N1 and GA-AA1 also varies slightly down the depths as follow: 3,405 psi, 4,110 psi, 5,062 psi respectively. The overpressure zone and normal pressure zone was encountered in well GA-W1, while normal pressure zone was experienced in both well GA-N1 and GA-AA1.

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