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## **Applied Research Work On Density Log Responses In Thinly Laminated Bedded Sediments Is Leading To A Better Understanding Of Reservoir And Well Performance In West Africa**

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### **Abstract**

The application of joint industry and university research focused on quantifying density log responses from high angle and horizontal wells drilled in thinly bedded sediments is providing the basis for an improved understanding of Cretaceous shallow marine reservoirs in the Lower Congo Basin, West Africa. These reservoirs are dominated by a thick section of thinly bedded – alternating tight and porous siltstones - that are correlateable on a field-wide scale of several kilometers. The vertical well data in these reservoirs lacks the resolution needed to define the true nature of these thin beds. The research work shows that in vertical wells it is the source to detector spacing that drives the vertical resolution of the density log response. In horizontal wells, it is the depth of investigation that drives the log response. There is approximately a 3 to 1 ratio difference in vertical resolution between the density log response in horizontal and vertical wells. In these reservoirs, the density log data from horizontal wells is able to fully define most of the thin beds in these reservoirs which, are in the order of 6 inches (15.2 Cm) thick. A second part of the research shows how enhanced vertical resolution processing can improve the resolution from vertical and deviated wells. As the hole inclination increases to approximately 45 degrees and above, the enhanced vertical resolution processing begins to match that of the horizontal wells with standard density processing.

Updated reservoir simulation models, based upon new high resolution data from horizontal wells and reprocessed deviated wells are providing new insights into the performance of both producing oil wells and water injectors. The improved understanding of the fine scale reservoir properties is enhancing both operations and infill drilling strategy.