

Stratigraphic Understanding of the Cambro-Ordovician, West Ghawar, Saudi Arabia

Zulfiqar Ali¹, Marco Vecoli¹, Michael Le Strat¹, Mohammad Nawaf Dossary¹, and Shahab Khan¹

¹Saudi Aramco, Dhahran, Saudi Arabia

ABSTRACT

A thick tight sand succession of Cambro-Ordovician strata, west of Ghawar, and in the Rub' Al-Kahli Basin, shows a complex stratigraphic architecture that requires more studies to improve the understanding of the reservoir geometry and quality, and to better evaluate the hydrocarbon resources in the Lower Paleozoic clastic successions of this region. Regional stratigraphic understanding of the basin is crucial and plays a key role in exploration and development of the hydrocarbon. However, delineation of major stratigraphic markers within the Cambro-Ordovician sequences is very complex west of Ghawar and much work is still required to resolve this stratigraphy. Therefore, in this study, an integrated approach, utilizing sedimentology, stratigraphy and biostratigraphy, has been used in an attempt to reconcile the stratigraphic complexities, depositional environments, facies distributions, reservoir architecture and geometry, within the Cambro-Ordovician section. Preliminary investigations based on integration of sedimentology, petrography, palynology and log analysis, suggest that in the west Ghawar area, the Late Ordovician Sarah Formation was deposited as glaciomarine channel fills/outwash fans infilling an erosional cut into underlying sediments. The preliminary findings indicate the Middle to Late Ordovician Qasim Formation is significantly eroded or absent in the study area. As a consequence, the Sarah Formation is mostly found lying unconformably on top of the Early-Middle Ordovician Sajir Member of the Saq Formation (Late Cambrian to Middle Ordovician).