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Depositional Architecture of Late Cambrian-Early Ordovician Siliciclastic Barik Formation; Al Huqf Area, Oman

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Early Paleozoic siliciclastics sediments of the Haima Supergroup are subdivided into a number of formations and members based on lithological characteristics of various rock sequences. One of the distinct sandstone sequence, the Barik Formation (Late Cambrian-Early Ordovician) of the Andam Group is a major deep gas reservoir in central Oman. The sandstone bodies are prospective reservoir rocks while thick shale and clay interbeds act as effective seal. Part of the Barik Formation (lower and middle part) is exposed in isolated outcrops in Al Huqf area as interbedded multistoried sandstone, and green and red shale. The sandstone bodies are up to 2 meters thick and can be traced laterally for 300 m to over 1 km. Most of sandstone bodies show both lateral and vertical stacking. Two types of sandstone lithofacies are identified on the basis of field characteristics; a plane-bedded sandstone lithofacies capping thick red and green color shale beds, and a cross-bedded sandstone lithofacies overlying the plane-bedded sandstone defining coarsening upward sequences. The plane-bedded sandstone at places contains Cruziana ichnofacies and bivalve fragments indicating deposition by shoreface processes. Thick cross-bedded sandstone is interpreted to be deposited by the fluvial dominated deltaic processes. Load-casts, climbing ripples and flaser-bedding in siltstone and red shale indicate influence of tidal processes at times during the deposition of the formation. This paper summarizes results of a study carried out in Al Huqf area outcrops to analyze the characteristics of the sandstone-body geometry, internal architecture, provenance and diagenetic changes in the lower and middle part of the formation. The study shows build-up of a delta complex and its progradation over a broad, low-angle shelf where fluvial processes operate beside shoreface processes in a vegetation free setting.

Keywords: Andam Group, Barik Formation, Ordovician sandstone, Al Huqf, Central Oman,