

## **Hydrocarbon Prospectivity of Late Jurassic Formations in West Kuwait – An Integrated Study, Onland Kuwait**

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### **ABSTRACT**

Jurassic wells drilled in North and West Kuwait have tested significant amount of hydrocarbons during testing of Late Jurassic Najmah, Gotnia and Hith formations of Oxfordian to Tithonian age proving presence of active petroleum system in unconventional reservoirs in the State of Kuwait. Southwestern part of Kuwait, the Salmi Platform of West Kuwait is underexplored. This area is covered by 2D seismic lines and sparse well data. Present work is the outcome of an integrated study carried out to assess the hydrocarbon prospectivity of Late Jurassic Oxfordian to Tithonian reservoirs in this region. During Late Jurassic, restricted seawater circulation in northern Arabian Shelf resulted in deposition of high organic rich mudstones of Najmah Formation preceded and followed by shallow ramp setting resulting in deposition of Najmah Lower Limestones and Najmah Upper Limestone respectively. Isolation during Tithonian led to the development of Gotnia Basin during which restricted inflow of marine waters enabled accumulation of four cyclic thick salt-anhydrite units of the Gotnia Formation. Seismic interpretation integrated with log correlation from southeast to southwest show increasing thickness of Upper Najmah Mudstone to early Gotnia sedimentary units (4th and 3rd cycles) indicating creation of active accommodation space during deposition of these units. Onlapping and wedging of late Gotnia units towards west observed on seismic and well data probably related to activation of Rimthan Arch leading to minor upliftment of this area. Log interpretation reveals presence of higher thicknesses of Najmah sedimentary units towards west and south-west with several grain flow units within bituminous mudstone possibly sourced from south. Thinning of upper Gotnia units observed on seismic and log correlation corresponds to gradual shallowing of the area during end of Tithonian. Petrophysical evaluation show better reservoir thicknesses towards the studied area from east to west. Structural position of the area is also favourable for hydrocarbon migration. However, in absence of significant well defined structural entrapment, fault bounded closures are expected to provide effective traps in Salmi Platform area compartmentalising it in to different prospective blocks. Stratistructural nature of Gotnia anhydrite-limestone units, conjugate fracture support and higher thicknesses of grain flow units in Najmah bitumen rich mudstone enhance the hydrocarbon prospectivity of this area.