

## **Water Encroachment Surveillance and Development Strategy for Production of Oil from Lower Burgan Reservoir: North Kuwait**

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### **Abstract**

Lower Burgan is one of the major oil producing reservoirs of Kuwait. It is a clastic reservoir. This reservoir is dissected by north south trending normal faults and is being produced under active water drive mechanism. The lower massive sandstone, underlain by a strong bottom aquifer, has been under extensive exploitation since early days of field development. As a result, a significant portion of reserves has been produced from massive sandstone. As of now, the major portion of oil production from Lower Burgan is catered by layered upper part of Lower Burgan reservoir. This thin (10 to 25 ft) intercalated sand shale layers have now become the main producing pool. Edge water drive is the predominant mechanism of drive in upper part of lower Burgan reservoir. Formation water salinity is to the tune of 250,000 ppm. In this scenario the Pulse Neutron log (PNL) in conjunction with Open hole log, produced water cut, well integrity and cement bond log have been proved to be an effective tool for chasing water front in lower Burgan reservoir. Time gap analysis of PNL log if recorded at regular interval has helped to workout rate of encroachment of water. The water encroachment study has resulted in demarcating dry oil area and hence working as one of the main tools in firming up infill locations and in identifying rig/rig less candidates. It also serves as useful technique to identify bypassed oil pockets. The identified infill locations and work over candidates are the main contributor for additional oil production there by it works as an operative tool for designing reservoir development strategy.