

## **Reservoir Optimization and Monitoring Challenges in the Nahr Umr Reservoirs of the Bahrain Field**

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### **ABSTRACT**

Nahr Umr reservoirs in Bahrain Field consist of three reservoirs that vary from calcareous silt stones to sand stones. These reservoir units are the second major producing zones in Bahrain Field and are overlain by Mauddud limestone reservoir separated by 8 - 10' shale. All these reservoirs have been on production since early thirties while the Mauddud reservoir has been under gas injection since 1938. These reservoirs with diverse fluid contents and hydro-dynamically different systems communicate with each other through the extensive faulting. For such mature reservoirs with a long production history; identifying by-passed oil, underperforming areas, areas under communication, locating infill wells and upgrading the reserves are challenging tasks. This paper describes the application of a practical process (1) Development of a systematic workflow for production optimization and reservoir analysis; (2) Identifying and highlighting reservoir trends, patterns and anomalies; (3) Locating the under performing wells/areas, and recommend solutions (4) Identifying essential patterns for consideration in overall development plan. The challenge was to evaluate large data sets in a short time and cost-effective manner. The technique uses a streamlined workflow of reservoir assessment processes, which require data gathering, formatting and validation through combining the data with several processes associated with both the static and the dynamic model of the reservoir. Quick interpretations of these models generate opportunity regions, re-completion candidates, and new infill potential in the reservoir. Based on the processes run in the Nahr Umr zones it was possible to understand the reservoir performance and main issues associated with field development. Utilizing these techniques, the recently completed development drilling program was suitably adopted to realize an efficient reservoir management process for developing the field with the objectives of decreasing decline rate and increasing the recovery.