

A Re-Evaluation of Production, Geological and Petrophysical Data of a Mature Clastic Middle East Reservoir Provides a Surprising Outcome

Michael Downen¹

¹Tatweer Petroleum, Riffa, Bahrain.

ABSTRACT

The Nahr Umr is a regionally extensive, lithological and stratigraphically complex, marine deltaic cretaceous reservoir. It comprises a highly bioturbated sandstone, clay and ironstone sequence designated the “C” producing reservoir of the Awali field. Long considered a key producing horizon in the Bahrain field the lower sequence, designated Cd, forms the basal member of the Nahr Umr and comprises interbedded sand and shale sequence of two hundred to three hundred and fifty feet in height. Historically there were ninety two producing wells, with thirty nine million barrels of oil in place. Currently thirteen Cd wells are active and collectively produce approximately seven hundred and fifty barrels of oil per day, usually as co-mingled production together with the shallower reservoir designated Cc. Conventional logs indicated that most sand intervals are wet which to the conclusion that the reservoir was a classic, low resistive pay. This was despite that fact that the lithologically similar shallower sands which had the same electrical and fluid properties indicated hydrocarbons on the logs. A recent external review, proposed a significantly increase the estimated oil in place and suggested many additional development opportunities for the Cd reservoir. This outcome prompted an in-house re-evaluation of the production data, geology and petrophysics of the reservoir. The findings proved surprising and resulted in a complete re-think of the potential of the Cd. This “back to basics” review raised key issues that have now impacted the continued development of the reservoir. It is thought that the review process that was undertaken would be very relevant to the assessment of both immature and mature assets generally. The lessons learnt highlighted the need to accurately quality control historical production data, to verify and understand the significance Petrophysical and geological data and has resulted in a completely new development strategy for the Nahr Umr.