

Analysis of the electrofacies, flow units and assessment of the reservoir potential of the Mishrif Formation (Cenomanian-Turonian) in the Esfand oil field, Persian Gulf

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Abstract

The Mishrif Formation is one of the most important oil reservoirs in the Persian Gulf Basin. In this research, the porosity and permeability data as well as the petro-physical logs are used respectively to determine the flow units and electrofacies of the Mishrif Formation in two wells of the Esfand oil field. Using petrophysical data, three electrofacies (EF) were detected by the MRGG method. The EF1 facies, which is consisted of predominantly carbonate shoal deposits, show the best reservoir characteristics, whereas the EF3 facies with the weakest reservoir parameters, is composed of lagoonal and marine deposits. Analysis of the porosity and permeability data also lead to identification of four hydraulic units by using FZI index. The HFU1 unit with the least reservoir quality is characterized by the carbonate shoal, lagoon and tidal flat deposits but the HFU4 unit with the best reservoir quality is consisted of the lagoon, carbonate shoal and open marine deposits. In addition, the EF1 is equivalent to the HFU2 and HFU3 as the EF3 to the HFU1. The flow unit of HFU4 that is equivalent to the EF1 and EF2 electrofacies. The study of reservoir potential of the Mishrif Formation, based on RPI index, suggest its complicated reservoir quality. According to this index, the Mishrif reservoir is classified as the fair and poor classes in the studied wells. The sedimentary and diagenetic processes were associated with complicated effects on the reservoir sequence and its parameters. Thus, assessment of the electrofacies along with the flow units increases possibility of the reservoir horizons separation.

Keywords: *Electrofacies, flow zone, reservoir potential, Mishrif Formation, Esfand oil field*