

Determination of discrete rock typing and distribution by sequential indicator simulation in Surmeh reservoir (Arab) in one of the oil fields of Southern Iran

F. Abdi¹, M. R. Kamali^{2*}, S. M. Aleali³, A. Kadkhodaie⁴

1, 3- Earth Sciences Department, Science and Research Branch, Islamic Azad University, Tehran

2- Research, and Development of Upstream Petroleum Industry Paradise, Research Institute of Petroleum Industry, Tehran

4- Earth Sciences Department, Faculty of Natural Sciences, University of Tabriz

* Kamalimr@ripi.ir

Received: 2019/4/13 Accepted: 2019/10/14

Abstract

The first essential and key step for optimum development of hydrocarbon fields is the determination of reservoir properties. More precise determination of reservoir properties provides stronger infrastructure for development management of the reservoir. Therefore we are observing significant attempts in order to develop more effective methods for determining and to present a more accurate view of the reservoir petrophysical properties, including reservoir rock types. Of the most effective recent methods is the RQI/FZI flow zone indicator method, which is very appropriate for the identification of hydraulic flow units (HFUs). In this study, a discrete rock type (DRT) was determined on the basis of HFU and with using the Sequential Indicator Simulation (SIS), its spatial structure and probabilistic distribution in the three-dimensional network of the reservoir has studied. As a result, five discrete rock types were identified while determined DRT3, DRT4 have the best reservoir quality; and the DRT1, DRT2 and DRT5 have the lowest reservoir quality. In the longitudinal section, DRT3 is more extensively developed in the middle part of the reservoir, indicating better reservoir quality in this part of the reservoir than in other parts. In the transverse section, the DRT3 and DRT4 are high reservoir quality in the southern and western part of the reservoir, but in the central and eastern part of the reservoir, the lower reservoir quality are observed; also the developed model with high accuracy shows rock type dispersion in the reservoir.

Keywords: flow zone indicator (FZI), discrete rock type (DRT), hydraulic flow units (HFU), reservoir quality index (RQI), sequential indicator simulation (SIS)