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Evaluation of the production potential of reservoir and spatial distribution of permeability and estimation of porosity, based on geostatistics modelling in Dezful embayment

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Abstract

The present research work attempts to explain the structural study for determination of spatial porosity and permeability distribution in north-end of Dezful embayment. Evaluation of spatial distribution of petrophysical properties in petroleum reservoirs plays a vital role in characterization, production and management of oilfields. Well testing data were analysed with the Pansystem Software, 2D and 3D maps in 3DFIELD 2.0.3.0 and also a computer modelling was conducted in GS+ v.5 package. Based on massive spatial datasets, the geology study indicates an asymmetrical anticline, which is located in the northwest-southeast trend. Among the 19 data wells drilled in field in Asmari formation, 13 official well testing data were available. Permeability, skin factor, flow regimes and presence of fractures are investigated through well test analysis. Well testing evaluations show that, overall, the field has poor storage and flow capacities. In fact, seven wells are producing from vertical fractures that intersect the well.

The geostatistics model of porosity and permeability were prepared in the form of 2D and 3D maps. Such maps, coupled with well testing results, can be used to pinpoint reservoir sectors of higher productive potential and therefore lower operational risk in the field development plan. It further revealed that the field has the largest storage and flow capacities in the west and northwest. Porosity and permeability tend to decrease towards the Centre of the field and slightly rise from the center to the east of the field.

Based on these observations and also well testing analyses, it is recommended to concentrate development wells in the western wing of the reservoir and also to perform horizontal drilling for maximum recovery.

