

Applying Indicator Kriging in Modeling of Regions with Critical Drilling Fluid Loss in Asmari Reservoir in an Oil Field in Southwestern Iran

Kioumars Taheri* and Farhad Mohammad Torab

Department of Mining and Metallurgical Engineering, Yazd University, Iran

kio.taheri@stu.yazd.ac.ir

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Abstract

Loss of drilling fluid in the reservoir formations in oil fields can cause loss of investments and serious damages to the hydrocarbon producible formations. Due to presence of severe losses in some reservoir formations, proposing preventing solutions for this undesirable phenomenon has significant importance. On the basis of mentioned matter, this research is focused on the study and prediction of fluid loss in Asmari formation and modeling critical loss zones using geostatistical method of indicator kriging in one of the southwestern oil fields. For this purpose, at the first step, the distribution of fluid loss was determined throughout the reservoir using data of 363 oil wells. Then using indicator kriging algorithm with supposing a critical limit for fluid loss, the data was transformed to binary and using variography, the variability and anisotropy of data were analyzed. At the final step, by building a block model, the probability of presence of critical losses was estimated throughout the reservoir using indicator kriging. The estimated results show that the fluid loss has high variability in Asmari formation and critical loss points (higher than 100 Bbl/h) are located in northwest parts in sector 2 and in southeast parts in sector 9, especially dispersed in deeper zones.

Keywords: Indicator Kriging, Modeling, Fluid loss, Asmari Reservoir, Block Model.