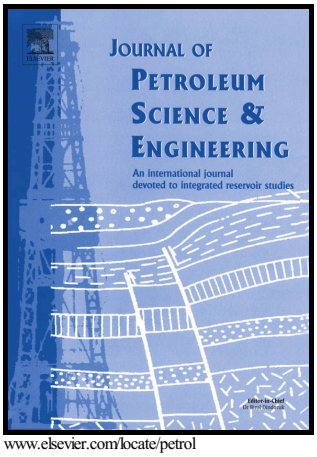

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PII: S0920-4105(17)30361-3
DOI: http://dx.doi.org/10.1016/j.petrol.2017.03.003
Reference: PETROL3891

To appear in: *Journal of Petroleum Science and Engineering*

Received date: 17 April 2016
Revised date: 25 September 2016
Accepted date: 1 March 2017

Cite this article as: Mohammadreza Akbari, Mohammad Javad Ameri, Sina Kharazmi, Yaser Motamedi and Maysam Pournik, New Correlations to Predic Fracture Conductivity Based on the Rock Strength, *Journal of Petroleum Scienc and Engineering,* http://dx.doi.org/10.1016/j.petrol.2017.03.003

New Correlations to Predict Fracture Conductivity Based on the Rock Strength

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Abstract

Acid fracturing is one of the applicable methods to stimulate oil and gas wells and increase the production rate in a carbonate reservoir. Acid fracture conductivity is an important parameter for the designing a fracture job. The amount of rock dissolved, fracture surface etching patterns, rock strength, and closure stress impact the resulting acid fracture conductivity. A model of acid fracture conductivity must accurately anticipate the fracture conductivity under closure stress. The rock strength affects substantially the fracture conductivity. A serious challenge of recent studies has been to predict the behavior of different formations under various closure stresses. This study developed a robust intelligent model based on genetic algorithm to precisely predict the fracture conductivity by incorporating experimental data from various formations, whereby resulted in a good match between the model predictions and the experimental data. The effect of rock strength was investigated on the fracture conductivity under various closure stresses. The results show the rock strength plays a significant role when anticipating fracture conductivity, as various formations have behaved differently under different closure stresses. Furthermore, due to the complexity of rock behavior at high closure stress, the results showed that as the closure stress increased the precision of all predictive correlations decreased considerably. Therefore, the fracture conductivity must be anticipated cautiously at high closure stresses by various predictive correlation particularly, in soft formation.

Nomenclature

$DREC$	Dissolved rock equivalent conductivity (md-ft)