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Title: ASSESSMENT OF SANDING POTENTIAL OF UNCONSOLIDATED SANDSTONE RESERVOIRS USING MODIFIED HOEK-BROWN FAILURE CRITERION.
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Contributors: Ogunkunle, Fred Temitope; Isehunwa, S. O.; Orodu, D. O.; Olabode, Oluwasanmi;
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Abstract: Assessment of sanding tendency during field development planning and completion design of oil and gas wells is very paramount because sanding tendency significantly impact on well completion choices and overall field development economics. Production of sand occurs in zones of failure creating perforation cavity and wellbore instabilities. The starting point of most predictive tool is identifying the stres-ses at the perforation cavity, failure prediction around such cavity and applying appropriate failure criterion. Most of the existing sand predictive tools are anchored on Mohr-Coulomb failure criterion which assumes a linear failure envelope but does not represent the response of reservoir rocks to induced stress. Therefore, this work presents the results of a study investigating the potential of sand production in a Niger Delta field using modified Hoek-Brown failure criterion in developing a new geomechanical sanding predictive model that describes the non-linear increase in peak strength of isotropic rocks with increase in confining stress. The condition for sanding was formulated to be minimum well pressure at/below which sanding is to be expected. Based on Hoek-Brown material constant (a) which describes the rock mass quality, three (3) sanding criteria were developed and verified by comparing the results with existing numerical the model result and field scenario. From the comparison with numerical model result, the three (3) sanding criteria gave the same result when Biot's constant is taken to be one (unity) but generally close to the numerical result. The results from the field case study, for the two wells evaluated indicates field well pressures that fall below the minimum well pressure at sanding predicted by the sanding criteria developed. This shows why they were both sand producers and this was in agreement with the production data from both wells. However, the model with exponent (a = 0.5) gave the closest to the field well

pressure. The good agreement between the results from numerical/field case study and current work augurs well for its application when Hoek-Brown material constants can be accurately predicted.

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