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Energy - Oil and Gas Research; Findings in Oil and Gas Research Reported from China University of Petroleum (East China) (A Semianalytic Solution for Temporal Pressure and Production Rate in a Shale Reservoir With Nonuniform Distribution of Induced Fractures)

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2019 SEP 20 (VerticalNews) -- By a News Reporter-Staff News Editor at Energy Weekly News -- Data detailed on Energy - Oil and Gas Research have been presented. According to news originating from Dongying, People's Republic of China, by VerticalNews correspondents, research stated, "The network of induced fractures and their properties control pressure propagation and fluid flow in hydraulically fractured shale reservoirs. We present a novel fully fractal model in which both the spacing and the porosity/permeability of induced fractures are distributed according to fractal dimensions (i.e., fractal decay of fracture density and the associated porosity/permeability away from the main induced fracture)."

Funders for this research include National Natural Science Foundation of China, Key Research and Development Program of Shandong Province, Major National Research and Development Projects of China, Natural Science Foundation of Shandong, Fundamental Research Funds for the Central Universities, Key Project of Coal-Based Science and Technology in Shanxi Province, Coalbed Methane Joint Research Foundation of Shanxi Province, NanoGeosciences Laboratory, the University of Texas at Austin, Mudrock Systems Research Laboratory Consortium at the Bureau of Economic Geology, the University of Texas at Austin, China Scholarship Council.

Our news journalists obtained a quote from the research from the China University of Petroleum (East China), "The fractal fracture distribution is general, and handles exponential, linear, power, and uniform distributions. We also developed a new fully fractal diffusivity equation (FDE) using the fractal distribution of fractures and their properties. We then used, for the first time, the semianalytic Bessel spline scheme to solve the developed diffusivity equation. Our proposed model is general and can capture any form of induced-fracture distribution for better analysis of pressure response and production rates at transient- and pseudosteady-state conditions. We compared the unsteady-state and pseudosteady-state pressure responses calculated by our fully fractal model with former models of limited cases: uniform fracture spacing and uniform porosity/permeability [conventional diffusivity equation (CDE)]; variable fracture spacing and uniform porosity/permeability [modified CDE (MCDE)]; and uniform fracture spacing and fractal porosity/permeability distribution (FPPD). We used these models to match and predict the production data of a multifractured horizontal gas well in the Barnett Shale. Our results showed that the fractal distribution of fracture networks and their associated properties better matches the field data."

According to the news editors, the research concluded: "Uniform distribution of induced-fracture networks underestimates production rate, especially at early time."

For more information on this research see: A Semianalytic Solution for Temporal Pressure and Production Rate in a Shale Reservoir With Nonuniform Distribution of Induced Fractures. SPE Journal, 2019;24(04):1856-1883. SPE Journal can be contacted at: Soc Petroleum Eng, 222 Palisades Creek Dr, Richardson, TX 75080, USA.

The news correspondents report that additional information may be obtained from G.L. Sheng, China University of Petroleum East China, Petroleum Engineering, Dongying, People's Republic of China. Additional authors for this research include Y.L. Su, W.D. Wang, F. Javadpour, J.H. Liu and K.J. Li.

Keywords for this news article include: Dongying, People's Republic of China, Asia, Oil and Gas Research, Energy, China University of Petroleum (East China).

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