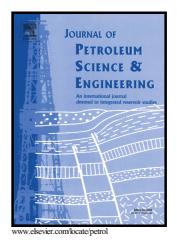
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A new production predicting model of fractured horizontal wells in dual-porosity gas reservoirs on non-Darcy flow conditions JunchaoWang^a, JiangwenXu^a, YongqingWang^b, Haitao Li^b

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Abstract

Dual-porosity is a common method to model natural fractured reservoirs or complex fracture network after volume hydraulic fracturing. To analyze the productivity of fractured horizontal gas wells, a new volumetric source model with high velocity non-Darcy flow in hydraulic fractures is developed. The basic volumetric source function is solved by utilizing orthogonal transformation in real space, which solves the problem that the non-linear equation (indicating non-Darcy effect) cannot adopt Laplace transformation. The volumetric source model is verified by the tri-linear flow model and a field example. Results shows increasing width of hydraulic fractures and enlarging size of proppant have significant effect on weaken non-Darcy flow. The volumetric source model is a fast and accurate method to predict the productivity. In addition, this model can provide a more reasonable method to optimize hydraulic fracturing considering non-Darcy flow effect.

Keywords: high velocity non-Darcy flow; dual-porosity gas reservoir; fractured horizontal well; volumetric source model

Nomenclature		
X _e	Length of reservoir	m
y _e	Width of reservoir	m
Z _e	Height of reservoir	m
$L_{\rm H}$	Length of horizontal well	m
r _w	Radius of horizontal well	m
k _m	Bulk permeability of matrix	μm^2
$\phi_{ m m}$	Bulk porosity of matrix	dimensionless
$k_{ m f}$	Bulk permeability of natural fractures	μm^2
$k_{\rm f}$ $\phi_{\rm f}$	Bulk permeability of natural fractures Bulk porosity of natural fractures	μm ² dimensionless
		·
$\pmb{\phi}_{\mathrm{f}}$	Bulk porosity of natural fractures	dimensionless
$\phi_{ m f} \ lpha$	Bulk porosity of natural fractures Shape factor	dimensionless m ⁻²

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