عنوان مقاله:

Important Dimensionless Groups Affect the Production Behavior of Hydrate-Capped Gas Reservoirs

محل انتشار:

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خلاصه مقاله:

Gas production from a hydrate-capped gas reservoir (a gas reservoir in contact with a hydrate zone at the top) is a process governed by a combination of mechanisms of heat transfer, fluid flow, thermodynamics of hydrate decomposition, and kinetic decomposition of hydrates. However, the results of several extensive simulation studies indicate that when a mobile phase exists in the hydrate zone some of the non-linear processes involved in gas production from hydrate reservoirs have a negligible effect on the overall behavior of the process. This significantly reduces the complexity of the process and allows development of a new analytical model for the constant-rate gas production from a hydrate-capped gas reservoir. The identification of important dimensionless groups affect the performance of a hydrate-capped gas reservoir is the primary focus of this paper. During the course of the analytical model development, three dimensionless groups describing four inter-related rates (rate of gas production, rate of change in sensible heat, rate of heat conduction and rate of gas generation) are identified. In addition, the analytical model developed here is compared against the available numerical model. Furthermore, this model is used to study the effects of important parameters on the reservoir behavior.

کلمات کلیدی:

Hydrate- capped, gas reservoir, Dimensionless groups, analytical model

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