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# A Productivity Prediction Model for Heavy Oil Steam Huff and Puff Considering Steam Override

**Yapeng Tian[1,2,3], Binshan Ju[1,2,3], and Jie Hu[4]**

[1]College of Energy Resources, China University of Geosciences(Beijing), Beijing, 100083, China;
[2]Beijing Key Laboratory of Unconventional Natural Gas Energy Geology Evaluation and Development Engineering(China University of Geosciences(Beijing)), Beijing, 100083, China;
[3]Ministry of Land and Resources Key Laboratory of Shale Gas Exploration and Evaluation(China University of Geosciences(Beijing)), Beijing, 100083, China;
[4]Changqing Industrial Group Co., Ltd., Xi'an, Shaanxi, 710018, China

## ABSTRACT

In the conventional productivity prediction model, steam huff and puff in heavy oil reservoirs is assumed to have a piston-type displacement,and considers the heating area to be the same from the top to the bottom of the reservoir.However,in an actual field application,the steam heat can transmit upward due to different oil and gas densities resulting in gravity differentiation,leading to a larger heating area at the top of the reservoir than that at the bottom(this phenomenon is called steam override).By determining the relationship between the heating radii of the top and bottom cap rocks,and introducing equivalent radius,a prediction model of steam huff and puff productivity in consideration of steam override was established on the basis of quasi-steady-state yield formula.Taking the M block in Gudao Oilfield as an example, the new model in this paper,the Marx model and a commercial simulator were used to calculate productivity.Simulation results indicated that the Marx model obtained a relatively high productivity because of without considering the steam override,with less heat loss and an average error up to 41%.However,our new model has an average relative error of 12% and a minimum relative error of 7%,which is consistent with the calculation results of the commercial software.The research results showed that the new productivity prediction model for steam huff and puff that takes into consideration steam override is reliable and could be put into practice.