

عنوان مقاله:

Modeling Critical Flow through Choke for a Gas-condensate Reservoir Based on Drill Stem Test Data

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خلاصه مقاله:

Gas-condensate reservoirs contain hydrocarbon fluids with characteristics between oil and gas reservoirs and a high gas-liquid ratio. Due to the large gas-liquid ratio, wellhead choke calculations using the empirical equations such as Gilbert may contain considerable error. In this study, using drill stem test (DST) data of a gas-condensate reservoir, coefficients of Gilbert equation was modified; 26.7% of DST data has uncertainty. In these data, due to a problem of flow transmitter, the water flow rate is recorded equal to zero. This makes the mean absolute error of 5% in the measuring of total liquid phase flow rate. Because of uncertainty in the water flow rate in some DST data, the coefficients were optimized for two sets of data to investigate the effect of water flow rate on the calculations. The first dataset was the complete set of DST data, and, in the second, data were filtered with the elimination of uncertain data. The regression results showed that the whole data have a mean absolute error of 5.1%. For this regression, the uncertain data had a mean absolute error of 8.6%, while the error of the remaining data was 3.9%. In this case, for 38% of uncertain data, the mean absolute error was more than 10% indicating that these data are the major factor of the error. Mean absolute error for the filtered dataset was 3.0%. Error reduction was due to the elimination of data with uncertainty. In this case, 3% of the total data had a mean absolute error of more than 10%. In other words, 5% error of the liquid phase flow measurement that includes 26.7% of data caused an increase of 2.1% in the error of calculations. This showed that the elimination of uncertain data causes a remarkable reduction in error. To study the effect of temperature on choke calculations, wellhead temperature was considered as a variable in the Gilbert equation form. The regression results showed that the mean absolute error of 3.0% does not change, and the wellhead temperature has no considerable effect on the choke calculation accuracy.

کلمات کلیدی:

(Gas-condensate Reservoir, Gas-liquid Ratio, Choke Modeling, Gilbert Equation, Drill Stem Test (DST)

