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CFD Simulation and Investigation of Critical Two-Phase Flow Rate in Wellhead Choke

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Abstract : Chokes are commonly used in oil and gas production systems. A choke is a restriction basically designed to control flow rates of oil and gas wells, to prevent the downstream disturbances from propagating upstream (critical flow), and to protect the surface equipment facilities against slugging at high flowing pressures. There are different methods to calculate the multiphase flow rate, one of the multiphase flow measurement methods is the separation and measurement by on¬e-phaseFlow meter, another common method is the use of movable separator, their operations are very labor-intensive and costly. The current method used is based on the flow differential pressure on both sides of choke. Three groups of correlations describing two-phase flow through wellhead chokes were examined. The first group involved simple empirical equations similar to those of Gilbert, the second group comprised derived equations of two-phase flow incorporating PVT properties, and third group is computational method. In the article we calculate the flow of oil and gas through choke with simulation of this two phase flow bye computational fluid dynamic method, we use Ansys- fluent for this simulation and finally compared results of computational simulation whit empirical equations, the results show good agreement between experimental and numerical results.

Keywords : CFD, two-phase, choke, critical
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