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Liquid entrainment and gas pull-through in horizontal, stratified gas-liquid flows[1] HAMED SADEGHI, STAVROS TAVOULARIS, Univ of Ottawa — Flows of water-air and saturated water-steam mixtures in a horizontal cylindrical pipe with a single transverse cylindrical outlet were investigated computationally using the volume of fluid (VOF) method to separate the phases and the detached eddy simulation (DES) model to simulate turbulence. The time-dependent gas-liquid interface was resolved and the vertical distance h between the interface elevation and the outlet was determined. The values h_{ole} at the onset of liquid entrainment and h_{ogp} at the onset of gas pull-through for different geometries and inlet flow rates were expressed as empirical functions of the Froude number and the ratios h/h_{ole} and h/h_{ogp} following onset of the corresponding incident were expressed as functions of the mass quality of the fluid. Available two-phase flow models appear to describe fairly well both liquid entrainment and gas pull-through. A combination of the Bond number and the Froude number was introduced into a model to represent the effects of surface tension and inlet liquid and gas flow rates. These studies are currently being extended to horizontal manifolds with multiple branches.

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