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Particle Deposition in a Two-Fluid Flow Environment¹ YIT FATT YAP, AFSHIN GOHARZADEH, The Petroleum Institute, FRANCISCO M VARGAS, Rice University, CHEE KIONG JOHN CHAI, The Petroleum Institute — The formation of particle deposit on surfaces occurs in many applications. For example, in the oil and gas industry, deposition of wax, hydrates and asphaltene reduces flows and clogs pipelines eventually if left untreated. Removal of the deposits is costly as it disrupts production. To further complicate the problem, the main flow carrying the depositing particles is often of a multi-phase nature. Successful mitigation effort requires good understanding and eventual prediction of the deposition process interacting within a multiphase flow environment. This work presents a model for prediction of particle deposition in a two-fluid flow environment. Modeling of the process is challenging as there are two unknown evolving interfaces, i.e. the fluid-fluid interface and the depositing front. Both interfaces are captured via the level-set method. The deposition at the depositing front is modeled as a first order reaction. The two immiscible fluids are modeled using the incompressible Navier-Stokes equations. Solution of the equations is implemented using a finite volume method. The model is then verified against known solutions. Preliminary results on deposition process in a two-fluid flow environment are presented.

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