
Project 1– Wax Deposition under Two-Phase Flow at Different Flow Patterns

Objectives

The general objectives of this study are to develop the more reliable model for two-phase (oil-gas) flow by integrating the deposition behavior observed from the available experimental data and to elucidate the impact of flow patterns in two-phase oil and water flow on wax deposition mechanism.

Project Description

This project will be conducted in two parallel tracks. It is well known that the flow patterns influence the behavior of wax deposition in multiphase flow. In the past, TUPDP successfully has experimentally studied the wax deposition in slug and stratified flow of Garden Banks oil and natural gas. The experimental data are essential to developing a more reliable mechanistic model for wax deposition in two-phase flow.

- Track 1: A more reliable and comprehensive model for two-phase flow will be developed by integrating the deposition behavior observed from the systematic experimental approach. This will be accomplished by utilizing the data of two-phase flow studies such as Chi (2018), Rittirong (2014), Kilincer (2003), Manabe (2001), and Matzain (1999).
- Track 2: Understanding of two-phase (oil and water) flow wax deposition will enhance our fundamental understanding and improve the ability of the systematic study of more complex cases (multiphase flow of oil-gas-water). The experimental data will be essential to develop a more reliable mechanistic model for wax deposition in multiphase flow. This project will be a continuation of the previous project (Chi, 2018) in TUPDP. The multiphase flow loop facility will be used for oil-water wax deposition in different flow patterns. Experiments will be conducted to investigate the effect of flow patterns, heat transfer on the oil-water wax deposition process. Hydrodynamic tests will be conducted first utilizing the high-pressure sapphire window cell to determine the flow pattern, pressure drop, liquid holdup, and any other required parameters. Once the hydrodynamic conditions for flow patterns are determined, the wax deposition experiments at different heat transfer and shear will be conducted.