Weekly CEAFM Seminar: Fall 2015

JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

Date: **Friday, September 18, 2015**

Time: 11:00 AM

Location: Gilman Hall # 132

Speaker: **Prof. Luis Fernando A. Azevedo (PUC-Rio)**

Title: ***"Wax Deposition in Pipelines: Modeling Attempts"***

Abstract

Wax deposition in pipelines has been studied continuously for decades since it is one of the most relevant flow assurance and safety problems faced by the petroleum industry. In subsea petroleum production, the crude oil flows out of the reservoir at, typically, 60°C into the production pipelines. These lines carry the oil to the platforms and from the platforms to shore. At large depths, the temperature at the ocean floor is of the order of 5°C. The solubility of wax in the oil decreases with decreasing temperature. As the oil flows, it loses heat to the surrounding water. If the crude oil temperature falls below the Wax Appearance Temperature (WAT), wax precipitates from the oil and may deposit along the inner walls of the pipeline, causing increased pressure drop or even the blockage of the pipeline. The ability to predict whether wax deposition will occur in a specific installation is relevant information for pipeline designers and operators. For instance, the indication of a probability of occurrence of deposition will influence on the type and amount of thermal insulation to be specified for the pipeline, with direct impact on the cost of the installation. Also, information on the temporal and spatial distributions of the deposit along the line, as well as its composition, is necessary to guide the strategy of pipeline maintenance, such as selecting pig type and frequency of passage.

Wax deposition simulation models are useful tools to aid pipeline design and operation. Due to the complexity of the phenomena controlling wax deposition, the existing simulation models make use of empirical constants and correction factors that tune the model to a particular set of field data. It is a consensus that the performance of the available deposition models is not satisfactory.

In the seminar we will describe some ongoing research efforts aimed at identifying and modeling the mechanisms responsible for wax deposition at the pipe walls.