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## ***Project 5– Thermal Removal of Wax Deposits***

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### **Objective**

The general objective of this study is to provide guidelines in terms of temperature target to remove wax deposits by heat tracing the wall and by circulating a warm fluid.

### **Motivation**

Operators are considering more and more single lines with electrical heating to manage wax and hydrates without any facility to deploy operational pigging. One idea to limit power utilization could be to maintain the temperature below the WAT during nominal production and to heat the line periodically to remove the deposit.

With no electrical heating, another remediation method could be to circulate hot fluid in the line. The question for both cases is: what is the minimum temperature to remove the deposit?

Many understand that the WAT of wax deposits is significantly higher than the WAT of the oil. Therefore, it could be foreseen to bring the deposit at a temperature much higher than the WAT of the oil. This is implicitly associated with removal based on a melting process of the deposit.

Within TOTAL, feedback from the field and a few observations in laboratory cells seem to indicate that the deposit removal can be achieved at a temperature even lower than the WAT of the oil. In these cases, the removal may be explained by a “disbondment” of the deposit from the wall.

### **Project description**

It is proposed to form different wax deposits in the loop under single flow conditions and to detect the onset temperature above which a removal process is observed.

A typical series of tests is as follows:

- Wax deposit formation in the loop
  - Record of the evolution of the pressure drop during deposit formation
  - Recover the wax deposit for characterization (wax content, WAT)
- Repeat the wax deposit formation to investigate the deposit removal by wall heating
  - Check the repeatability by comparing the evolution of the pressure drop during formation
  - Increase the wall temperature step by step
    - Detection of the removal process from the evolution of the pressure drop
- Repeat the wax deposit formation to investigate the deposit removal by fluid heating
  - Check the repeatability by comparing the evolution of the pressure drop during formation
  - Increase the fluid temperature step by step
    - Detection of the removal process from the evolution of the pressure drop