Simulation of Vacuum Distillation Tower Using iCON

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Abstract
Vacuum distillation is the distillation of a liquid under reduced pressure. The atmospheric pressure in the distillation tank is reduced making it possible to boil the liquid at a lower temperature. Liquids boil at lower temperatures under reduced pressure. Vacuum distillation is used to safely recover higher boiling point solvents. The Vacuum Distillation Unit (VDU) produces five cuts: a light vacuum gas oil (LVGO), a medium vacuum gas oil (MVGO), a light distillate stream (V1SS), a medium distillate stream (V2SS), and a heavy distillate stream (V3SS). The feed that is charged to the VDU is LSWR from the refinery. It flows through a series of heat exchangers and the feed heater to the vacuum tower. Vacuum is maintained by the overhead vacuum system package. Light Sulfuric Waxy Residue (LSWR) hot charge to the Vacuum Distillation Unit (VDU) is received from the Crude Distillation Unit (CDU). The CDU 1 is designed to process sweet crudes, mainly which is the “Tapis Blend”. Due to mechanical constraints of the CDU1 tower, these lighter components are slipping to the LSWR which will feed to the VDU. When this happens, The VDU will then have to be adjusted to compensate to these lighter components. This paper will focus on developing a complete simulation of the VDU in ICON to analyze and suggest efficient control strategies to overcome the problem. There is a possibility of also to develop the application of fuzzy logic programming to the VDU tower as to automatically adjust the tower to cope with the light components and as quickly as possible.

Keywords: Control, Simulation, Optimization

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