Abstract

The purpose of this work is to introduce some minor design modifications into an existing unit in a refinery with a view to maximizing the octane number of the gasoline product.

Hydrotreated light Naphtha is processed in the UOP PENEX-DIH unit, to convert low octane paraffins into higher octane iso-paraffins in order to increase the gasoline quality. The studied unit is the PENEX DIH unit at MIDOR refinery. The study focuses on the process involving two distillation columns. These are the stabilizer and the de-isohexanizer.

The HYSYS software was used to simulate the selected unit.

In order to get the best octane number of the product stream, 5 variables have been changed. These variables are the operating pressures of the stabilizer and the deisohexanizer, their feed plate positions and the cut plate position of the side stream in the deisohexanizer along with the reflux ratio inside the Deisohexanizer.

The octane number of the design case can be improved by moving the feed plate position 7 plates toward the bottom of the column and the cut plate position moves 8 plates toward the top of the Deisohexaniser.

By comparing the different process used to separate normal and isoparaffin, the Deisohexanizer was found to match the purpose of the existing Penex unit.