EVALUATION OF REFINERIES HYDROTREATING UNIT PERFORMANCE WITH HEAT INTEGRATION TO REDUCE TOTAL ANNUAL COST

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Abstract

Petroleum refinery industry is an industry that has an important role in the world, especially at supplying energy demand. Hydrotreating or Hydroprocessing is a catalytic hydrogenation process to saturate hydrocarbons and remove sulfur, nitrogen, oxygen and metals from process stream. Optimization of this unit becomes a very important thing to get a product with predetermined standard. This study was conducted to obtain optimum operating conditions for Hydrotreating unit that produces a product that meets the current standard in order to obtain the maximum benefit for the company. Simulations using Aspen Plus program. Purge Split Fraction and reactor temperature are the variable that change in this study. Optimization of operating conditions in order to obtain products that meet the minimum sulfur content standards. After optimization of the operating conditions, we get maximum load of Heat Exchanger for the Heat Integration. Heat integration is done using the pinch method, that exchange of heat between the streams that want to be heated and cooled. Optimum operating conditions without integration at reactor temperature 585.65 K with Purge Split Fraction 0.11. Heat integration design has been obtained by 100% steam demand savings and 48.71% cooling water savings. The use of heat integration systems in the hydrotreating unit can reduce Total Annual Cost (TAC) 60.65% of the system without integration.

Keywords: Aspen Plus, Optimization, Heat Integration, Pinch Method, Total Annual Cost (TAC)
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