

ABSTRACT

Process Optimization of the Fluid Catalytic Cracking Unit
at Trintoc

Susan Gail Ng-Sang

Process optimization of the process variables of the Fluid Catalytic Cracking Unit is important because the effect of these variables subject to the quality of the feedstock available, is reflected in the types and quality of the products to be marketed. Hence it has a direct economic contribution to the viability of the refinery. In addition, process optimization can provide a valuable tool which can be used to show the flexibility of the unit operations depending on the variables considered and their interaction.

In this project, operating data specific to the unit and type of catalyst is used in the absence of pilot plant data to determine the relationship between the specific variables and also their contribution to the conversion of the feedstock to products, subject to the accuracy of the operating data and laboratory analyses, the unit limitations and also the availability of software packages. A basic functional form of the objective

function consisting of the process variables and specific constants, is inputted into a software package called SYSTAT, which then solves these constants. The resultant objective function is then optimized subject to the operating constraints using the computer package HYPERLINDO.

The results of the optimization are compared to the current plant operations. Overall and component mass and volume balances as well as heat balances depicting actual plant operations are used to infer the plant's performance using the optimized process variables. Results have shown that the unit can process a throughput of 24,049 bpd of heavy feedstock, typical of that derived from indigenous type crude, using a high activity catalyst circulated at a high rate. The results are only subject to the reactor limitations in view of the complexity of the linearization of the objective function.