

Chevron Lummus Global LC-SLURRY Technology for VR Upgrade

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Abstract

LC-SLURRY technology, developed by Chevron Lummus Group (CLG), is a slurry hydroprocessing process. CLG used its well-established ebullating bed hydrocracking technology, LC-FINING, as a basis for developing LC-SLURRY technology. The LC-SLURRY process can be used to convert nearly 100% of heavy oils/solvent deasphalting (SDA) tar to high-value products. This new technology is based on a unique, high-activity catalyst that is recycled and recovered in the process (ISOSLURRY™ catalyst), eliminating fouling concerns associated with other catalyst or additive systems.

Like other slurry processes, LC-SLURRY technology is attractive for heavy feeds. It combines the advantages of carbon rejection with the upgraded product quality of hydrogen-addition processes. Because dispersed catalyst systems are not prone to plugging from coke, they can be used to process high metals and high Conradson carbon residue feedstocks.

Residue conversion is projected to continue to increase due to decreasing fuel oil demand coupled with increasing light and middle distillate demand. Processes and motor fuels are both subject to more severe environmental requirements. At the same time, production of heavy crude oils is likely to increase.

In this review, we examine the economics of hydrocracking vacuum residue (VR) for production of liquid fuels based on a 50,000 bpsd (barrels per stream day) grassroots LC-SLURRY unit operating on the US Gulf Coast.

Our technoeconomic evaluation includes estimated capital and production costs, showing the details of important process cost parameters such as battery limits and offsites costs, variable cost, plant cash cost, plant gate cost, production cost, etc. We used information derived from public domain sources and nonconfidential information provided by the licensor, CLG. The process design was simulated primarily using Aspen Technology's HYSYS® process simulator. We worked out plant and process economics (CAPEX and OPEX) using IHS Markit proprietary PEPCOST software, using in places our own design judgments based on operational experience.

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