Process Notes

Designing Deepcut Vacuum Units That Really Work

Every barrel of vacuum gas oil (VGO) you can save from being reduced to coke in the delayed coker unit is a barrel more that can go to the FCCU. That's a good reason to raise HVGO cut-point. But how to do it? Some people think the job can be done just by running computer models in the engineering office, relying on vendors and their data sheets for a clue to true equipment performance. Experience, however, shows it just ain't so. For either a grass roots project or a revamp, designing a deepcut vacuum unit to handle heavy sour crudes that are becoming more common today demands a lot more.

It takes personal experience in doing tube-by-tube design of the fired heaters and knowing where and how to inject coil steam, managing the hydraulics of the heater including critical two-phase flow in the tubes and transfer line, how to deal with corrosion and fouling in heat exchangers, balance the intricate details of tower internals and vacuum ejectors- and above all, mate these interdependent components into a fully integrated system that reliably and consistently maximizes VGO yields low in microcarbon and vanadium.

Difficult? Not a job, certainly, for anyone who only sits in the office doing nothing but running simulations. This isn't to say that models are not important. They are. But to produce anything of real value these process and equipment models need to have been tested and checked against actual measured pressures, temperatures, flows and stream compositions. And the person who runs the simulations must always keep in mind the dictum of one of the grand old men of refining: "Fluids obey the laws of physics and not the whims of the process designer." In these times when every barrel of crude needs to be converted to highest value products, one must look to the expertise not just of the engineers who run the models, but of those who also wear Nomex® and get dirty measuring real unit performance.

For a more involved discussion
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