Question 85: How often do you clean the FCC slurry exchangers?

Dwight Agnello-Dean (BP)

For us, as I'm sure for it is for others, minimizing FCC slurry exchanger cleaning has been a continuous improvement effort for quite some time. As a result we have implemented best practices in the areas of slurry circuit and fractionator operations and design. Through these efforts we have some units that only need to clean during cycle ending turnarounds. Others look for strategic opportunities during turndown periods for cleaning. At my own location which has two FCC units feeding mostly hydrotreated gasoil we clean approximately one exchanger per year.

Mike Teders (Valero)

Slurry exchanger cleaning frequency can range from as little as a few days (from an upset) to several years depending on the service and configuration. A few of the FCC's in the Valero system have spare slurry exchangers so on-line cleaning does not impact unit availability. Slurry antifoulants have extended the time between slurry exchanger cleanings in many of our FCC's. One of our FCC units increased time between cleanings from 1 year to 4 years by utilizing a chemical additive and using best practice methods for mitigating fouling in lain column bottoms service. These best practices include maintaining good velocity (4 – 9 fps) in the main column bottoms heat exchanger tubes and main column bottoms quench to mitigate coke formation in the main column bottoms circuit. In some units we have improved the quench efficiency by using a pipe distributor.. Units without quench limit the main column bottoms temperature to 690 F maximum. We put limits on the main columns bottoms product gravity and/or LCO 90% point to minimize main column bottoms heat exchanger fouling. Typical slurry gravity limit is -4 API and LCO 90% point of 685 F maximum. In some locations we have backwash connections on the slurry lines to periodically reverse flow through the main column bottoms heat exchangers and remove any loose catalyst fines and small coke particles from the exchanger tubes. The backflush connections are typically used where the heat exchanger tube velocity cannot be maintained at greater than 4 fps.

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