Question 92: Aside from erosion failures, what is your experience with newly installed lining failures in vibration-cast cold wall risers and standpipes? What caused the failures? What can be done to prevent or mitigate the failures?

Mike Teders (Valero)

Valero has experienced this at one of our revamped FCC units on very long regenerated catalyst standpipe, near the top of the reactor riser in two other units. There are numerous hot spots that can be quenched with steam lances. Since the lances are effective at cooling the steel, we believe that the refractory is still in place and that hot gas is finding its way to the steel through cracks in the refractory. Newly installed lining failures may be caused by either an improper mix or poor installation including curing procedures. One refinery has also seen hot gas working through cracks and “running” up the wall. Vapor stops were installed in the regenerator during a maintenance outage to address this issue. At another location, clam shells were welded on outside of the riser and packed and or pumped refractory into void. Large areas were repaired, and full run attained without incident. Upon inspection of riser during TAR, cracks were found, and some refractory sloughing witnessed.

Dwight Agnello-Dean (BP)

A similar question was answered at the FCC Q&A in 2010. The BP panel member (Kasle) responded that we have generally had good performance and not had non-erosion failures of riser vibra-cast linings. I continue to support that position but want to point out that we have very few new installations, which in itself is testimony to these linings. That being said, late last year we replaced the risers on one unit. Routine thermal scans have areas of elevated temperature indicating the lining has not failed but is compromised. We are continuing to monitor this situation. Our failure prevention practices for these systems are to select qualified fabricators and have an independent refractory expert follow the quality of the refractory installation. In addition, we strictly adhere to recommended heat-up/curing procedures during unit startup. In relation to the new risers discussed, we followed all of these practices.

Catalysts

Reactor Vessel

Regenerator

Reliability

Start-up

Year

2011