Question 27: What is your experience with processing benzene in C5/C6 isomerization units? Have there been any issues with higher reactor exotherms associated with benzene saturation?

DUNHAM (UOP)

UOP’s general guideline is to limit the lead reactor ?T to 100°F (55°C). This limit is based on our design margins or the heat exchangers around the reactors. That 100-degree limit corresponds to above 5 to 8% benzene in the feed. So, one way to get around that is to recycle or add something to dilute the benzene. Older recycled hydrogen isomerizations will generally have less ?T than the oncethrough units. We know of some customers who had experience running as high as 110 to 115°F (61 to 64°C) in the lead reactor. A revamp option is to add a benzene saturation reactor upstream of the isomerization reactors.

PATEL (Valero Energy Corporation)

Recycling a stabilizer bottom slip steam back to the feed will dilute the feed, and it will react or reduce reactor delta temperature. The other option, as Daryl suggested, is to install a benzene saturation unit upstream of the reactor.