## Question 8: What are your typical run lengths between maintenance turnarounds for gasoline units? What evaluations do you make to ensure that a prolonged turnaround interval is the most profitable choice?

**Jocelyn Daguio** (UOP)

CCR Platforming Unit Customers report 3.2 years on average between turnarounds. And 10 % of the units exceed 5 years. Although, catalyst change-out frequently determined this time previously, the ability to change out “on the-fly” while maintaining operations has removed this constraint.

Applying best practice in turnaround planning can extend future turnaround interval. Close monitoring both process and equipment performance is an enabler for exercising best practice during the turnaround.

For examples, evaluation of the combined feed exchanger, stabilizer column performance, fired heater efficiency, equipment pressure, compressor vibration and catalyst health conditions allow timely operation adjustment to prolong turnaround interval. Catalyst fines monitoring and fines control are essential to avoid unnecessary unscheduled turnaround due to fouling of equipment. For fixed bed reforming units, proper procedure of catalyst dump and screen and corrosion control during catalyst regeneration can reduce turnaround frequency or/and avoid unscheduled unit shutdown and turnaround.

**Michael Crocker and Ka Lok** (UOP)

For Isom units, the typical run length between maintenance turnarounds is approximately between two to five years, depending on naphtha complex flow schemes. Process evaluations include determination of catalyst activity and unit performance. Also included in the evaluation is the identification of any unit constraints during the run, which would include normal monitoring of process equipment. Traditionally, most ISOM units are corrosion-free due to the nature of the design of the unit (i.e., water is a poison to the catalysts), but where high HCl can possibly meet with free water (such as in the case of the Net Gas Scrubber in Penex and Butamer process units), online routine non-destructive testing techniques and monitoring of pipe wall thicknesses, where applicable, should be conducted.

**Kurt Detrick** (UOP)

Typical run lengths for HF Alkylation units have been increasing over the past couple of decades. The HF Alky run is typically tied to the FCC run length and the majority of units are planning for either 4 or 5 year run lengths. Some units plan for 3-year runs, and a very few are trying for 6-year runs.

A prolonged interval is not always the most profitable choice. Things that make longer runs less profitable are:

- Higher probability of unplanned shutdowns. An unplanned shutdown almost always has a higher Lost Profit Opportunity (LPO) than a planned shutdown.

- Piping and Equipment inspection and replacement must be done more aggressively. The general guideline is that the inspection interval should not exceed ½ the estimated remaining life of the piping or equipment. Things that cannot be replaced without a shutdown (such as key valves, exchangers, piping and vessels) must be renewed more frequently (it is a lot easier to get a valve to seal properly for 4 years than 6 years).

- The longer the run length, the less meaningful a 1-year extension of run length becomes (diminishing returns). A 6-week planned shutdown is 5.8% of a 2-year run, 3.8% of a 3-year run, 2.9% of a 4-year run and 2.3% of a 5-year run. So, you don’t gain a lot by extending from a 4-year run to a 5-year run (but you do increase the risk of an unplanned shutdown).

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HF Alkylation (HF Alky)

Operations

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Year

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