

Mega Projects Process Design Challenges – Sadara Systems Review

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Abstract

Delivering a safe process design that works as intended in a timely manner is often a very challenging goal to achieve on mega projects. There are many factors such as cost and schedule constraints that typically drive project execution. Even though such projects are normally staffed with adequate Owners' staff of process and other engineers, they are typically limited in number compared to the contractors' staff; which makes it very challenging for the Owners to ensure high quality of the contractor deliverables during the design and engineering phase.

Sadara is the largest grassroots petrochemical complex being built in a single phase. With twenty six process units (14 units new to KSA), 20 billion dollars of investment, and being the first complex in GCC to crack naphtha along with ethane in the Mixed Feed Cracker unit, Sadara faced many new unique challenges besides the usual ones such as cost and schedule constraints during the design and engineering phase. Many of the design gaps from this phase were uncovered by Sadara much later during the commissioning and startup phase.

This presentation will highlight the high level strategy that Sadara followed during the design and engineering phase to get a high quality engineering design. During Commissioning and startup phase, Sadara did a comprehensive process design review of some 250 systems designed by different EPC companies. A system was defined as the collection of all equipment, instruments and piping for a given raw material, product or utility, starting from the point of origin to the final destination. For example, the 1-butene import system originates at the storage tank in the Jubail Port facilities and is pumped to the Sadara site via the 35 km long offsite pipeline. Most of the systems had sections which were designed by different EPC contractors. The Presentation will discuss in detail the work process used in this review. It will also list the most common design gaps that were uncovered and how they were mitigated to avoid further delays in commissioning and start-up of the Sadara plants.