International
Downstream Conference
& Exhibition
23rd – 25th October 2018
Kingdom of Bahrain

Abstract Title: New Innovative Approach to Increase Isomerization Throughput and Octane Booster

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The once-through conversion of a traditional fixed bed light naphtha isomerization unit is limited by the reaction equilibrium. Overall unit conversion can be achieved by use of a recycle stream of primarily n-paraffins, a typical example of which is the use of a de-isohexanizer (DIH) column to separate the recycle stream as an n- hexane rich middle cut, with the overhead isomerate and bottom product "drag stream" sent to gasoline blending. Even the simple addition of a DIH is capital and energy intensive and the isomerate product quality is limited to around 88 RON. Any incremental feedstock processing demands place stress on the system resulting in lower isomerate octane.

KBR's MAX-ISOM™ technology uses a unique catalytic distillation column design to generate high conversion of n-paraffins to iso-paraffins in a single column. While the technology can operate as a stand-alone isomerization unit in its own right, it also offers a unique revamp opportunity to already constrained recycle isomerization units. MAX-ISOM can be placed downstream from the DIH column of a traditional recycle isomerization unit to process the middle and bottom products. The DIH column becomes a binary split column, thereby reducing energy consumption, and the volume of fresh feed to the existing unit can be increased by up to 40% due to removal of the recycle stream. Furthermore, overall isomerate octane will be boosted due to high conversion achieved in the MAX-ISOM column.

The MAX-ISOM column contains beds of isomerization catalyst separated by fractionation zones. High conversion of n-hexane and methylpentanes is achieved by exploiting the relative volatilities of the reactants and products and through internal recycles. This paper will include a case study to demonstrate the throughput and product quality gains offered by MAX-ISOM in a revamp flow scheme.