Recovery of Delayed Coker Propylene At Turndown

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Outline:

• Satorp
• Delayed Coker Configuration & Basis of Design
• Re-Processing of Off-Spec LPG
• Observed Propylene Loss
• Analysis and Troubleshooting
• Recommendations
• Actions and Results
• Q & A
Re-Processing of Refinery Off-Spec LPG

• Through Merox Unit
• Through DCU (through HP receiver and Debut.)
DCU - Debut
Observed Propylene Lost

1- Occasional Loss of Propylene Recovery
2- Propylene lost when off –Spec LPG is re-processed
3- Evaluation of Main Stripper Operation
Yellow: opening of off spec LPG valve to HP drum
Blue: propylene mole fraction in LPG
Green: propylene Mole fraction in FG
Light Orange: LPG Flow to R/D
Dark Blue: opening of off spec LPG valve to HP drum
Light Blue: Temperature of HP drum vapor
Purple: Temperature of HP drum liquid
Analysis and Troubleshooting

Simulation of the drum at:

Different quality of Off-Spec LPG:
- Low Propylene content
- High propylene content
- Pure propylene

Different flows, 0, 5 and 10 T/H

Different pressure:
- Actual Pressure, 12.5 barg
- H&M balance pressure 13.8 barg
C3= Mole % in 021-D-0019 Products

- Mol% C3= in off Gas
- Mol% C3= in Liquid

Pressure (Barg) vs Mol%
C3= Recovery in 021-D-0019 Products

Recovery %

Pressure (Barg)

C3= Recovery in off gas
C3= Recovery in Liquid
Observed Propylene Lost

1- Occasional Loss of Propylene Recovery
2- Propylene lost when off – Spec LPG is re-processed
3- Evaluation of Main Stripper Operation
Main Stripper Operation

Bottom temperature relatively high

a- Undetectable C2 in Coker LPG (design 0.5 wt% max)

b- H2S in sour LPG is less than 0.1 wt%( design 6 – 7 wt%)
Actions and Results

- Gas plant pressure slightly increased
- Stripper bottom temperature reduced from 158 °C to 154 degC
- High Recovery achieved and propylene produced increased 250 %
Thank you

Q & A