PROJECT REPORT (PR-019)
FUEL OIL VACUUM DISTILLATION UNIT REVAMP

Customer: Major Refinery in Asia

Project: Vacuum Distillation Unit (VDU) Revamp

Date of Revamp: 2008

BACKGROUND

The Vacuum Distillation Unit, or Vacuum Tower, is a key processing tower in refineries. The bottom residue of the atmospheric crude column is heated and fed into the Vacuum Tower for further distillation. In this fuel oil refinery, the side product draws of the Vacuum Tower are heavy diesel and gas oils. The Vacuum Tower is required to have good separation efficiency, low pressure drop and good operating flexibility.

The poor separation efficiency and high pressure drop of the existing trays in the VDU resulted in low recovery, and off-spec products. Therefore, the VDU was revamped with structured packing and optimized internals in 2008.

REVAMP OBJECTIVES

The primary objectives of this revamp of the VDU were to:

1. Decrease overall column pressure drop;
2. Improve separation efficiency; and
3. Increase heavy diesel yield.

COLUMN PERFORMANCE

Before Revamp:
The diameter of the VDU is 6.4 m in the top section, 9.45 m in the middle section and 4.877 m in the bottom stripping section. The existing column was equipped with conventional valve trays in the top section and bubble cap trays in the bottom section. Due to the high pressure drop, the customer had to increase the temperature of the furnace, which thus led to some cracking and coking in the lower column section (above the flash zone). The separation efficiency of the existing conventional valve trays was poor and the yield of heavy oil was low.

After Revamp:
The liquid collector Tray #6 above the main feed and the existing conventional Trays #1-5 in the stripping section were reused after checking the performance. The other (29) trays were revamped with 5 beds AMT's SP-type high performance structured packing. All of the feed and draw-off nozzles, as well as the existing manholes, were reused after the revamp. There was no change to the number and locations of the existing draw-offs and pump-around sections.

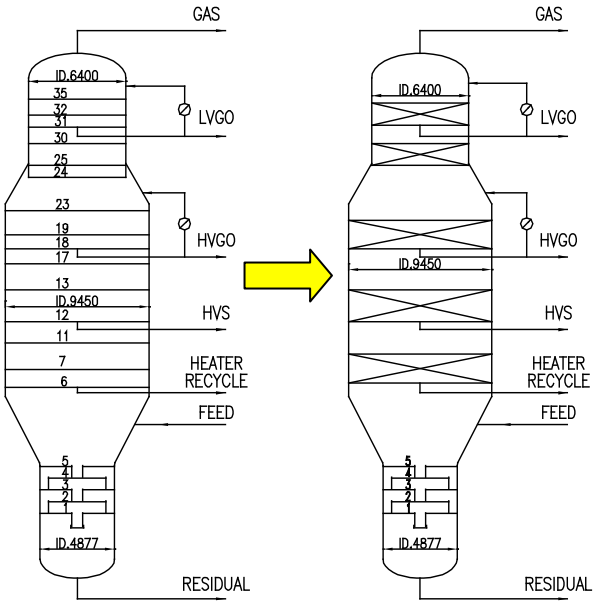
The following is a summary of a performance comparison of the Vacuum Tower before and after revamp:

	Before Revamp	After Revamp
Feed Rate	100%	105%
Total Side Draw/Feed	51.64%	57.10%
Top Temp.	80 ℃	50 ℃
Flash Zone Temp.	397 ℃	372 ℃
Overall Pressure Drop	0.14 bar	0.02 bar

Table 1.Summary of VDU Column Performance

CONCLUSIONS

The revamp of the VDU Column with high performance SP type structured packing and new optimized internals was very successful.



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