



PROJECT REPORT

PR2805/96

HiTRAN[®] Thermal Systems Technology

DEBOTTLENECKS VACUUM DISTILLATION UNIT AT MOHAWK LUBRICANTS

PLANT

Used Oil Re-refinery, North Vancouver, B.C., Canada.

SERVICE

Vacuum distillation reboiler

EXCHANGER

TEMA type BEM, 1 tube pass
338 tubes: 19.05 x 1.65 x 1219
($\frac{3}{4}$ in. x 16 bwg x 4ft.)

PROBLEM

The recovery capacity of valuable 100 neutral lube oil in a new vacuum distillation train was severely restricted by an undersurfaced pumped-recirculation reboiler, prone to coking and solids fouling. Actual performance suggested partial tubeside vapourisation with 'dirty' solids being deposited at tubewall nucleation sites. Regular cleaning was necessary simply to maintain 60% of the required duty.

SOLUTION

System analysis by Cal Gavin showed that a low film coefficient was dominant, and that fluid maldistribution caused by low tubeside velocity was further-limiting heat transfer. As a consequence, a long fluid residence time at high tubewall temperatures led inevitably to thermal degradation (coking).

A custom-performance retrofit using HiTRAN Matrix Elements would give the necessary enhancement to meet the new duty and provide 20% oversurface in the clean condition. Also, tubewall temperature would be reduced, and oil would be evenly distributed through each tube. Nucleation at the wall associated with the increase in duty, would be suppressed by the elements and fouling would be mitigated due to a combination of all these mechanisms.

BENEFIT

The HiTRAN Thermal System proved to be an extremely quick and effective installation, with reported payback within 30 days. Reboiler performance improved as predicted and this has allowed a big increase in the recovery of premium products with the plant now operating at 100% capacity.

INSTALLATION

July 1996



Cal Gavin Limited

Process Intensification Engineering
Telephone: +44 (0)1789 400 401
Facsimile: +44 (0)1789 400 411
Email: email@calgavin.co.uk
Web site: www.calgavin.co.uk