

# PROJECT REPORT

PR2472/96



## HiTRAN<sup>®</sup> Thermal Systems Technology

REDUCES NUMBER OF NEW SHELLS AT WINTERSHALL & IN COMBINATION WITH HELICAL BAFFLES, MITIGATES FOULING BOTH SIDES OF THE EXCHANGER

### PLANT

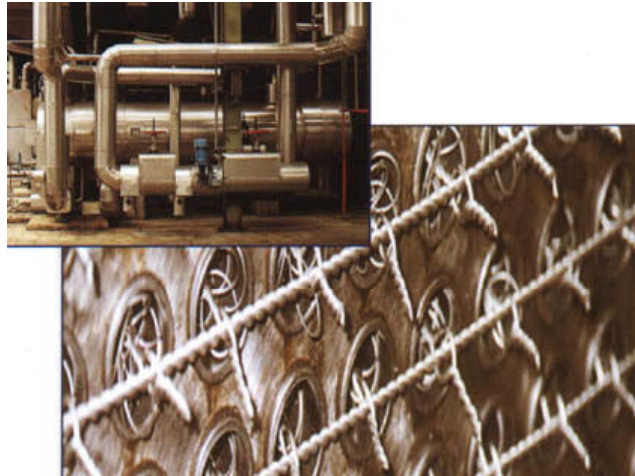
Refinery, Lingen, Germany

### SERVICE

Vacuum residue / crude oil preheat interchanger

### EXCHANGER

Floating head TEMA type AES  
2 tube passes  
638 tubes: 25.0 x 2.0 x 4880



### PROBLEM

Operating experience with these heavily fouling fluids indicated that conventional shell & tube design would result in regular unplanned shutdowns for cleaning. Multiple shells increase the task, and cost.

### SOLUTION

Maximum enhancement and therefore minimum surface area for heat transfer would result with the hot viscous residue stream flowing tubeside. Shellside helical baffles and in-tube HiTRAN<sup>®</sup> Matrix Elements would both mitigate against fouling and would be expected to maintain the design duty for longer, compared to conventional plain-tube/segmental baffle units. The duty was achieved in a single shell having less than half the surface of a conventional shell & tube design.

### BENEFIT

In service, duty is achieved in smaller compact equipment. Despite regular flow interruptions in vacuum residue, proper flushing before re-start allows resumption of performance without problem. As well as clear capital cost savings and lower operating and maintenance costs, substantial indirect benefits accrue from such an approach as typified by this project. These include \* minimum space requirements, less pipework, valves and instrumentation.

### INSTALLATION

July 1996

Details of this project are described by Storey, D.N., & van der Ploeg, H.J., "Compact exchanger to reduce refinery fouling", Pet.Tech.Quarterly, Autumn 1997, p88-89.

\* A comprehensive discussion on benefits which may accrue is given by Gibbard, I.J., & White, N., "Cost savings through heat transfer enhancement", Chem.Proc.Tech.Intl., No.11, Spring 1997.

### Cal Gavin Limited

Station Road  
Alcester  
Warwickshire B49 5ET  
Tel: +44 (0)1789 400 401  
Fax: +44 (0)1789 400 411