



CASE STUDY

INDUSTRY: REFINERIES



CUSTOMER: British Petroleum

LOCATION: Rotterdam, Netherlands

BACKGROUND: BP's petrochemical refinery in Rotterdam had more than 300 repair clamps on the condensate return systems in the FCCU area, resulting in safety and reliability issues as well as high maintenance costs.

SCOPE OF WORK: Armstrong International performed a full analysis of the HP and LP condensate return systems with the objective to prepare the scope for the next turn around. The information about the condensate systems was scattered over many isometrics, P&ID's and pipe rack drawings. A number of drawings were not up to date. The following methodology was used for this study:

- A new "as built" layout drawing combining all condensate systems of the units was created.
- All systems were checked for issues like water hammer, leaks, open bypass valves, incorrect slope, etc.
- All condensate temperatures and backpressures were verified.
- A mass and heat balance was created.
- Condensate and flash loads for all condensate mains were calculated.
- Lines with too high loads were identified.

Based on the analysis, Armstrong indicated and carried out the following:

- Move cooled-down condensate connection from one unit below water level of the receiver
- Remove a left open bypass between a LP condensate system and the HP condensate network
- Install a thermic vent on a HP air locked flashtank (avoid operator intervening level controls)
- Repair condensate coolers after a flash tank
- Split up severe overloaded systems and add a local condensate receiver
- Enlarge several overloaded condensate return lines
- Disconnect a HP steam user from the LP network and discharge condensate to the pumped condensate return using an Armstrong Thermosiphon Mixer (MTS)

BENEFITS: BP's Rotterdam refinery safety and efficiency increased and proved more reliable after Armstrong's condensate return system improvements were complete.

