

'Uthmaniyah Gas Plant Completes Heat Exchanger Tube Repair



An overview of the operation in progress.

New Technique Reduces Downtime, Costs

"One small leak in one small pipe can halt all production at an entire refinery or gas plant," explains Musfir Al-Dossary, 'Uthmaniyah Gas Plant (UGP) inspection engineer. "Even at new facilities, piping can only withstand corrosion and erosion for a limited time," adds Al-Dossary.

Early in 1996, after approximately 15 years in service, repeated leaks occurred in the UGP's Gas Treatment Train #1 in exchanger tubing carrying lean diglycolamine (DGA) coolers in the gas treatment unit. Although some refineries had reported similar problems in their seawater exchangers, none had been reported by other gas plants.

Al-Dossary brought the problem to the at-

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tention of Salamah Al-Anizi, a Consulting Services Department (CSD) heat exchanger engineer. Al-Anizi suggested that he contact a Dubai-based company specializing in heat exchanger repairs.

In the past, the remedy for sea-

water exchanger leaks was to re-tube and install Teflon tube-end inserts. Proprietary tube-end inserts seemed to be the answer to this problem as well.

A vendor was chosen to manufacture and install tube-end inserts fabricated from a hard alloy that will resist erosion/corrosion caused by turbulence as the lean DGA enters the tube. The increased wall thickness added by the inserts doesn't result in any significant increase in velocity or flow loss.

UGP installed inserts in the inlet pass tubes of 120 fin-fan tube bundles in three gas treatment trains. These were installed in 75 percent of the more than 5,000 tubes.

Erosion in the remaining tubes was minimal and did not require repair.

Before installing the inserts, the tubes were flushed with water, power-brushed clean and their ends were trimmed flush with the tube-sheet. The inserts were then driven into the tubes and hydroswaged.

The tubes were next rolled at both ends and flared onto the tube-sheet.

Prior to their return to operation the fin-fan units were hydrotested.

The repair method solved the erosion problem and at the same time was very cost-effective compared with partial re-tubing, according to Al-Dossary.

It took four weeks to install all the inserts compared with an estimated 240 weeks to partially re-tube 120 units. The cost comparison for partial re-tubing of the exchangers versus the actual cost for using inserts was dramatic.

To meet installation requirements without production loss, a 24-hour, seven-day-a-week schedule was followed. It allowed preparatory work (blinding, de-blinding and flushing) to be done at night, and inserts to be installed during the day. Hydrostatic testing was done on both shifts as units became available.

According to Thamir A. Al-Rushayd, UGP manager, project success resulted from dedicated teamwork which capitalized on the appropriate utilization of necessary resources and expertise.

— Dave Kaiser



Tube ends are trimmed flush.