



Magnetec Monthly Chronicle

" From the Field "

Issue No.2
Feb 2005

1 Failed Tube in 10/2004 with a Lost Opportunity of \$150,000 Dollars
The Exchanger is Found in a Major Mid-eastern Refinery.
The bundle was inspected to aid in a post failure investigation and document the primary failure corrosion mechanism.
The exchanger operates as a WFO process Solvent Aftercooler with tube side cooling water and shell side WFO solvent. The tubing consists of 354 U-tubes X .083 min wall X SA-214 X 20 Foot long.

The bundle had been retubed/replaced 4 times in the 24 year life cycle with many failures and unreliable service. The inspection was performed on 25% of the tubing and the failed tube section. The failed tube and actual failure section was removed after the failure location was determined by the RFET inspection. The tubing was detected with I.D. under deposit cooling water corrosion (Concentration cell initiated) due to the heavy lay-out of deposits. The pitting was found as multiple pit locations of heavy concentration along the tube length. The actual failure was found to be seam weld attack and penetration along the seam. Seam welded type tubing is considered poor material for cooling water environments due to the preferential attack to the weld to parent tube material. Based on the age of the bundle at the time of failure (6 years) this type of failure is not uncommon and accelerated corrosion and additional failures would have been expected. Cooling water bundles generally provide 10 years of service before problems are expected.

Operating conditions such as coolant flow, temperature, contaminants in water supply and oxygen content, all contribute to the corrosion rate which can vary the expected life to a high degree.

The bundle was determined to be unsuitable for continued service and was scrapped. The material of the replacement bundle was upgraded to SA-179 (Seamless) and the bundle was put on an accelerated cleaning cycle to aid in removal of cooling water deposit lay-out.



Magnetec Inspection Inc.

Excellence in Eddy Current Inspection Technology & Failure Analysis

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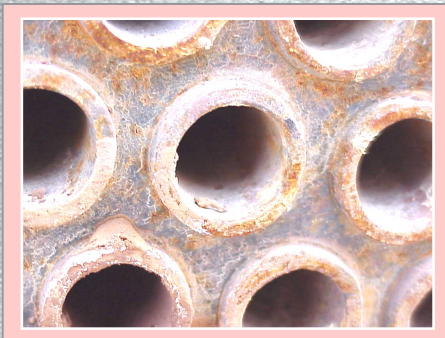
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Tube Section Prior to Sandblasting



Failure
at seam
weld



Same Tube After Sandblasting

Same Tube After Sandblasting



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