Coated tube condition v uncoated

Project Objective:

A refinery client pulled identical cooling water tube bundles in side by side service during a unit maintenance turnaround. Exchangers were installed at the same time more than 9 years ago, one of the bundles was coated down the full-length tube IDs and across the tubesheet faces.

The refinery wanted to assess tube condition of the both exchangers using IRIS inspection. The coated and uncoated bundles were sent to Curran shop for surface prep; a near white substrate was required for IRIS inspection meaning the existing tube coating had to be removed.

Project Description:

The tube bundles were hydro blasted and de-contaminated at the refinery prior to transport to Curran shop. The tubesheet gasket seating areas were protected, and Curran dried tube IDs of water and ensured there were no obstructions down tube.

Once the cleaning dwell time was calibrated and visually verified for tube ID cleanliness, this dwell time was used to clean 100% of the tubes. Exchangers were grit blasted from both ends; to remove tenaciously adhered coating, and to clean deep pits in the uncoated bundle. Tubes were blown down of waste grit and debris and a random number of tubes were inspected. Images of the cleaned tubesheets are at right, and tube IDs are below. The protective coating was completely removed from the previously coated bundle.

Uncoated tubesheet (top) compared to coated tubesheet; comparable operating period in cooling water.

Conclusion:

Images of cooling water service tube IDs after Curran surface prep provide a clear comparison of uncoated (L) versus formerly coated substrate (R). Tubes were visually inspected using a borescope, images show the pitted condition of the uncoated bundle where substrate was exposed to cooling water. Image of uncoated tubesheet is at upper right. Compared to the previously coated bundle, there were little to no visible signs of pitting. Verification of bundle integrity based on refinery IRIS inspection was not made available for this report.