**Mid-South Refinery – 2006 Plant Wide Maintenance Turnaround**
**Dry Abrasive Cleaning of Tube IDs**

**Problem –** In previous maintenance turnarounds, a 195 mb/d refinery had poor results in achieving clean cooling water exchanger tube IDs using typical hydroblasting methods. As a result NDT probes were limited in travel down the full length of the exchanger tubes, and data collected was incomplete. Over a seven year period repeated attempts to inspect exchanger tube IDs did not improve results, baseline data was not available.

**Solution –** The refinery inspection engineers contracted Curran International to perform its unique dry grit blast method on the exchanger tube IDs – about 100 bundles were tagged for NDT inspection during the 2006 plant wide turnaround. The scope was to dry abrasive blast clean 100% of the tube IDs in each bundle for full inspection. The plant required about 10% of the exchangers in the scope to be cleaned in the unit; Curran International supplied containment tents for in-situ blast cleaning, and a blast shed (left) for work performed on the blast pad. Spent grit was contained and disposed in owner provided drums; a 300 CFM vacuum system contained dust. Other maintenance contractors were able to continue work uninterrupted while in-situ bundles were cleaned.

Most bundles tagged for inspection were 16-20 foot straight length "U" tube bundles, carbon steel was the predominate material, brass tubes were in the mix of bundles. With each bundle sample tubes were blasted a specified dwell time, visually inspected, and re-blasted as necessary to achieve the level of cleanliness required for the tube inspection. Dwell times specific to each bundle are used to blast clean the remaining tubes; depending on the bundle and operating conditions, dwell times ranged from 15 seconds to about 1:00 a tube.

**Results -** Curran International provided cleaned bundles to multiple NDT inspection crews ahead of schedule, there were no delays to the inspection scope. As a result of the NDT data pulled from the tube IDs, refinery inspectors identified several bundles with extreme indications of corrosion and pitting, several bundles were tagged for re-tubes during the outage. The high integrity inspection data offered the refinery base line data of the remaining exchangers, and reduced the future opportunity for unexpected outages.