



STATE OF THE ART PRODUCTS AND SERVICES  
FOR NON-DESTRUCTIVE TESTING

# FROM THE FIELD

## **Problem:**

A prominent, high volume paper mill in Virginia was experiencing generating bank tube failures believed to be due to soot blower erosion. This boiler was the plants main steam generator and was critical for the plant to run at capacity. External tube inspections such as spot U.T. were not viable options due to the limited space in between the tubes and the lack of coverage area. Accordingly, the client needed an I.D. tube inspection method. The plant needed a quick and accurate test of approximately 400 tubes. In addition, the plant needed to know the condition of the mud and steam drum bends. Furthermore, it was necessary to perform the inspection from the mud drum to reduce the cost and time of removing Steam Drum internals. An Iris inspection would not meet the requirements due to its inability to inspect bends and its difficulty to perform the inspection from the mud drum.

## **Solution:**

After extensive research the plant engineers decided that the TesTex developed Eagle 2000 Digital Inspection System using the Remote Field Electromagnetic Technique was the most qualified to meet their requirements. The Eagle 2000 System does not require couplant or permanent magnets. In addition, scale/deposits do not affect the signal; in this case, no tube cleaning was required.

The specifications of the carbon steel tubes were 2.5" O.D. with a nominal wall thickness of .150". The plants minimum wall cut-off was 0.080". The inspection took about 10 hours with the Eagle 2000 System and 7 tubes were found with 0.068-0.075" wall remaining. The majority of the flaws found were in the pass of the lowest soot blower as the plant expected. After TesTex gave an on-site preliminary report to the plant, a third party inspection company performed U.T. on all of the accessible areas of the wall loss found with the TesTex Eagle 2000 System. The U.T. inspection confirmed the locations and the depth of the wall loss on select tubes that were reachable by hand. The U.T. also confirmed that no wall loss was present in areas the TesTex Eagle 2000 System found to be nominal thickness. All U.T. values were within 0.003 mils of the TesTex Eagle 2000

System results. The plant decided to plug the 7 tubes showing 0.068-0.075" wall remaining and 4 tubes showing 0.076-0.083" wall remaining. The plant also re-aligned the lower soot blower to prevent future damage. With the confidence that the remaining Generating Bank tubes were in code compliance, the boiler was then placed on-line.

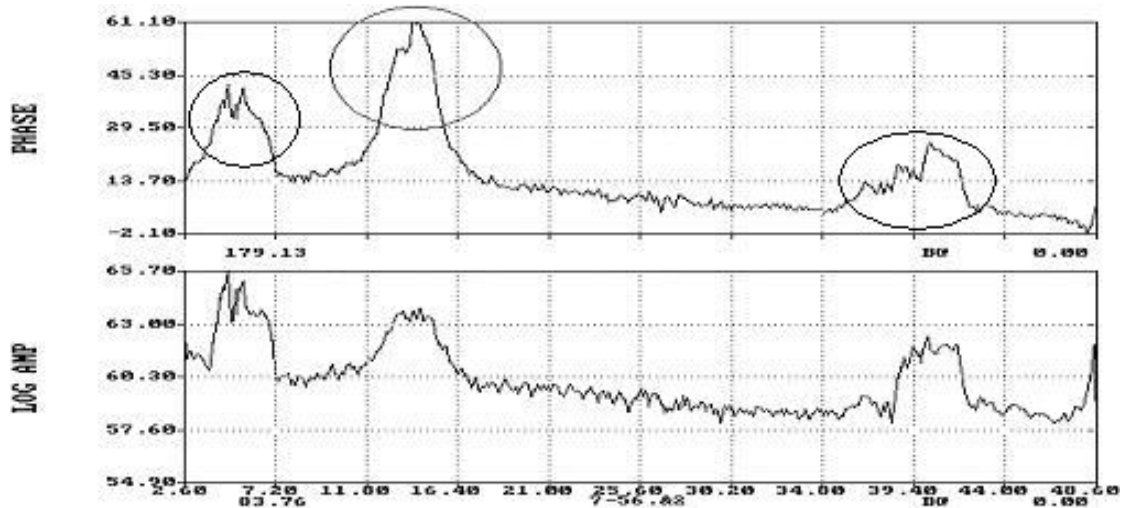


Figure 1: A sample waveform collected from the inspection. The left most and right most circled areas show the Steam Drum and Mud Drum bends, respectively. The center circled area shows 180 degree soot blower thinning with 0.072" wall remaining.

**Conclusion:**

TesTex proved to the paper mill its ability to detect, size, and report indications along the entire length of the tube. Due to the speed, accuracy, and cost effectiveness, the Eagle 2000 System will be invited back to test the plants other boilers. In addition, the paper mills engineers are also interesting in inspected the swage region of the tubes with the TesTex developed [Octavision 2000 System](#) and inspecting D/A tanks with the TesTex [Falcon 2000](#) Mark II Digital Tank System. If you would like to learn more about the [Eagle 2000 System](#) or other quality TesTex products and services, please contact us at [testex-ndt@verizon.net](mailto:testex-ndt@verizon.net) or call at 412-798-8990.