

CASE STUDY – ACOUSTIC PULSE REFLECTOMETRY



Coal Fired Power Plant (Taiwan) Heaters





Job Overview

Arise Global conducted an Acoustic Pulse Reflectometry (APR) non-invasive inspection on three heaters at a power plant in Taiwan consisting of a total of 5628 U tubes. Conventional technologies were utilized for their previous inspections (sampling) for more than a week in a total outage of 15 days. The customer was most interested in identifying precise location of leakages, corrosion (mainly at U bend) to enable calculation of the corrosion rates. The primary reasons for selecting an Acoustic Eye inspection were based on the strengths of the system including:



Video scope Images of Defective Tubes

- ✚ Flaw Morphology: Leakages & Corrosion (especially in U bend) was being initiated on the tube ID
- ✚ Inspection Time: Speed was a major factor due to an extremely short inspection window.

The entire inspection of three heater tubes was completed within 3 days and created a positive notion to proceed for 100% inspection of tubes in a periodical fashion. The verification of our findings using video scope provided higher level of confidence on technology and people working on it.

Summary of Inspection Results

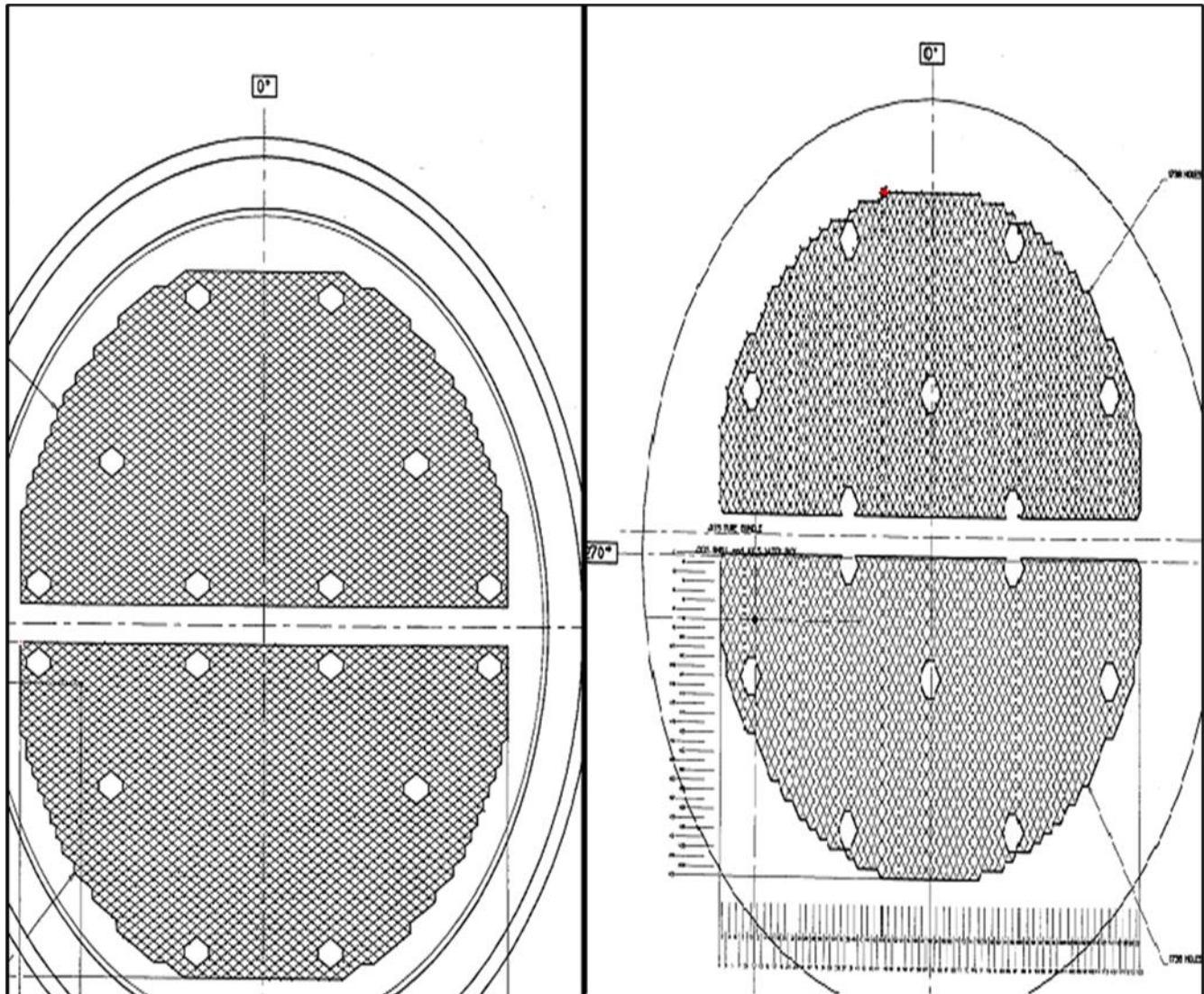
Tube Size	0.6299" (16 mm) outer diameter 0.05511" (1.4mm) wall thickness
Tube Thickness	Carbon Steel
Tube Length	75.45ft (23m)-Average Exposed Length
Tube Shape	U type
# of Tubes	5628 (3 Equipment)
Defects Found	Hole 0.5177"(13.15mm): 1 , Hole 0.047"(1.2mm): 1, Hole 0.034"(0.87mm):1 Blockages 40%-60%: 1, Blockages >60%: 3 Pits 40-60%: 13
Inspection Time	30 hours (1 APRIS system)

Outcome

- All tubes with holes and with pitting >60% were plugged.
- Corrosion rate as well trending information were calculated based on defects reported.



Tube Sheet Diagram



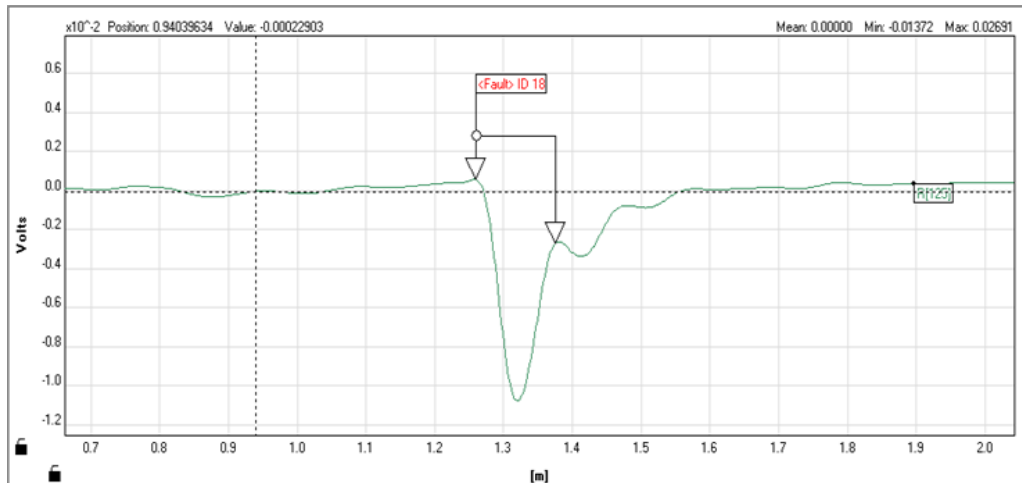
About APRIS's Non-Invasive Inspection

With APRIS's breakthrough capabilities for inspecting today's most challenging tube sizes and configurations up to 4", it is possible to inspect boilers, Fin Fans and other heat exchangers in any shape or material. Ultra-fast, accurate testing can be performed at a fraction of typical inspection cycle times and without extra inventories of consumable probes and standards. Utilizing Acoustic Pulse Reflectometry (APR) technology, APRIS is a very advanced yet easy-to-use tool. With its simple operation, automated analysis and report generation, there are minimal training requirements and far less dependency on operator expertise.

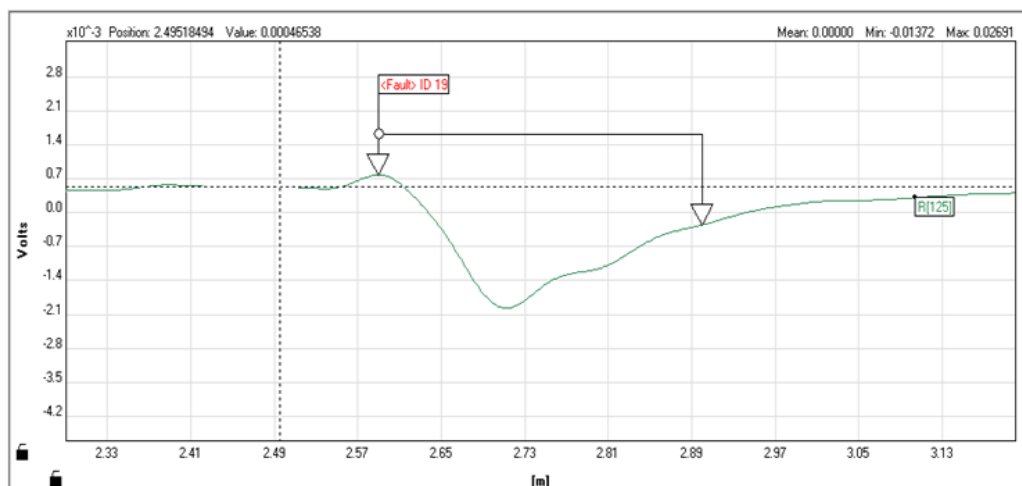


Defect Examples

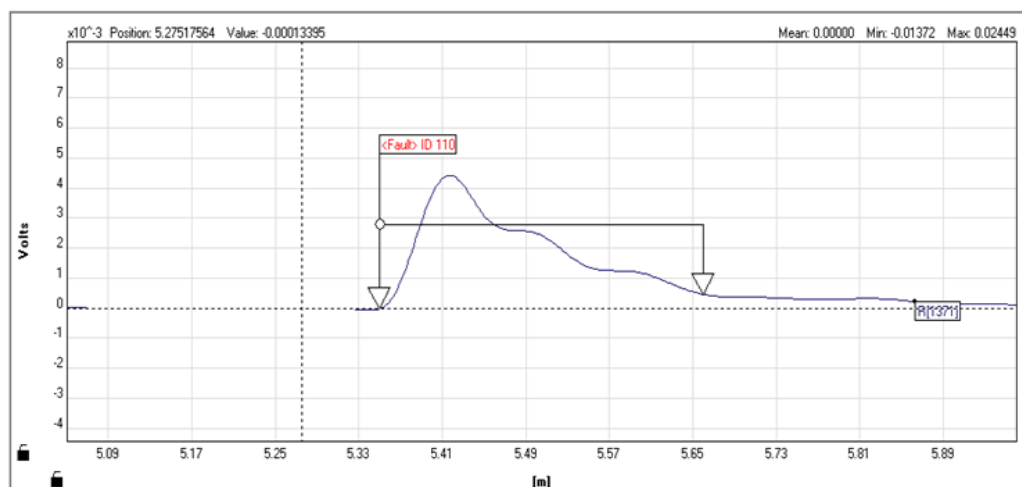
APR Defect Identification



>> Hole 1



>> Hole 2



>> Blockage