



Natural Gas Liquefaction & Fractionation Plant (KSA)

Depropanizer (twisted U-bend) Tube Inspection

OVERVIEW

One of the world's largest natural gas liquefaction and fractionation plants is based in Saudi Arabia that produces 1 billion cubic feet of gas per day.

The depropanizer that needed to be inspected was 15-year-old and its tubes, which were twisted U-type, had previously never been 100% inspected except with hydrotesting.

Conventional technology probes could not be used, so Acoustic Pulse Reflectometry (APR) technology was applied because it works well with any tube configuration. Each tube can be inspected in less than 10 seconds and so 100% of the tubes could be inspected in a short period of time.

The Technology

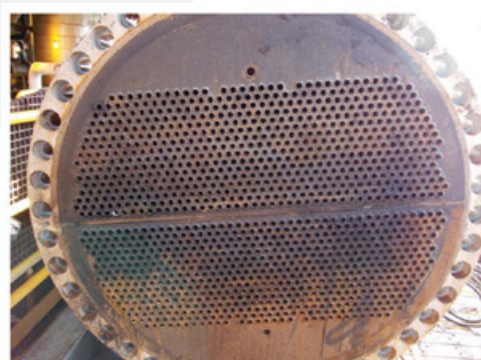
TUBE SHEET DIAGRAM

Using APR technology, a total of 1,500 depropanizer U-type tubes were quickly inspected within 1 day with an additional day taken to generate the tube analysis report.

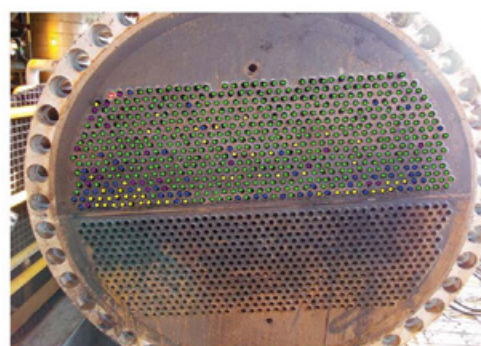
Neither elaborate preparation was needed, nor extensive cleaning required to test the boiler tubes.

With this technology, sound waves were injected into the tubes and their reflections pinpointed the specific type, location and size of inner diameter defects.

ø: 19.05mm T: 2.1082mm L: 11.85m



Before



After

OUTCOME RESULTS

The objective was to inspect 100% of the depropanizer tubes accurately to mitigate the risk of any adverse outcome.

1

Based on APR signal analysis,

- 28 tubes had wall loss between 20% - 40%,
- 6 tubes had wall loss between 40% - 60%; and
- 3 tubes had wall loss > 60%.

Tubes with wall loss between 40% - 60% were placed under critical observation while tubes with wall loss > 60% were plugged.

2

With APR Technology, 100% of the tubes were inspected very quickly and accurately.

A detailed report was generated shortly thereafter that enabled sound, evidence-based decision-making.