Supplementary AUT Qualification Services for Riser Pipe Girthwelds

Automated ultrasonic testing (AUT) is the preferred inspection method to ensure the integrity of girth welds in offshore installations. Before an AUT system may be fielded for inspection, it must undergo system qualification to determine its capability to detect and size critical flaws identified in the pipeline engineering critical analysis. For more than 12 years, Southwest Research Institute® (SwRI®) has served as an independent evaluator of the detection and sizing performance of AUT systems. Under the AUT qualification program, SwRI provides supplementary nondestructive evaluation (NDE), destructive testing (DT), and AUT statistical performance analysis for weld test specimens according to guidelines defined in DNV-RP-F118, DNV-OS-F101 Appendix E, and MIL-HDBK-1823.

SwRI is committed to providing clients with confidential, independent, and unbiased results.

A qualification is performed by examining representative weld specimens that include a population of intentionally seeded defects with AUT, and then comparing the AUT results to findings from supplementary NDE methods and DT. Traditional qualification programs have relied on extensive DT to provide sufficient information about the flaw population to determine AUT detection reliability. More recently, multi-angle immersion ultrasonic testing (IUT) has been employed to provide detailed maps of the entire weld volume, leading to improved characterization of the flaw population, reduced DT necessary to determine flaw dimensions, and improved characterization of AUT detection reliability.

SwRI has developed a service program that is both comprehensive to the supplementary NDE and DT testing requirements and customizable for individual project needs. Key program services include:

- Radiographic testing (RT) – coordinated through certified subcontractors
- Visual (VT) / liquid penetrant (PT) / magnetic particle testing (MT)
- Machine preparation of welds
- Immersion ultrasonic testing (IUT)
- Destructive testing (DT)
- AUT statistical performance analysis

SwRI provides tabular reports for each supplementary NDE and DT service that describe the location, size, and type of detected flaws. The detected flaws are matched against indications reported by AUT using a common coordinate system. The matched report is used to perform a comprehensive statistical analysis of AUT system performance. Performance metrics are tailored to the reporting requirements of the client and may include probability of detection, missed flaw rate, false call rate, length/depth/height sizing variance, and trending of zonal sizing error.
The AUT weld qualification program is conducted under an ISO 9001:2015 Quality Management System. SwRI develops test and analysis procedures that meet the unique requirements of each project and that conform to DNV guidelines. Weld configurations of varying geometries (J-Prep, V-Prep, or custom) and materials (corrosion-resistant alloys, bimetallic welds, forgings, or multi-process welds) can be accommodated. All services are performed at SwRI’s San Antonio campus. Clients are welcome to visit the campus for onsite observation.

Seven stages of weld evaluation:

1. Candidate AUT vendors inspect welds and report findings.
2. SwRI performs RT on welds.
3. SwRI machines welds into uniform rings.
4. SwRI performs VT and either MT or PT.
5. SwRI performs IUT on weld rings.
6. SwRI combines all inspection reports and compares against AUT reports.
7. DT is used to confirm flaw dimensions.
8. SwRI statistically evaluates AUT sizing accuracy and probability of detection.

We welcome your inquiries.
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