

### ***EPRI Re-Examining Ultrasonic Qualification Program in Light of Recent Event***

***A recent failure to identify a weld crack that later leaked has raised questions about the reliability of nondestructive evaluation techniques; EPRI is coordinating a response plan to address these concerns.***

Several nuclear industry events related to the results of nondestructive evaluation (NDE) inspections over the past few years have raised questions about the reliability of NDE techniques. All have boiled down to human errors in implementing qualified procedures. To date, these errors have been conservative, involving “false calls” where subsequent investigation has demonstrated that the initial determination of cracking or other indication of degradation was not accurate.

In early 2012, however, the nuclear power industry experienced a non-conservative error. Immediately after a qualified ultrasonic examination (UT) reported no defects at a U.S. pressurized water reactor plant, two deep axial cracks leaked after about 20% of the weld thickness was machined off, and three additional indications of deep axial cracking were discovered in the same weld. The event raised a number of concerns:

- What is the extent of this condition fleetwide? Could other cracks have been missed? Should some prior inspections be repeated?
- Is the nuclear power industry’s UT qualification program working? If so, what contributed to this “miss”?
- What changes are necessary to improve the effectiveness of implementation?

In the broader context of the previous “false calls,” there are also specific procedural issues that warrant consideration. For example, should manual UT be allowed when encoded UT is possible?

EPRI’s Materials and NDE Programs are leading an effort to review the recent non-conservative event and identify needed actions. The results are expected to encompass a wide scope with respect to improvement opportunities that could impact NDE reliability. EPRI formed an NDE Implementation Focus Group to coordinate the analysis and has developed a response plan comprising about 30 short- and long-term action items in several categories:

- NDE qualification aspects (for example, site-specific mockup practices, simulation of field environment during qualification)
- Implementation of inspections in the field (for example, pre- and post-job briefs)
- Industry oversight of inspections (for example, practice for examinations, monitoring examinations)
- Examiner proficiency – training and maintenance (for example, direct distribution of operating experience to examiners, strengthened periodic training)
- Fleet extent of condition (for example, fleet survey and recommended actions)

New “Needed/Mandatory” requirements under the industry’s materials initiative are a possible outcome of this analysis, delivered primarily in a revision to *Guideline for Conducting Ultrasonic Examinations of Dissimilar Metal Welds* (1018181). Also, the Institute of Nuclear Power

Operations may be requested to review the industry's implementation practices. EPRI has been regularly communicating its activities with the Nuclear Regulatory Commission's Office of Nuclear Regulatory Research, which has expressed satisfaction with industry's response to the NDE concerns.

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