

November 16, 2012

MEMORANDUM TO: Timothy R. Lupold, Chief
Piping and Nondestructive Examination Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Robert O. Hardies, Senior Level Advisor */RA/*
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF CATEGORY 2 PUBLIC MEETING BETWEEN THE
U.S. NUCLEAR REGULATORY COMMISSION AND INDUSTRY
REPRESENTATIVES TO DISCUSS ULTRASONIC INSPECTION OF
DISSIMILAR METAL WELDS

On September 11, 2012, a meeting was held between Nuclear Regulatory Commission (NRC) staff and industry representatives at NRC headquarters in Rockville, MD. The purpose of the meeting was to discuss industry plans and schedule related to improving standards and practices related to ultrasonic examination (UT) of dissimilar metal (DM) welds. The slides presented at the meeting are available at the Agency Documents Acquisition Management System (ADAMS) Accession Number ML12257A159. The meeting agenda and notice are available at ADAMS Accession Number ML12237A091. A list of attendees is enclosed.

NRC staff opened the meeting by presenting a regulatory perspective related to a recent industry example of the failure of a Performance Demonstration Initiative (PDI) qualified UT examination to detect multiple deep cracks in a dissimilar metal weld. The NRC discussed issues related to use of site specific mockups to change essential inspection technique variables without using a blind mockup to demonstrate that the changes would not negatively affect the qualification. The staff noted that additional potential contributing factors included: receipt control of the probes; team scanning; a limited and potentially insufficient number of flaws in the site specific mockup; possible flaw installation artifacts; use of non-encoded techniques, and a lack of modeling. The staff expressed a need to understand the scope of dissimilar metal welds in industry that may have been examined using UT procedures, personnel and equipment that have been qualified using site specific mockups.

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In response to the recent instance of a PDI qualified UT procedure failing to detect significant cracks during a field inspection of a dissimilar metal weld, the industry formed a focus group called the Nondestructive Examination (NDE) Improvement Focus Group (NIFG). This group, which includes representatives from utilities, the Electric Power Research Institute (EPRI), the Performance Demonstration Initiative, the EPRI Materials Reliability Program (MRP) the EPRI Boiling Water Reactor Vessels Internals Program (BWRVIP) and the EPRI NDE Center, was tasked to review and propose industry actions to improve the implementation of NDE. After the presentation by the staff, the utility lead of the NIFG discussed the background, development and status of the NIFG activities. Next, the NIFG described their information gathering effort to understand which licensees used site specific mockups on any Class 1 dissimilar metal welds. They intend to use the information gathered by their survey to assist in developing a risk ranking process, and then use the risk ranking process to determine which welds may need to be expeditiously re-examined. They noted that the survey was not yet complete and that some of the gathered data requires re-verification.

NIFG followed with a discussion of the use of encoded versus non-encoded examinations. Encoded exams yield electronic records of the examination results that can be reviewed off line by other examiners or interested parties. The NIFG is developing a graded approach that would provide utilities a decision-making tool to apply when deciding whether or not to perform encoded examinations. The staff noted that encoded examinations always yielded results that were superior to non-encoded exams with respect to the ability to interpret results and review the examination performance at a later date. The industry noted that it is not always physically possible to perform encoded exams due to access considerations.

The next NIFG presentation addressed improvements to the site specific mockup process. The use of site specific mockups facilitates examination of field configurations that differ from the mockups available in the PDI sample inventory. NIFG proposed enhancements to the site specific mockup process related to mockup flaws, the technical justification document, demonstration requirements, implementation, and acceptance criteria.

The NRC indicated that UT examination procedures and personnel are required to be qualified in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Appendix VIII, with additional conditions provided by Title 10 of the Code of Federal Regulations, Part 50.55(a), which requires blind mockups for qualification of procedures, equipment and personnel. The staff commented that the site specific demonstration process must not be used to circumvent applicable requirements. In particular, the minimum required flaw set, the definition of essential variables and applicable tolerances for changing essential variables, and the use of open testing were subjects of interest. The NRC Staff expects to review the new site-specific mockup process and, if it permits deviation from Appendix VIII requirements, the NRC will need to approve its use at sites that would employ it to change essential variables outside of their tolerance limits. The NRC staff expects to continue interactions with NIFG and the ASME Code to develop a common understanding of the comprehensive and appropriate list of essential variables and to identify the applicable tolerances.

NIFG reviewed the evaluation work being performed on the transducers and mockups that were used in the recent field UT examination that failed to detect significant through wall cracks. The work is being performed cooperatively with the NRC Office of Research.

The next few presentations focused on enhancements to prerequisites for personnel qualifications, utility oversight of contractors, preexamination hands-on practice and scanning time expectation, team scanning, and improving datasheets from manual, non-encoded exams. These presentations describe methods of improving examination quality and reliability. The new guidelines will be issued to the industry using the NEI-03-08 process which imposes three levels of implementation requirement: good practice; needed; and mandatory. The staff expects to review the implementation of the new guidelines to ensure the NEI-03-08 designation level is commensurate with the safety significance of the guideline being implemented. The NRC asked whether the industry planned to subject team scanning to blind testing in order to generate objective evidence regarding its effect on inspector performance. The industry discussed the longer-term plan for team scanning which will include actual blind testing in a PDI setting to determine the effectiveness of the process. NIFG also provided a presentation of their team scanning guideline document which discourages use of team scanning, recommends its use be approved by a NDE Level III, and requires team demonstration prior to use. The staff expressed concern that team scanning is not a PDI qualified process and should not be used without appropriate performance demonstration.

Both NRC staff and NIFG representatives expressed interest in providing the NRC staff an opportunity to review and provide informal comment on the draft guidance before the industry completes its review and approval process. The staff agreed to provide a list of the documents that are most important. The industry will engage their management to try to determine where in their approval process they could request staff preliminary review.

The staff expressed interest in the NIFG proposal for an industry NEI 03-08 "mandatory" or "needed" item that would require utilities to reinspect welds that had been inspected using site specific mockups and non-encoded exams. The staff commented that the risk ranking approach may not adequately discriminate between welds that have very different levels of susceptibility (e.g. hot leg versus cold leg temperature, where hot leg welds would be expected to experience degradation much more quickly than cold leg welds). The NIFG indicated that their approach was intended to be conservative.

All parties agreed that additional meetings will be required to facilitate staff understanding of industry progress in improving the performance of NDE. The next meeting is scheduled for fourth week in November.

Enclosures:

1. List of Attendees

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| NAME | RHardies | |
| DATE | 11/16/12 | |

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List of Attendees

| | |
|-------------------|--------------|
| Tony Oliveri | PSG |
| Kevin Hacker | Dominion |
| David Anthony | Exelon |
| Harry Smith | Exelon |
| Charles Wirtz | First Energy |
| Tim Lupold | NRC |
| Greg Selby | EPRI |
| Mark Hunting | XCEL |
| Robin Dyle | EPRI |
| John Hayden | SIA |
| Michael Anderson | PNNL |
| Carol Nove | NRC |
| Hector Rodriguez | NRC |
| Kenjiro Aono | JNES |
| John Tsao | NRC |
| Ali Rezai | NRC |
| Iouri Prokofiev | NRC |
| Jay Collins | NRC |
| Stephen Cumblidge | NRC |
| Bob Hardies | NRC |
| Dave Alley | NRC |
| Wally Norris | NRC |
| Al Csontos | NRC |

ENCLOSURE