

January 13, 2009

MEMORANDUM TO: Robert O. Hardies, Chief
Component Integrity Branch
Division of Engineering
Office of Nuclear Regulatory Research

FROM: Wallace E. Norris, Senior Materials Engineer **/RA R. Hardies for/**
Component Integrity Branch
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Office of Nuclear Regulatory Research

SUBJECT: SUMMARY OF MEETING BETWEEN ELECTRIC POWER
RESEARCH INSTITUTE AND NUCLEAR REGULATORY
COMMISSION – PROBABILITY OF DETECTION CURVES FOR
ULTRASONIC EXAMINATIONS

The Office of Nuclear Regulatory Research (RES), Division of Engineering (DE), Component Integrity Branch (CIB), hosted a Category 2 public meeting on January 7 and 8, 2009, to discuss with the Electric Power Research Institute (EPRI) the status of ongoing research activities planned to develop probability of detection curves for certain ultrasonic examination techniques currently used for inspections. The meeting attendance is provided in Enclosure 1.

The NRC hosted an international meeting in January 2008 to discuss the probability of fluid system piping rupture. The meeting was held to evaluate the current state of knowledge, potential knowledge gaps, areas of conservatism/non-conservatism, and to discuss the quantification of relevant uncertainties. This information is needed to develop Probabilistic Fracture Mechanics (PFM) analytical tools to quantify the effects of Primary Water Stress Corrosion Cracking (PWSCC) and other potentially active degradation mechanisms. As an outgrowth of the January 2008 meeting, RES initiated a program to develop a modular PFM code capable of estimating extremely low probabilities of rupture in piping systems. One of the inputs to the PFM code is information related to the reliability of the Non-Destructive Examination (NDE) techniques applied to piping welds.

Appendix VIII, *Performance Demonstrations for Ultrasonic Examination Systems*, Section XI, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, was developed to qualify NDE procedures and personnel. While an extensive database of qualification measurements has been accumulated by EPRI in administering the Appendix VIII program, the program was not intended to infer Probability of Detection (POD). However, in support of the RES program to develop a PFM code for piping, EPRI agreed to interrogate the database to provide information about NDE reliability.

EPRI is currently conducting quality checks of the data. Data queries have been performed to extract data that may be relevant to the re-evaluation project. The meeting provided a forum to exchange ideas relative to POD modeling considerations, the selection of data for modeling POD, and approaches for binning data. A teleconference will be held in the near future to

R. Hardies

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further discuss these issues. The goal will be to reach agreement on POD evaluation methodology.

The ultimate goal of the project is to develop a more robust, fully probabilistic approach to GDC-4. The probabilistic fracture mechanics evaluation methodology and software tools will take several years to develop.

EPRI's presentation slides are provided in Enclosure 2. NRC staff did not make a formal presentation. The meeting was noticed as a Category 2 public meeting. However, no members of the public, other than industry representatives, were present. No meeting feedback forms have been received.

If you have any questions or comments, please contact Wallace Norris at 301-251-7650.

Enclosures: As stated

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