November 8, 2010

Mr. Richard J. Fuller, Chair
Performance Demonstration Initiative
Perry Nuclear Power Plant
10 Center Road
Mail Stop: PYA250
Perry, OH 44081

Dear Mr. Fuller:

At the June 17 & 18, 2010, meeting with Performance Demonstrative Initiative (PDI) staff and industry representatives, the U.S. Nuclear Regulatory Commission (NRC) discussed items of mutual interest associated with the effectiveness of the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section XI, Appendix VIII performance demonstrations for ultrasonic testing as administered by the PDI program. The performance demonstrations consist of representative mockups containing statically significant numbers of representative cracks. As stated in the NRC staff's meeting summary dated July 30, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML102110431) an item of mutual interest was the screening criterion used to determine procedure and personnel qualifications for piping examination performed from the inside surface. The screening criterion is expressed as the root mean square error (RMSE) associated with depth sizing cracks in large diameter, thick wall, dissimilar metal weld (DMW), test mockups. The screening criterion sets a uniform industry standard for identifying effective procedures and personnel who are skilled in using these procedures. The screening criterion also minimize the acceptance of ineffective procedures and lesser skilled personnel.

The depth sizing screening criterion is the same for all pipe performance demonstrations. To date, no procedures or personnel have met the screening criterion for depth sizing qualifications from the inside surface of DMWs and adjacent welds (when present) using PDI performance demonstration mockups. As implemented, the PDI administered performance demonstration test is ineffective in screening ultrasonic testing procedures and personnel for depth sizing performed from the inside pipe surface.

At the June meeting, PDI and the NRC provided suggestions for addressing the RMSE screening criterion issue. As suggested, NRC is interested in querying the DMW pipe performance demonstration database to assess the RMSE depth sizing population distribution for individual cracks. The interest is for demonstrations performed from the inside surface and to correlate the individual results with the specific test specimen surface condition. The intent of the queries and correlations is to assess the initial assumptions for the Appendix VIII depth sizing screening criteria, to assess the statistical accuracy of sizing cracks at different through-wall depths; to assess the effects on statistical accuracy of sizing cracks for different pipe wall thicknesses, to assess the effects on statistical accuracy of sizing for surface configurations and waviness (gap between transducer and surface and limitations), and to assess the effects of transducer selection and size.

The NRC assessment is to confirm the depth sizing issues presented by the industry at the June 2010 meeting. The issues were stated as: surface waviness, transducer size, and pipe wall thickness. Specifically, the assessment is intended to identify the effects on depth sizing from configurations (potential limitation to a procedure scope), identify sizing biases on crack depth (% of through-wall depth), identify sizing biases associated with pipe wall thickness (mean path length from transducer to crack tip), determine if a test set can be assembled from the existing mockups using cracks examined from a smooth surface (1/32-inch gap between transducer and pipe), and identify gaps in crack placement for a smooth surface test set (crack depth, location, and pipe wall thickness). The assessment is expected to provide solutions for depth sizing on rough surfaces at existing facilities, to address RMSE requirements for new plants, and to have a functioning performance-based screening criterion.

The NRC staff understands the sensitivity associated with PDI's database information and will take the appropriate precautions as recommended by PDI. The NRC staff requests that PDI provide a timely response to this request (before the spring NRC/PDI meeting). Should you have any questions regarding this request, please contact Don Naujock of my staff at 301-415-2767.

Sincerely,

/RA/

Timothy R. Lupold, Chief
Piping & NDE Branch
Division of Component Integrity
Office of Nuclear Reactor Regulation

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