

RP Materials Reliability Program _____ MRP 2021-015
(via email)

Date: September 2021

To: Matthew Homiack, Materials Engineer, U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research, Division of Engineering, Reactor Engineering Branch

From: Craig Harrington, EPRI, MRP Project Manager

Subject: Transmittal of Applicability Assessment Guidance for Probability of Detection Curves

Reference: NRC-EPRI Cooperative Nuclear Safety Research Memorandum of Understanding Addendum titled “*xLPR Version 2 Code Documentation and Leak-Before-Break Applications*,” NRC Agencywide Documents Accession and Management System Number ML17040A146

Project 2.c, “Generalization Study,” of the referenced Addendum describes cooperative NRC and EPRI efforts to investigate probabilistic leak-before-break methodologies for demonstrating compliance with the requirements of Criterion 4, “Environmental and Dynamic Effects Design Bases,” of Appendix A, “General Design Criteria for Nuclear Power Plants,” to Title 10 of the *Code of Federal Regulations*, Part 50, “Domestic Licensing of Production and Utilization Facilities.” The attached document titled, “*Applicability Assessment Guidance for Probability of Detection Curves*,” supports the data collection activities for this project. This transmittal is intended to facilitate reference of the document in publicly available NRC and EPRI reports that document the resulting generalization study analyses.

EPRI Technical Report 3002010988, “Materials Reliability Program: Development of Probability of Detection Curves for Ultrasonic Examination of Dissimilar Metal Welds (MRP-262, Revision 3): Typical PWR Leak-Before-Break Line Locations,” issued May 17, 2017, provides relevant probability of detection (POD) model input parameters for use in analyses executed using the Extremely Low Probability of Rupture (xLPR) probabilistic fracture mechanics code. These POD curves were derived from EPRI Performance Demonstration Initiative (PDI) inspection qualification data, but they only address a limited set of generic dissimilar metal weld configurations.

The attached assessment was developed in consultation with EPRI PDI staff with extensive knowledge and experience in ultrasonic examinations and the PDI qualification program to provide guidance on the potential applicability of the existing POD curves in MRP-262, Revision 3, for xLPR code analyses. It was provided to the NRC and EPRI project teams as a working document in February 2021 for use in defining suitable inputs for the range of analysis

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cases within the scope of the Generalization Study project. As noted in the document, the results of the assessment should not be considered as the definitive POD curves for the stated dissimilar metal weld configurations. Use of the recommendations in the document should be considered as an input assumption and be documented accordingly as a contributor to the cumulative output uncertainty.

If you should have any questions concerning this letter, please contact Craig Harrington, EPRI MRP Project Manager, at (charrington@epri.com).

Sincerely,

Craig Harrington
MRP Project Manager
Electric Power Research Institute

Cc: