



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

June 21, 2022

MEMORANDUM TO: Brian Smith, Director  
Division of New and Renewed Licenses  
Office of Nuclear Reactor Regulation

FROM: Louise Lund, Director  
Division of Engineering  
Office of Nuclear Regulatory Research

SUBJECT: IMPENDING PUBLICATION OF TECHNICAL LETTER  
REPORT ENTITLED "GUIDANCE FOR PERFORMING  
PROBABILITY OF DETECTION ANALYSIS FOR NUCLEAR  
POWER COMPONENT INSPECTIONS" (PNNL-32908) (UNR  
NRR- 2020-002)

*John B. McKirgan* McKirgan, John signing on behalf  
of Lund, Louise  
on 06/21/22

The Office of Nuclear Regulatory Research (RES) has completed a Technical Letter Report (TLR) entitled "Guidance for Performing Probability of Detection Analysis for Nuclear Power Component Inspections," (ADAMS Accession ML22166A038) under contract with Pacific Northwest National Laboratory (PNNL). This TLR documents work performed under User Need Request (UNR) NRR-2020-002, "Update of the User Need Request for Evaluating the Reliability of Nondestructive Examinations of Vessels and Piping." This UNR focused on assessing the reliability and effectiveness of nondestructive examination methods used in nuclear power plants. Task 9 on International Collaboration enabled RES to leverage resources by collaborating with international regulators and inspection bodies on technical areas covered by the technical tasks in the UNR.

This TLR provides technical guidance for probability of detection (POD) analysis for nuclear power plant (NPP) components and documents the results of an international virtual round robin study utilizing data generated by the virtual flaw method. The TLR was prepared as part of an ongoing international research collaboration for topics related to nondestructive examination (NDE) in commercial NPPs called the Program for Investigation of NDE by International Collaboration (PIONIC). Organizations from the U.S., Finland, Japan, Sweden, South Korea, and Switzerland, participated in this effort.

The primary objectives of the effort were to assess capabilities and limitations of POD models for use in probabilistic fracture mechanics codes such as xLPR and to summarize guidance and recommendations for conducting POD analyses. A general conclusion of this effort is that estimating POD for NPP components is complex and that there is not a "one-size-fits-all" approach. The best approach will depend on the characteristics of the available datasets and the intended application for the POD data.

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Staff representatives from the Division of New and Renewed Licenses in the Office of Nuclear Reactor Regulation (NRR) reviewed a draft of this TLR and stated, "The NRR staff agrees with the conclusions of the report and the key findings. The TLR is of high quality and is a good report on the research. The TLR contains sufficient detail and rigor to be used as a reference in evaluating probabilistic calculations and in xLPR."

RES has established an online quality survey to collect feedback from user offices on the usefulness of RES products and services. This survey can be found online at the hyperlink: [RES Quality Survey](#). I would appreciate the responsible manager or supervisor completing this short survey within the next 10 working days to present your office's views of the delivered RES product.

Enclosure:  
Technical letter report (TLR) entitled "guidance for Performing Probability of Detection Analysis for Nuclear Power Component Inspections"

TLR PNNL-32908 DATE June 21, 2022

DISTRIBUTION:

- MMitchell, NRR/DNRL/NPHP
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**ADAMS Accession No.: ML22166A037; ML22166A039**

OFFICE	RES/DE/CIB	RES/DE/CMB	RES/DE	
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DATE	Jun 17, 2022	Jun 21, 2022	Jun 21, 2022	

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