EPRI ELECTRIC POWER RESEARCH INSTITUTE

U.S.NRC United States Nuclear Regulatory Commission *Protecting People and the Environment*

PUBLIC RELEASE ANNOUNCEMENT

PROBABILISTIC FRACTURE MECHANICS CODE

xLPR

Version 2.1

Now Available at EPRI.com

OVERVIEW

xLPR: **Ex**tremely **L**ow **P**robability of **R**upture. A state-of-the-art probabilistic fracture mechanics code for piping applications. The code models failure probabilities associated with nuclear power plant piping system components subject to active degradation mechanisms. Its core capabilities include modeling fatigue, stress- corrosion cracking, inservice inspection, chemical and mechanical mitigation, leakage rates, and seismic effects.

TARGET AUDIENCE

Engineers and scientists engaged in the application of probabilistic analytical methods to the study of nuclear power plant piping system structural integrity.

BENEFITS TO PUBLIC

The code provides regulators, industry, researchers, and the public with new quantitative capabilities to analyze the risks associated with nuclear power plant piping systems subject to active degradation mechanisms.

REQUEST PROCESS

- The U.S. Nuclear Regulatory Commission (NRC)'s Office of Nuclear Regulatory Research and the Electric Power Research Institute (EPRI) have collaborated to make the code available for request through EPRI's website.
- There are no fees, but prospective users must satisfy certain citizenship requirements and sign an End User License Agreement.
- Prospective users may initiate the request process from https://www.epri.com. Search for and navigate to Product ID 3002019356.
- A copy of the code and supporting materials will be made available for download after a request is approved.

TECHNICAL SUMMARY

xLPR Version 2 is a state-of-the-art probabilistic fracture mechanics code for piping applications. The code was jointly developed by the NRC's Office of Nuclear Regulatory Research and EPRI. Code development was a multi-year effort that built on the results of a successful pilot study. The code was designed, built, and tested under a rigorous software quality assurance program and provides regulators,

industry, researchers, and the public with new quantitative capabilities to analyze the risks associated with nuclear power plant piping systems subject to active degradation mechanisms. Core capabilities of the code include modeling fatigue, stress corrosion cracking, inservice inspection, chemical and mechanical mitigation, leak rates, and seismic effects.

xLPR Version 2.1 is the first public release and includes updated leak rate calculations through incorporation of thermophysical properties of water calculation routines supplied by the National Institute of Standards and Technology. In addition, it features a new color scheme and visual design and has been tested under the xLPR software quality assurance program to confirm support on platforms running Microsoft Windows 10 and Excel 365 32-bit.

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3002019570 June 2020

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