

December 11, 2011

MEMORANDUM TO: Michael J. Case, Director  
Division of Engineering  
Office of Nuclear Regulatory Research

FROM: Patrick L. Hiland, Director     **/RA/ M.Cheok for**  
Division of Engineering  
Office of Nuclear Reactor Regulation

SUBJECT: REVIEW OF DRAFT XLPR VERSION 1.0 REPORT, TECHNICAL  
BASIS AND PILOT STUDY PROBLEM RESULTS

In August, 2010, the Office of Nuclear Reactor Regulation (NRR) issued a User Need Request (UNR 2010-18) for the Office of Nuclear Regulatory Research (RES) to develop a probabilistic fracture mechanics approach for evaluating the structural consequences of primary water stress corrosion cracking (PWSCC) of nickel-based alloys in pressurized water reactors. NRR intends to use the research results to establish review criteria for future Leak-Before-Break (LBB) applications and license amendments involving Alloy 82/182/600 and Alloy 690/52/152 materials and to support any regulatory actions taken in connection with PWSCC or mitigation of PWSCC involving these materials.

In UNR 2010-18 NRR requested that RES develop the xLPR probabilistic fracture mechanics computer code. Development of this sophisticated probabilistic software tool that meets necessary technical requirements and incorporates relevant quality assurance needs is a technically and programmatically challenging task. Developing the project management structure, defining the probabilistic framework, modeling complex physical phenomena, and data collection and handling are just a few of the issues that must be addressed very early in the software development effort. Given this inherent complexity, NRR requested, as Subtask 1.2 of UNR 2011-18, that a pilot study be completed. The pilot study had limited goals of (1) demonstrating the feasibility of the concept, (2) informing key computational platform decisions, and (3) exercising the process approach proposed for developing a computational tool to evaluate the probability of degradation in piping systems leading to rupture.

RES in cooperation with the Electric Power Research Institute (EPRI), through a memorandum of understanding, has developed a draft final report describing the results of a pilot study effort in the development of a modular probabilistic fracture mechanics code. This draft report provides a high level summary of the entire effort that comprises the xLPR Pilot Study conducted from spring 2009 through fall 2010 and addresses project outcomes and recommendations for each of these three major Pilot Study goals.

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The Division of Engineering of NRR has completed a review of the RES draft pilot study report. The draft document is well prepared and meets our needs. We have no comments and would like to express our appreciation for developing such a high quality product, within the originally establish schedule goals. We understand that this report will be published both as an EPRI MRP document and a NUREG.

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**ADAMS Accession No.: ML11340A013**

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