



### Modeling and Simulation Group

## Structural Integrity Assessments Modular - Extremely Low Probability of Rupture – SIAM-xLPR

### Computational Structural Fracture Mechanics Team

The ORNL Modeling and Simulation Group (MSG) develops sophisticated numerical solutions for a wide range of scientific, engineering, and operational applications. MSG's core competency is computational physics and engineering, and within our Computational Structural Fracture Mechanics Team we have been developing a new computer code for research in the field of computational fracture mechanics. Funded by the U.S. Nuclear Regulatory Commission's (NRC) Office of Nuclear Regulatory Research, the *Structural Integrity Assessments Modular – Extremely Low Probability of Rupture* (SIAM-xLPR) software tool supports the NRC's initiative for developing a new piping system assessment methodology.

#### Main Characteristics

The new piping system methodology provides a tool for demonstrating compliance with the regulatory requirement that primary power plants coolant piping systems exhibit an extremely low probability of rupture (xLPR) 10 CFR 50 Appendix A GDC-4.

SIAM-xLPR is a modular-based assessment tool that incorporates a framework assembled from new and existing fracture mechanics models and software. xLPR tool represents one of the four subsystems currently installed in the ORNL-developed SIAM Problem-Solving Environment. The SIAM-xLPR framework models and software modules are linked within a probabilistic framework fully developed using open-source languages and software libraries.

SIAM-xLPR enables contributions by multiple organizations within modular software architecture. MSG is uniquely positioned to address this challenge in that it provides a confluence of theoretical modeling and high performance computing capabilities. We welcome the opportunity to discuss your potential applications and ways SIAM-xLPR can contribute to a solution.

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SIAM-xLPR

