



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Light Water Reactor Sustainability

Rebecca Smith-Kevern, Director

Office of Light Water Reactor Technologies
Office of Nuclear Energy
U.S. Department of Energy

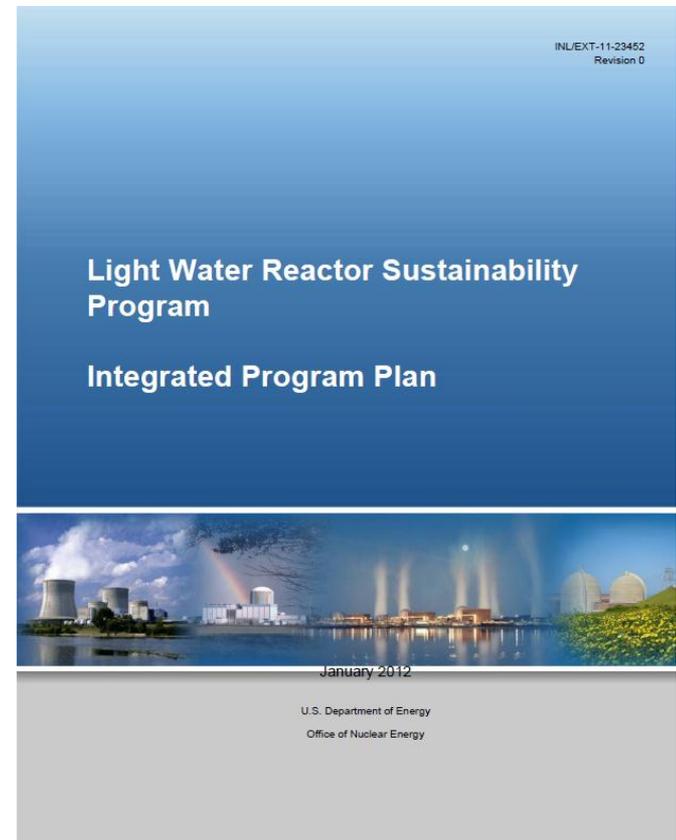
April 22, 2013



Objectives and Strategic Linkages

■ Program Goals

- Develop the fundamental scientific basis to understand, predict, and measure changes in materials and systems, structures, and components (SSCs) as they age in environments associated with continued long-term operations of the existing reactors
 - Apply this fundamental knowledge to develop and demonstrate methods and technologies that support safe and economical long-term operation of existing reactors
 - Research new technologies to address enhanced plant performance, economics, and safety.
- Directly supports Objective 1 of the NE R&D Roadmap by investing in R&D to develop technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors



Technical Focus Areas

■ Nuclear Materials Aging and Degradation

- Develop scientific basis for understanding and predicting long-term environmental degradation behavior of materials in nuclear power plants
- Provide data and methods to assess performance of systems, structures, and components essential to safe and sustained nuclear power plant operation, providing key input to both regulators and industry

■ Advanced Instrumentation, Information, and Control System Technologies

- Develop, demonstrate, and deploy new digital technologies for instrumentation and control architectures and provide monitoring capabilities to ensure the continued safe, reliable, and economic operation of the nation's operating nuclear power plants



Nuclear Energy

■ Risk-Informed Safety Margin Characterization

- Develop and demonstrate a risk-assessment method that is tied to quantification of safety margins
- Develop advanced safety assessment tools that can enable a more accurate representation of a particular plant safety margin

■ Advanced Nuclear Fuels

- Develop high-performance, higher burn-up fuels with improved safety and economics

■ Systems Analysis and Emerging Issues

- Address high impact emerging issues such as potential backfit of cooling towers
- Review research needs in response to Fukushima lessons learned



Coordination with NRC

- **MOU with the Office of Nuclear Regulatory Research**
 - Expanded Materials Degradation Assessment (EMDA)
 - Battery Testing
 - Fukushima Daiichi Accident Study
- **Participate in Public Meetings discussing Subsequent License Renewal (SLR) and related research**
 - Joint workshops in 2008 and 2011
 - Jointly hosted the IAEA's Third International Conference on Nuclear Power Plant Life Management in Salt Lake City, May 14-18, 2012
 - Quarterly coordination meetings with NRC/DOE/EPRI/NEI
- **Material samples from shutdown plants**
 - Zorita
 - Zion
 - Kewaunee/Crystal River