

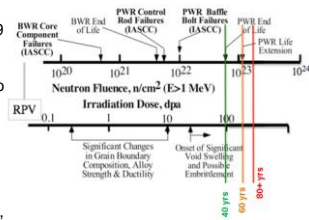


EPR Long-Term Operations R&D Program

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Regulatory Information Conference
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EPR LTO Program Goals and Objectives

- Technical basis for safe, reliable plant operation through extended lifetime
- Useful results in 2014 to 2019 timeframe
- Demonstrated technologies to support long-term plant management
- Research projects integrated with other EPR programs
- External collaboration - DOE, NRC Research, EDF, MAI, NEI, Owners Groups and IAEA



R&D Focus Areas

- Potentially Life Limiting
 - Primary system metals, welds and piping
 - Reactor pressure vessel
 - Electrical cables
 - Concrete and containment structures
- Opportunities for Modernization
 - Advanced I&C
 - On-line monitoring
 - Advanced risks and PRA
- Enabling technologies
 - Pilot plant projects and demonstrations
 - ILCM
 - Aging Management Programs



Concrete and Containment Structure Aging Management

- Projects to support LTO:
 - Pilot plant augmented containment inspections
 - Long-term effects of irradiation and potential concrete damage
 - SFP Leakage – effects of boric acid on SFP integrity
- Toolbox to manage concrete aging



Funding	Completed Concrete Projects	EPRI No
TI	Assessment of Needs for Concrete Research in the Energy Industry	1022373
	Nuclear Concrete Structures Aging Reference Manual	1023035
	Concrete Civil Infrastructure in United States Commercial Nuclear Power Plants	1020932
	Non destructive evaluation inspection of concrete structures subjected to corrosion	1025627
LTO	Effects of radiation in concrete	1025584
	Boric acid attack of concrete and reinforcing steel in PWR fuel handling buildings	1025166
ANT	Embedded Sensors in Concrete	1023006
	Quality control of concrete during construction – Voids detection	1025300
NDE	Nonlinear Ultrasound to Evaluate the Integrity of Thermally Damaged Concrete	1026501

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7



Advance I&C and On-line Monitoring

- Close collaboration with EPRI I&C Program and DOE LWRS
- Centralized On-line Monitoring (COLM) publications
 - Bruce Power Station (1024765)
 - Ginna Tendon Monitoring (1025322)
- Projects to support LTO:
 - Architecture to support advanced I&C structure
 - On-line demonstration projects for EDGs at Sharron Harris and Generator Step-up transformer at Braidwood
 - Develop automated diagnostics and remaining useful life applications



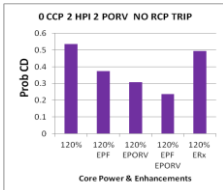
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8



Advanced Risks and Safety Analysis

- Close collaboration with DOE LWRS on development of advanced risks assessment tools and techniques
 - DOE development of RELAP-7
- Scope of work and benefits for LTO:
 - Advanced thermal hydraulic tool for risk assessments
 - Analysis the impacts of power uprates on plant margins
 - Analysis the impacts of modifications on plant margin
 - Supports the SDP (Significance Determination Process)



Example RISMC Margin Recovery Results: 120% Power Uprate with Postulated Plant Enhancements

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9



2013 & 2014 Planned Deliverables

- Materials Knowledge Basis
- Technical Update on Advanced Welding
- Revision to Embrittlement Trend Curves
- Containment Walkdown and Assessment GLs
- Cable Aging – Temperature and Radiation Exposure
- Cable Vulnerability Guidelines
- RISMC Case Study on Safety Margins in Power Uprate
- Pilot for Transformer and EDG On-line Monitoring
- Advanced I&C – Structure for LTO
- Life Cycle Mgmt (ILCM) Pilot Application and Software
- Aging Management Programs -- Gap Analysis Review
- Demonstration of UT on Containment Liner Mock-ups
- Technologies for Refurbishment and Up-rate Decisions

Together...Shaping the Future of Electricity
