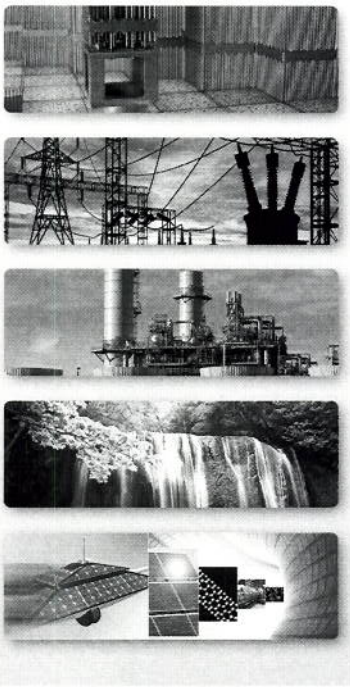

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Risk-informed New Build

Applications and Considerations

March 24, 2011

White Flint, MD

Introduction

- Background
- RI-Decision Making Considerations
  - Impact on New Build Enhanced Safety Features
  - Examples

Background

- RI-PSI / RI-ISI
  - EPRI report evaluated both EPRI RI-ISI methodologies for applicability to New Build designs. Insights:
    - New Build generally consistent with Operating fleet
    - New Build incorporates lessons learned from operating fleet (e.g. material, increased spatial separation, redundancy, and diversity)
    - PRA timing
- EPRI Report on PRA Technical Adequacy for RI-PSI / RI-ISI programs
  - Applicable to the Operating and New Build fleets
  - Includes basis for PRA timing (e.g. DCD vs post fuel load PRA)
  - SE expected in 2011
- EPRI Project on RI-Procurement
  - Based on USNRC approved RI-Repair / Replacement pilot plant application at ANO, Unit 2
  - 10CFR50.69-lite (i.e. focus on pressure boundary)

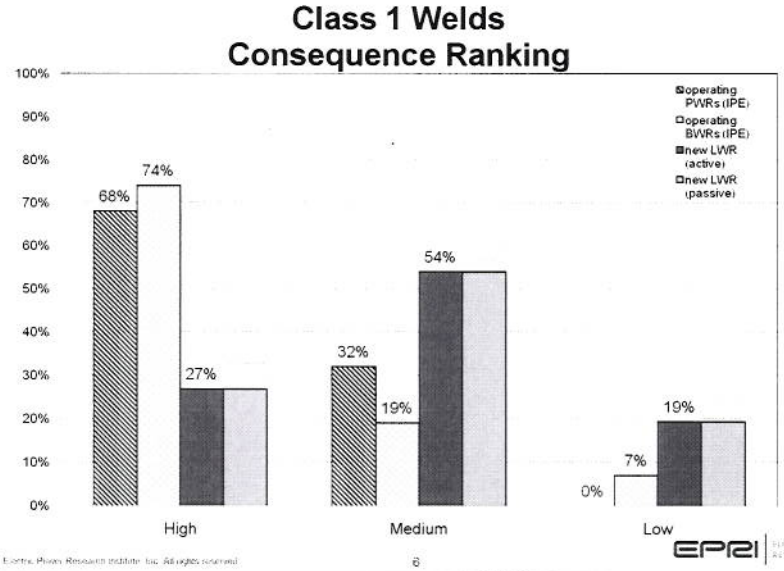
Considerations

- RI-PSI
  - More informed approach to PSI (more appropriate locations, techniques, "inspection for cause")
  - Increased inspection requirements for some HSS locations (e.g. volumetric versus outside diameter surface)
- RI-ISI
  - Lessons learned from almost entire US operating fleet and international members (maintain safety, reduced worker exposure)
- RI-Procurement (10CFR50.69 lite)
  - Built upon categorization process as approved at ANO, Unit 2
  - Includes verifying assumptions on equipment reliability for equipment not within the scope (similar to RISC-1/RISC-2 requirements in 10CFR50.69)

Enhanced Safety Features

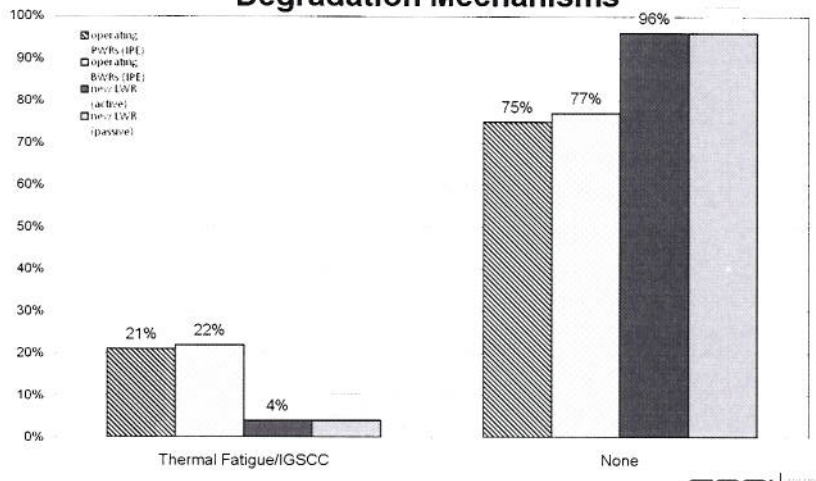
No	EPR Design Feature Description	Impact on RI-Decision Making of		
		RI-PSI	RI-ISI	RI-Procurement
1	**High level of redundancy and independence for safety systems** The U.S. EPR design incorporates four trains of most safety systems, and provides for significant separation: Four trains of the safety injection systems (LHSI, MHSI, and accumulators). Four trains of emergency feedwater (EFW), supplying four steam generators. Each train has an EFW water storage tank for its suction source. Four safety trains of support systems (cooling trains, building HVAC, and electric power).	Neutral	Neutral	Neutral
2	**Physical separation of safety systems** In addition to being highly redundant, the four trains of safety systems are physically separated by being located in different safeguard buildings. This significantly reduces the potential for core-damage accidents due to internal flooding, internal fires, or external events for which spatial considerations are important.	N/A	N/A	N/A
3	**In-containment refueling water storage tank (IRWST)** The design of the IRWST eliminates some failure modes that have been important for current-generation plants: Use of the IRWST eliminates the need to change system alignment by switching suction sources for safety injection following a LOCA. The failure to accomplish this switchover has been an important contributor to failure of long term safety injection for many current-generation PWRs. Eliminating the need for switchover also obviates the need to isolate the suction path used during the injection phase. For some current-generation PWRs, failure to isolate this path has been assessed to result in inadequate NPSH for the safety injection paths, and may create a release path after the recirculation path is opened. The reactor containment building affords the IRWST better protection against some types of external events than is the case for equivalent tanks at current-generation plants.	Neutral/ Positive	Neutral/ Positive	Neutral/ Positive

Examples – RI-ISI



Examples – RI-ISI

Class 1 Welds
Degradation Mechanisms



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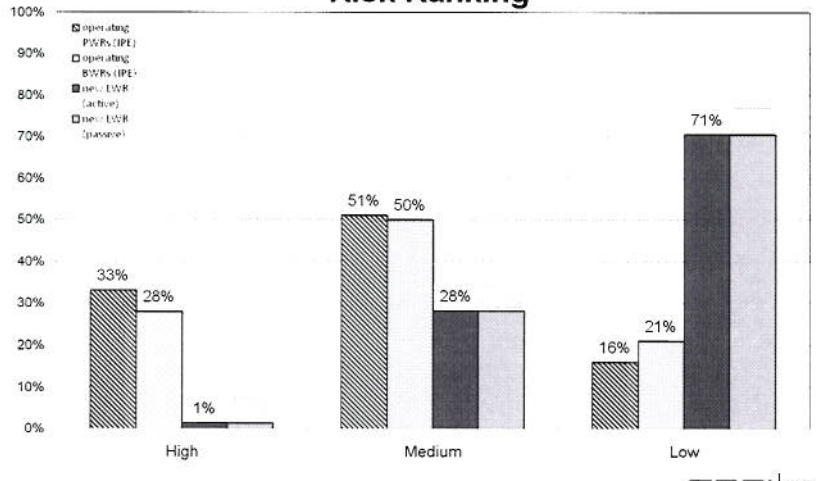
Examples – RI-ISI

Class 1 Welds
Risk Ranking



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Examples – RI-Procurement

- Containment Spray System
  - HSS: those segments supporting multiple safety functions and trains (e.g.
    - RWST
    - Recirculation
  - LSS: those segments whose failure have redundant / diverse backups, no or minimal impact on containment
  - Additional safety focus (e.g. RISC-1 / RISC-2)
    - PORVs in feed and bleed
    - Fire / raw water to steam generators

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