

Industry/NRC Materials Technical Exchange Meeting

Materials Reliability Program (MRP) Report

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MRP Report

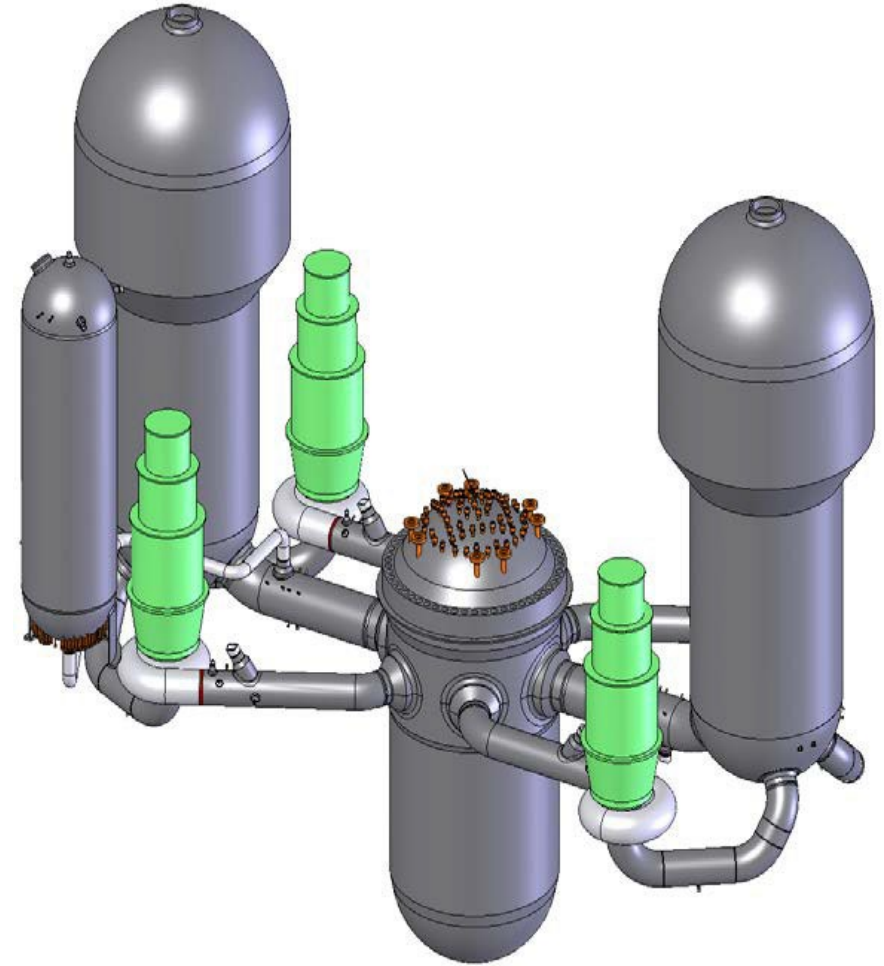
- Significant MRP updates since last meeting
- Status of reports submitted to the NRC
- Expected reports to be submitted to the NRC
- Forthcoming public reports of interest to the NRC
- OE of interest since last meeting



Significant MRP Updates Since Last Meeting

MRP Introduction

- PWR specific materials issues in the late 1990s led to the formation of the EPRI Materials Reliability Program (MRP) within the Nuclear Sector
- EPRI's MRP supports efforts to assess and implement countermeasures for degradation mechanisms impacting materials in PWR primary systems
- Program research provides utilities and regulatory agencies with the information necessary to make technically sound and cost-effective decisions for managing degradation



MRP Member Utilities

North America

- Ameren Services Company
- American Electric Power Service Corporation
- Constellation Energy Corp.
- Dominion Energy, Inc.
- Duke Energy Corp.
- Energy Harbor Corp.
- Entergy Services, LLC
- Evergy Services (Wolf Creek)
- NextEra Energy, Inc.
- Pacific Gas & Electric Co.
- Pinnacle West Capital Corp.
- PSEG
- Southern Nuclear
- STP Nuclear Operating Co.
- Tennessee Valley Authority
- Vistra Energy/Comanche Peak
- Xcel Energy Services, Inc.



Europe

- Axpo (Switzerland)
- EDF Energy (UK) [NEW]
- Foro-CEN (Spain)
- Rolls-Royce Submarines, Ltd.
- Vattenfall (Sweden)

Asia

- China National Nuclear Power
- Emirates Nuclear Energy Corp.
- Japan Atomic Power Company
- Kansai Electric Power Co.
- Korea Hydro & Nuclear Power
- Kyushu Electric Power
- Taiwan Power Company

South America

- Eletrobras Termonuclear S.A.

MRP Team and Advisory Structure

THE EPRI TEAM



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ADVISORY STRUCTURE

Research Integration Committee

Chair: Chris Koehler, Xcel
Vice Chair: Pål Efsing, Vattenfal

Technical Advisory Committees

Internals & Integrity
EPRI TAC Lead - Elliot Long
Acting Chair – Maribel Valdez, FPL
Vice Chair – OPEN

Pressure Boundary
EPRI TAC Lead - Chris Wax
Acting Chair - Corey Thomas, Southern
Vice Chair - OPEN

Inspection
EPRI TAC Lead - Bob Grizzi
Chair - Dale Brown, Southern
Vice Chair - Todd Davis, Constellation



Status of Reports Submitted to the NRC

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- The following MRP report has been submitted to the NRC for a safety evaluation (ML22129A141):
 - *Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227, Revision 2)*. EPRI, Palo Alto, CA: 2021. 3002020105.
- This report now includes RPV internals inspection and evaluation guidance for PWR operation beyond 60 years and it is referenced in SLR applications
- EPRI made this report public consistent with past revisions
- Questions: Should EPRI hold a topical report ‘Intro’ meeting with staff? When may EPRI expect NRC RAIs?



Expected Reports to be Submitted to the NRC

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- In 2023, it is expected that these reports may be submitted for NRC review:
 - Report detailing the WEC evaluation of irradiated SS fracture toughness data relevant to PWR internals and the basis developed for appropriate fracture toughness limits
 - Report on timing for when a plant needs to make changes to their Tech Specs (i.e., Pressure-Temperature (P-T) Limit Curves) based on new capsule test results (in response to OE from Prairie Island)



Forthcoming Public Reports of Interest to the NRC

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- The following public reports are expected to be published this year (review by the NRC not requested):
 - Materials Reliability Program: Technical Basis and Implied Margins of ASME Code, Section XI, Appendix G (MRP-450, Revision 1) Subtitle: Fracture Toughness Criteria for Protection Against Failure (3002023871).
 - Data from this report includes WEC- and CE-designed RPV cooldown transients that were utilized by NRC in analysis of Small Flaws and the potential revision of RG1.99R2
 - New revision to include B&W-designed plant cooldown transients as a new Appendix B

Forthcoming Public Reports of Interest to the NRC (2)

- Materials Reliability Program: Stress Corrosion Crack Growth Rates in Stainless Steels in PWR Environments (MRP-458) (3002020451).
 - Disposition curve base on publicly available data
- Materials Reliability Program: Assessment of the Need to Consider Heat Affected Zone (HAZ) Properties in RPV Integrity Assessments (MRP-475) (3002023870).
 - Technical basis report that HAZ specimens can be excluded
 - from future capsules,
 - from testing in current capsules, and
 - from inclusion in RPV integrity analyses, if already tested
 - Confirms prior NRC conclusions and changes in Appendix H



OE of Interest Since Last Meeting

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- Repeat of OE associated with PWR Core Barrel Thermal Shield Bolting and Flexures (not nuclear safety related) – 2 PWR units
- Stainless Steel Piping Stress Corrosion Cracking (SCC) overseas
 - US industry has stood-up a Joint MRP/PWROG engineering Focus Group
- Phased Array UT inspection indications near RCS DM welds
- Relevant Guide Card wear identified at another 4-loop PWR in US, will need to be well-managed for the long-term during LR and SLR
- CRDM Thermal Sleeve wear and funnel degradation continues to be identified in PWRs, will need to be well-managed for long-term



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