



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

**Spent Fuel Pool
Neutron Absorbing Material Degradation
for
NEI Used Fuel Management Conference**

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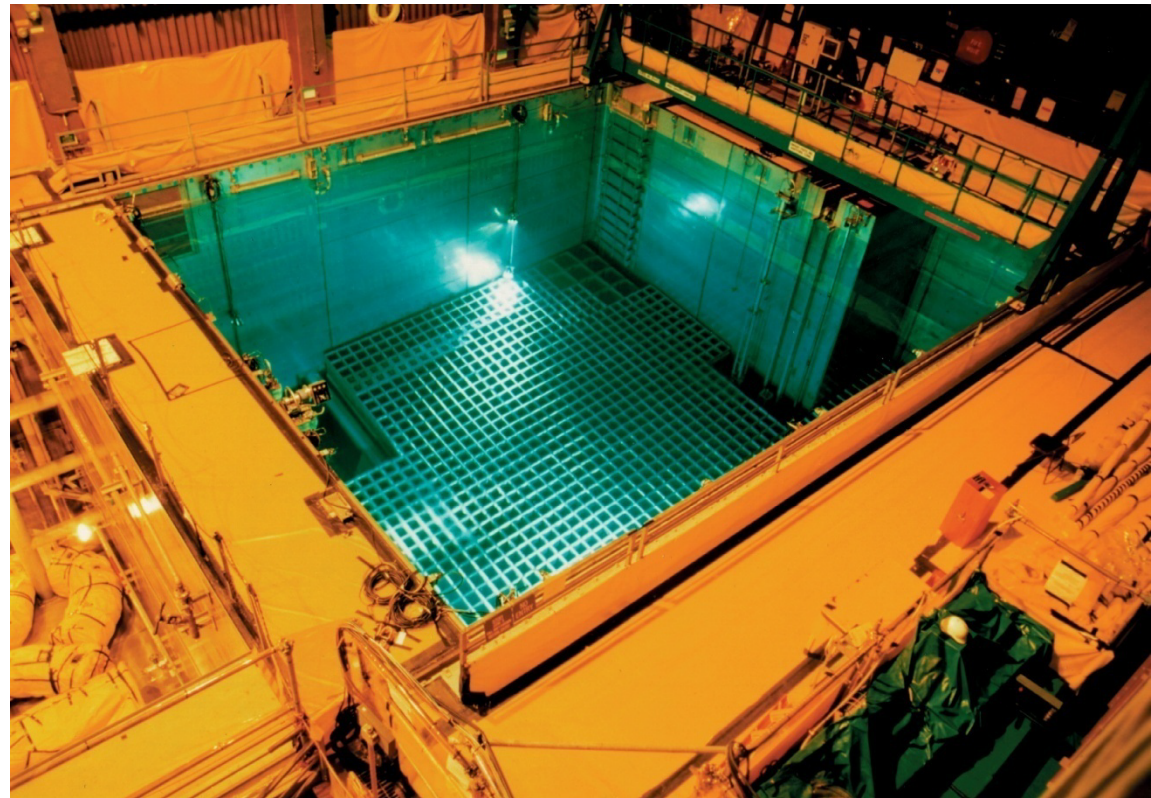
Division of Engineering

Steam Generator Tube Integrity and Chemical Engineering Branch

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Overview

- Safety Significance
- Operating Experience
- Current Issues
- NRC Actions
- Knowledge Base
- Surveillance Methodologies
- Path Forward



Picture: Spent Fuel Pool

Safety Significance

- Prevent the occurrence of any inadvertent criticality events in the SFP
- Neutron absorbing materials have a direct impact on safety
 - Unidentified and unmitigated degradation poses a criticality and safety concern
 - Challenges compliance with NRC subcriticality requirements: 10 CFR 50.68 and GDC 62
- NRC staff has identified this issue as potentially safety significant

NRC Current Issues

- Unconfirmed what materials are in each SFP and the method used to monitor these materials
- Unconfirmed whether industry is adequately monitoring and mitigating the degradation
- Unconfirmed accuracy of in situ neutron attenuation measurements
- Unconfirmed if the surveillance intervals are sufficient to monitor degradation

NRC Actions

- IN 09-26, ISG 2009-01, and update to GALL (NUREG 1801 Rev 2)
- NRC Office of Research investigating material degradation mechanisms, surveillance techniques, and predictive modeling
 - Literature knowledge base
 - Confirmatory research on the surveillance methodology
 - Confirmatory research on the surveillance interval adequacy
 - Living knowledge base based on the previous areas

Knowledge Base

- Current NRC state of knowledge
 - Commercial and decommissioned SFPs
 - Lists materials in each SFP
 - Periodically updated
- Issued public
 - Technical Letter Report: ML1135502414
 - Spreadsheet: ML121090500
- Many gaps in information
- Need to interact with industry on this issue

Surveillance Methodologies

- Boraflex methodologies (predictive code and in situ method) examined
- Reports to be issued summer 2012
 - NUREG/CR 7129 on Boraflex, RACKLIFE, and BADGER methodologies
 - NUREG/CR 7130 on BADGER tool
- BADGER report pertains to all neutron absorbing materials
- Need to interact with industry on this issue
- Coupon methodology – under evaluation

Path Forward

- Continue dialogue with industry
- Release the NUREG/CRs
- Determine need for Regulatory Guidance and/or Generic Communications
- Continue with NRC Research activities

Questions