

U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

**Status and Path Forward for Generic Safety
Issue 191, Pressurized Water Reactor Sump
Performance**

Presented by:

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Purpose

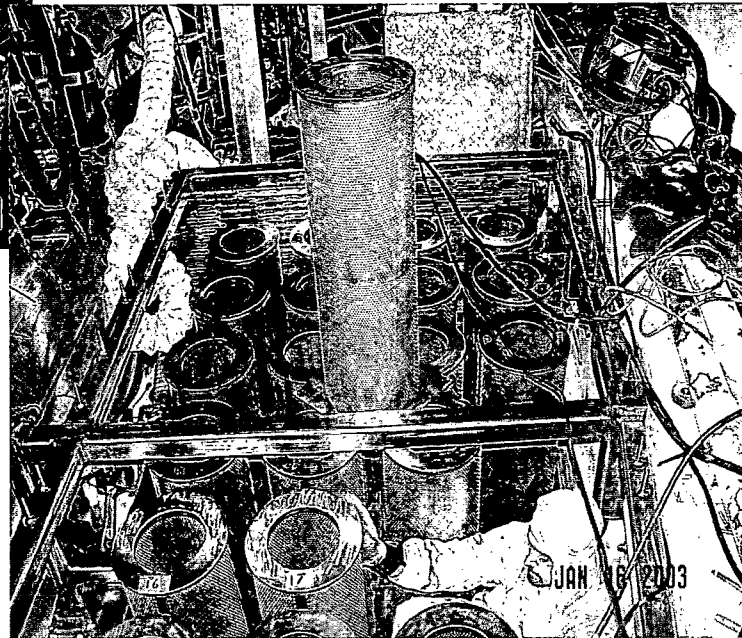
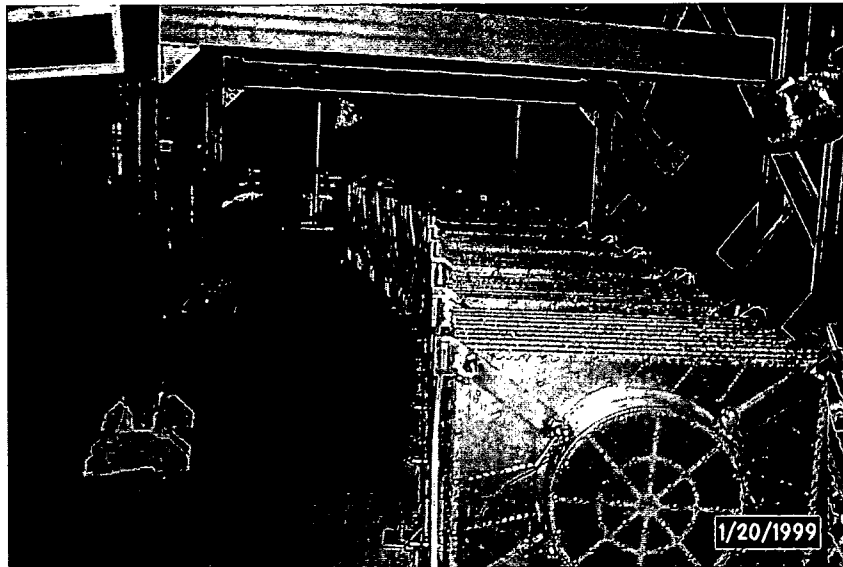
- Provide update on progress in addressing GSI-191, areas where technical uncertainties exist, and plans for addressing these uncertainties and closing the GSI



GSI-191 Milestones

- Bulletin 2003-01 issued June 2003
- Nuclear Energy Institute (NEI) methodology guidance document (NEI 04-07) submitted May 2004
- Generic Letter (GL) 2004-02 issued September 2004
- NRC Safety Evaluation (SE) on NEI 04-07 issued December 2004
- Licensee detailed responses to GL 2004-02 provided September 2005
- Licensees currently installing much larger strainers
- Complete responses to GL 2004-02 due by end of 2007

New Strainer Installations





Chemical Effects

- NRC and industry tests indicate chemical products can form in representative post-loss-of-coolant-accident (LOCA) environments
- NRC expects licensees to evaluate plant-specific chemical effects and to include consideration of chemical effects in strainer modifications
- PWR Owners Group (PWROG) Report WCAP-16530 provides guidance for chemical effects evaluations – under NRC review



Downstream Effects (Components)

- Almost all licensees are using PWROG Report WCAP-16406P for their evaluation methodology
- The WCAP was submitted for review as a topical report - NRC reviews are nearing completion
- Design of systems for handling debris-laden fluids is well understood
- Staff continues to work with PWROG and licensees on the topical report and site-specific issues



Downstream Effects (Fuel)

- PWROG recently submitted topical report WCAP-16793NP with specific guidance for evaluation of debris effects on fuel
- NRC will review licensee modifications and industry tests for downstream issues
- NRC has draft review guidance for fuel and reactor vessel issues
- NRC has run confirmatory computer analysis of effects of potential flow blockage in the vessel

Coatings

- NRC adopted conservative positions for coatings zone of influence (ZOI), coatings debris characterization, non-qualified coatings failure rate, and coatings debris transport
- Plants can deviate from these positions with an adequate technical justification (test data)
- NRC will evaluate industry testing to ensure that it is technically sound and applicable



Regulatory Approach to GSI Closure

- NRC has provided an approved resolution methodology
- Industry developing additional guidance, on which staff will comment or has already done so
- Licensees are responsible for resolving sump issues at their plants
- Enlarging strainers will enhance safety; additional measures may be needed
- NRC will verify adequacy through inspections, audits, and review of final GL 2004-02 submittals from licensees



Regulatory Approach (Continued)

- Approved guidance for GSI-191 evaluations is conservative in many areas
- NRC working with industry to attempt to identify:
 - Areas in which conservatism can be reduced
 - Ways to reach reasonable assurance of adequate long-term cooling “holistically”
- Issue is resolved for each plant when licensee provides reasonable assurance that adequate long-term core cooling will be maintained in the presence of debris



Audits

- Auditing corrective actions at 10 plants – samples of products and analyses of all five strainer vendors
- 8-person team on site for one week
- Numerous open items identified at audits performed to date
- NRC expects improving trend in future audits as licensees note and address, at their plants, issues identified at other plants



Current Focus

- Staff still expects licensees to address GL 2004-02 by 12/31/07
 - Demonstration that adequate long-term cooling maintained in presence of expected plant-specific debris loading and transport
 - All needed modifications complete
- Some plants will likely seek additional time (late chemical testing)



Extensions

- Have granted 15 plant-requested extensions for completion of one or more (typically very few) corrective actions
 - 14 into spring 2008
 - 1 into spring 2009



Near-Term Plans

- Continue audits (every other month)
- Continue working to address remaining technical issues
- Develop safety evaluations for three topical reports
- Develop additional review guidance to support closure of GL 2004-02



Near-Term Plans (Continued)

- Staff developing content guide for level of detail needed for GL submittals
- Soliciting remaining staff technical questions and considering how to resolve each one; possible alternatives:
 - Industry action (technical basis for concern)
 - NRC-sponsored research
 - No action (justification)



Challenges

- Many plants have not yet successfully completed chemical effects testing
- Issues continue to arise
 - From NRC staff (review of strainer head loss test protocols)
 - From Advisory Committee on Reactor Safeguards
 - As a result of chemical effects testing
- Need to resolve issue “holistically” – reaching determination that there is reasonable assurance of long-term core cooling in presence of complexities and uncertainties
- GSI-191 is a highly plant-specific issue – no “one size fits all” approach
- Possible need for additional confirmatory NRC-sponsored research



Treatment Disparities

- For some debris-related issues, NRC and industry treatment differs between BWRs and PWRs
 - Zone of influence assumptions
 - Chemical effects
 - In-vessel downstream effects
 - Others
- NRR considering path forward