



# **NRC Perspectives on GSI-191 PWR Sump Performance**

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and Analysis





# Regulatory Background

- **Screen/strainer clogging with debris not a new issue**
  - ▶ PWR and BWR ECCS recirculation performance examined under Unresolved Safety Issue (USI) A-43 in early 1980s
  - ▶ BWR strainer blockage issue addressed following several ECCS strainer clogging events in mid-1990s
  
- **Research indicates sump screen clogging may not be adequately addressed at operating PWRs**
  - ▶ More and finer debris could be generated by a LOCA than had been originally considered
  - ▶ Fibrous and particulate debris could combine to result in higher head losses than had been originally considered
  - ▶ NRC's Office of Research confirmed that sump clogging is a credible concern through its technical assessment of GSI-191



# Summary of NRC Research

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- Parametric Study modeled each PWR as a “case”
    - ▶ Sump clogging was found to be likely for:
      - 60 of 69 cases during a LBLOCA
      - 37 of 69 cases during a MBLOCA
      - 32 of 69 cases during a SBLOCA
  - Initial risk assessment showed that the average CDF considering sump clogging could increase to 45 times the average baseline CDF
    - ▶ Initial assessment did not credit realistic sources of risk reductions such as operator actions
  - Subsequent update to initial risk assessment showed that operator responses to sump blockage could provide risk benefits
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# NRC's Regulatory Conclusions

- NRC has made the following regulatory conclusions based on the GSI-191 research findings:
  - ▶ Detailed plant-specific assessments are needed to assure the reliability of ECCS recirculation at PWRs
    - Although parametric study identified sump clogging as a potential industry-wide concern, it did not contain sufficient information to definitively identify the susceptibilities of individual plants
  - ▶ PWR licensees may be capable of reducing risk associated with potentially degraded sumps by implementing interim measures
    - Significant benefits may be achievable, considering the multiyear period that licensees may require for evaluating and implementing resolutions to GSI-191



# NRC's Regulatory Objectives

- Issue generic communications to PWR licensees regarding potential debris blockage concerns
  - ▶ Bulletin 2003-01 issued to address interim measures
  - ▶ Future generic letter (planned for Spring 2004) to address evaluations and corrective actions
- Review industry-developed guidance to ensure its acceptability for use in evaluating recirculation sump performance
- Oversee licensee activities to ensure adequate recirculation sump performance
  - ▶ Review of generic communication responses
  - ▶ Temporary instruction(s) to inspect licensee activities in response to generic communications
  - ▶ Sample audits of licensee's inspection performance
- NRC's approach complements industry program to minimize regulatory burden



# NRC Status Overview

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- Additional staff presentations will cover further details of NRC plans concerning
    - ▶ Planned regulatory activities
      - generic letter
      - temporary instruction(s) for generic communications
      - review of industry sump evaluation guidance
      - review of Bulletin 2003-01 responses
        - NRC staff held a public meeting on the bulletin on June 30 and will be available to answer additional stakeholder questions on bulletin
    - ▶ Planned research activities
      - resident debris sampling and head loss testing
      - chemical effects testing
      - calcium-silicate head loss testing
      - HPSI throttle valve blockage testing
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# Conclusion

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- NRC is taking regulatory action to address a potential safety concern with respect to PWR sump performance
  - NRC is completing tail-end research activities to ensure that GSI-191 is resolved in a technically adequate manner
  - NRC is committed to working with stakeholders in the plant-specific implementation of the resolution of GSI-191
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