

# Industry Activities to Address PWR ECCS Sump Performance

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Session W3D – GSI-191

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# GSI-191, PWR Sump Performance

- GSI-191 applies to all 69 pressurized water reactor units in U.S.
- Each unit is unique in one or more important design aspects:
  - Insulation materials
  - Containment coatings (both qualified and unqualified)
  - Containment design (compartmentalized, open)
  - Sump design
  - NPSH requirements
- The high level of design variation requires plant-specific resolution approach for each plant



# Evaluation Guidance Development

- Development of Industry Evaluation Guidance began following issuance of NUREG/CR-6762, Parametric Evaluation for PWR Recirculation Sump Performance (2002)
- NEI 02-01, Debris Sources Inside Containment (2002) issued to begin plant data collection activities
- Bulletin 2003-01, Potential Impact of Debris Blockage on Emergency Sump Recirculation at PWRs (2003) called for compensatory actions



# GL 2004-02

- GL 2004-02, *Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors*, issued September 2004
- Requested PWR licensees to perform an evaluation of recirculation functions and, if appropriate, take additional actions to ensure system function
- GL schedule:
  - By 2/28/05 – provide description of evaluation methodology to be used and schedule for completion
  - By 9/1/2005 – provide results of evaluation
  - By 12/31/2007 – complete all actions, including necessary plant modifications

# Industry Guidance (NEI 04-07)

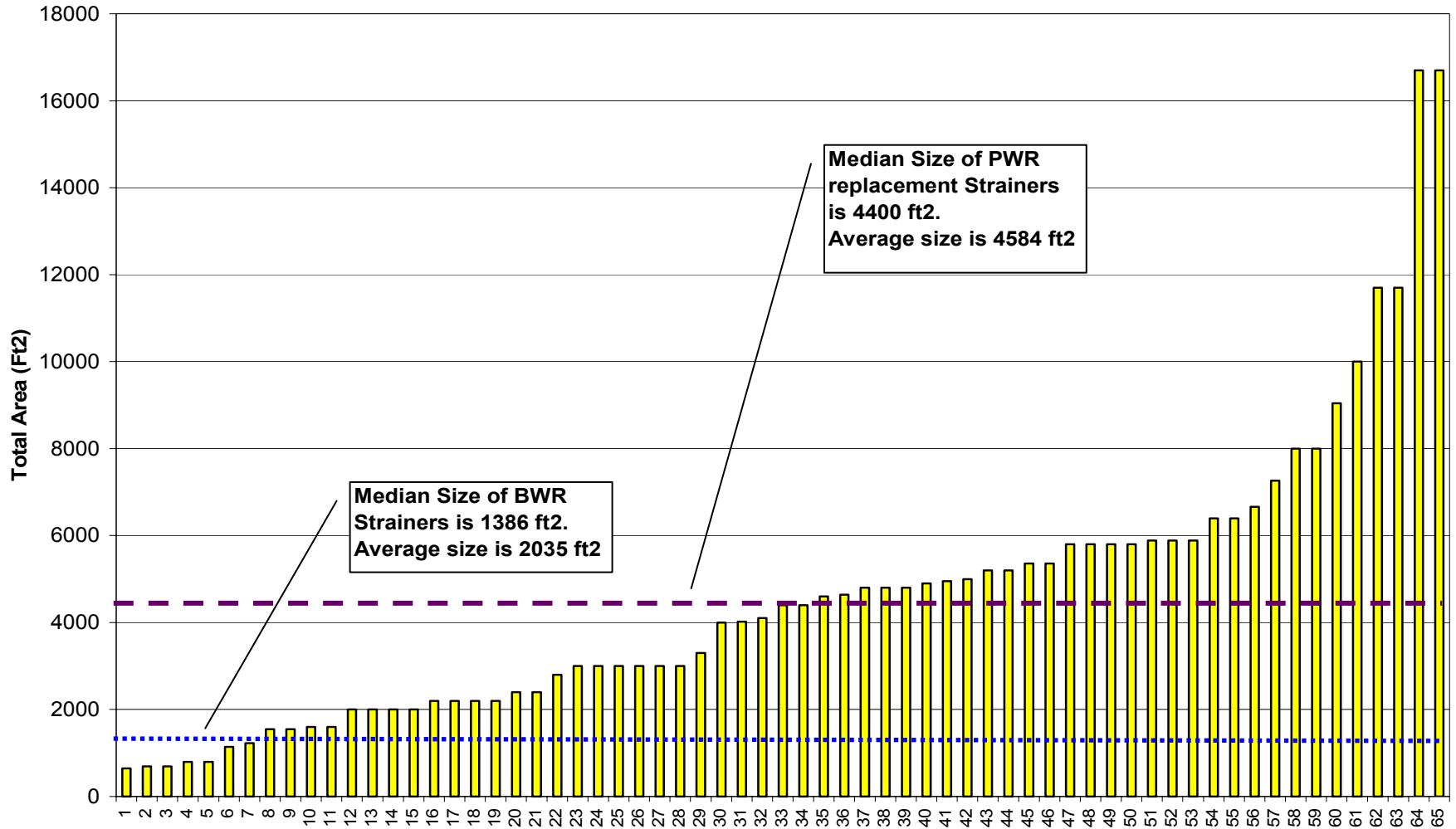
- Evaluation guidance, developed in coordination with the WOG, was issued as NEI 04-07 in December 2004
- Supplemental guidance was prepared by the WOG to support evaluation in two areas not addressed in NEI 04-07
  - WCAP 16406-P, *Evaluation of Downstream Sump Debris Effects in Support of GSI-191*, issued June 2005
  - WCAP-16530, *Evaluation of Post-Accident Chemical Effects in Containment Sump Fluid to Support GSI-191*, issued February 2006

# Industry Resolution Activities

- All 69 plants have completed evaluations necessary to assess need for strainer modifications
  - Three units have assessed that their current strainers are appropriately sized
  - Sixty-six units plan to replace their current strainers
- Active – Passive – Undetermined
  - Four units intend to install active strainers
  - Remaining units are passive strainers



# Estimated Size of PWR Replacement Strainers (Passive Strainers only)



Median Size of PWR replacement Strainers is 4400 ft2.  
Average size is 4584 ft2

Median Size of BWR Strainers is 1386 ft2.  
Average size is 2035 ft2

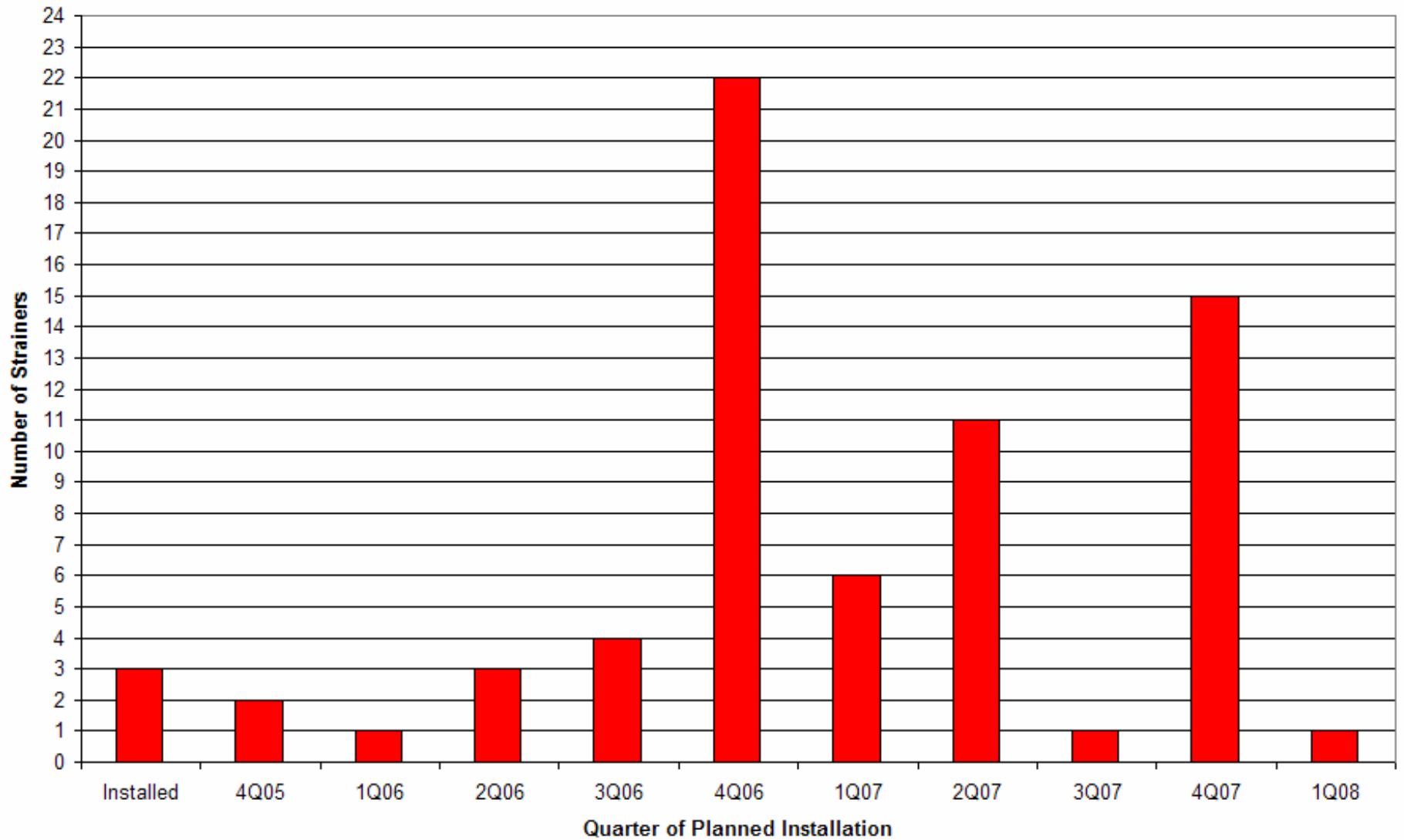


# Factors Affecting Strainer Size

- Plant design factors
  - NPSH margin
  - Containment insulation materials
  - Coatings
- Conservatism in Analysis
- Addition of Margin



## Planned Strainer Installation



# Other Plant Activities

- Actions to address debris sources
- Containment modifications beyond strainer installation
- Downstream modifications
- Programmatic changes



# Industry Test Activities

- WOG Chemical Effects Testing
- Strainer Qualification Testing
- WOG Alternate Buffer Project
- STARS Coatings Tests
- FPL/ARIVA Coatings Tests



# Summary

- Activities for plant-specific resolution of GSI-191 are well underway
- Remaining uncertainties are being addressed through conservative application of evaluation methodology, testing and strainer design
- Industry sponsored and plant-specific testing activities will continue in support of final designs

