GSI-191
PWROG Resolution Efforts

April 15, 2010

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Chairman PWROG Executive Committee
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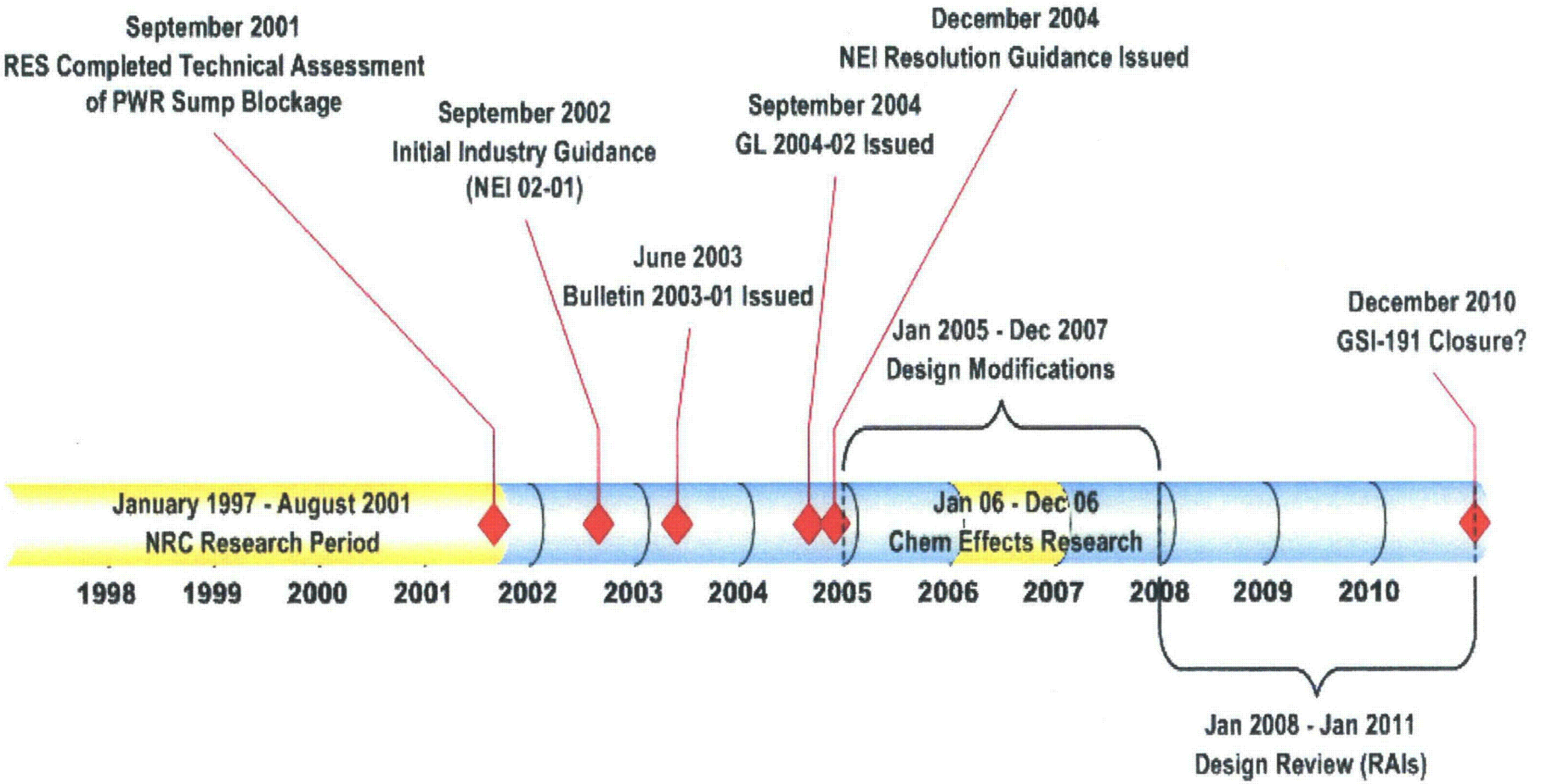
GSI-191 Timeline



Resolution Actions

- A highly conservative, deterministic approach was developed to address GSI-191
- Plant modifications were based on the application of conservative tests and methods
- All PWR licensees have replaced their strainers and implemented numerous design and operational enhancements
- GSI-191 is no longer a safety issue for PWRs

Summary of Actions

- Median size of new screens is 4,000 ft^2
  - On average, 32 times larger than original screens
- Additional design modifications include:
  - Replacement of fibrous insulation with Reflective Metallic
  - Changes to alternate buffering agents
  - Flow diversions and debris interceptors
  - Downstream modifications
- Enhanced operational and emergency procedures

Current Status

- Actions in last 24 months focused on attempts to respond to NRC review questions
- Efforts to remove overly conservative assumptions and view holistically have been unsuccessful
- A determination of reasonable assurance of compliance with current regulations is possible now
- Further plant modifications will not improve safety

Recommended Actions

- Permit application of GDC-4 exclusion of Leak-Before-Break qualified piping to local debris generation
- Industry margin recovery efforts will continue
- Continue efforts to develop models and analysis methods based on prototypical tests and research

NRC Commissioner Briefing on GSI-191 Resolution Status

April 15, 2010

David A. Heacock
President and Chief Nuclear Officer
Dominion Nuclear

Dominion GL 04-02 Status

• North Anna	• Project complete
• Surry	• RAI response complete; minor modifications pending
• Millstone	• RAI response ongoing
• Kewaunee	• RAI response ongoing

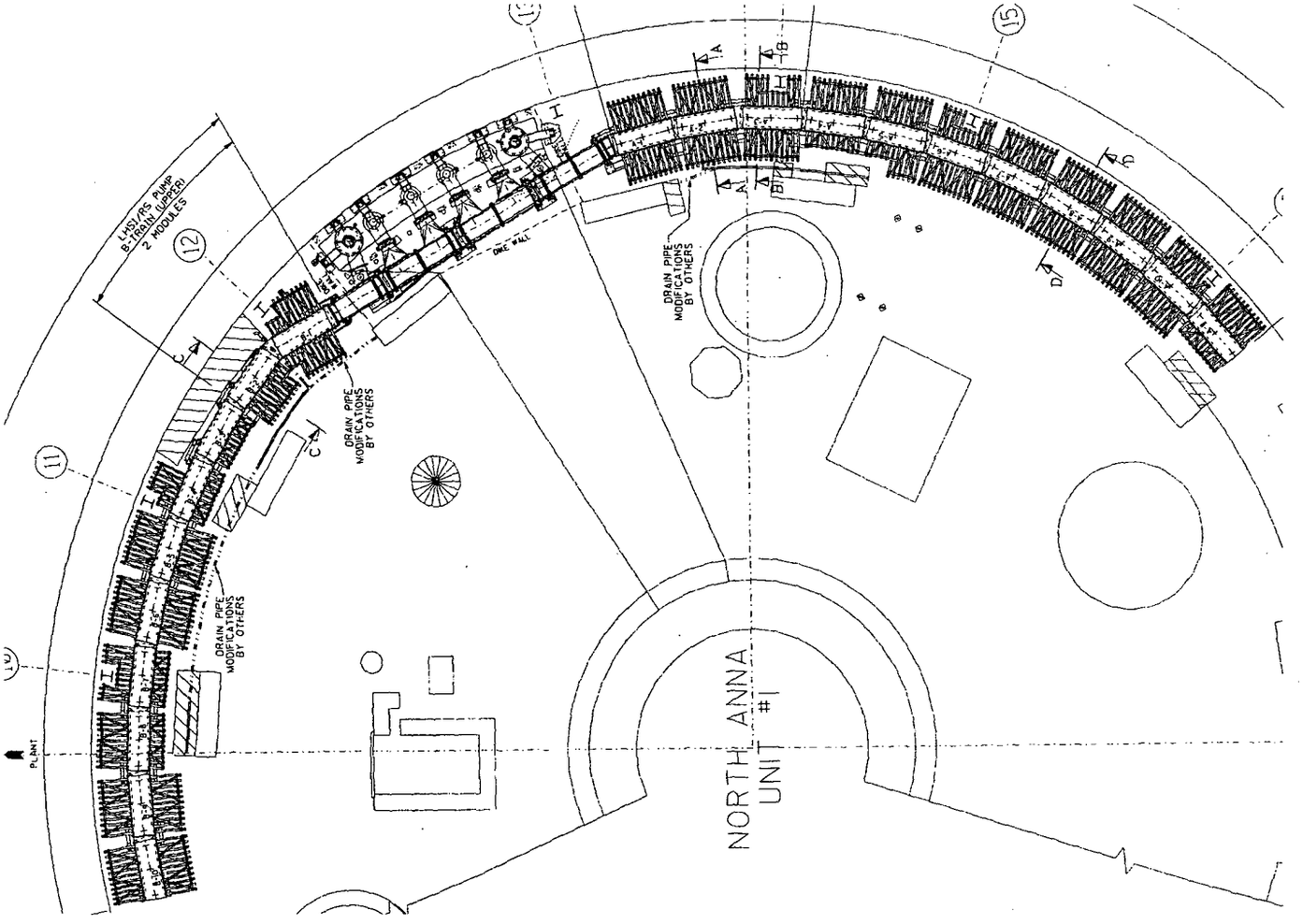
GSI-191 / North Anna Timeline

2003/4	Containment walkdowns
07/05	Decision to abandon active strainer - install passive strainer
09/05	Response to GL 2004-02 due
11/05	AECL chosen as strainer vendor

GSI-191 / North Anna Timeline

2005-07	Containment reanalysis/LAR
2007-08	Chemical effects testing
2007/08	NRC corrective action and chemical effects audits
05/2009	NRC NAPS acceptance letter
~07/2010	NRC SER for in-vessel effects

NAPS-1 GSI-191 Containment Sump Strainer



Comparison of Before/After NAPS Strainer Surface Area

Unit/System	Original Design Strainer Area (approximate)	Newly Installed Strainer Area (approximate)	Percent Increase
NAPS Unit 1 RS	168 ft^2 (common)	4400 ft^2	~3800 %
NAPS Unit 1 LHSI		2000 ft^2	
NAPS Unit 2 RS	168 ft^2 (common)	4400 ft^2	~3750 %
NAPS Unit 2 LHSI		1900 ft^2	

Obstacles to Success

- Evolving, plant-specific R&D effort
- Multiple licensees - few vendors
- Lack of / ill-defined and evolving acceptance criteria
- Unrealistic regulatory schedules
- Unrealistic regulatory resource impact estimate

Keys to Success

- Commitment of project team
- Insights from NRC audits
- Selection of research-oriented vendor
- Adequate containment floor space

Conclusions

- Generic issues are R&D projects and rarely adhere to pre-ordained regulatory schedules
- Implementation of requirements prior to specification of acceptance criteria is counterproductive and ineffective
- Reasonable levels of conservatism provide reasonable assurance of safety

The Southern Nuclear GSI-191 Perspective

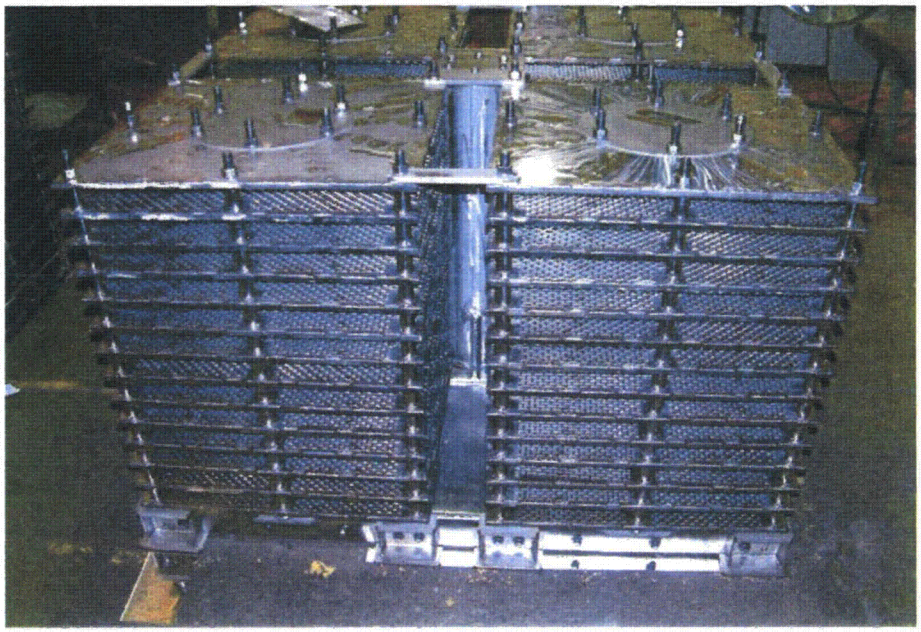
April 15, 2010

Jeff Gasser

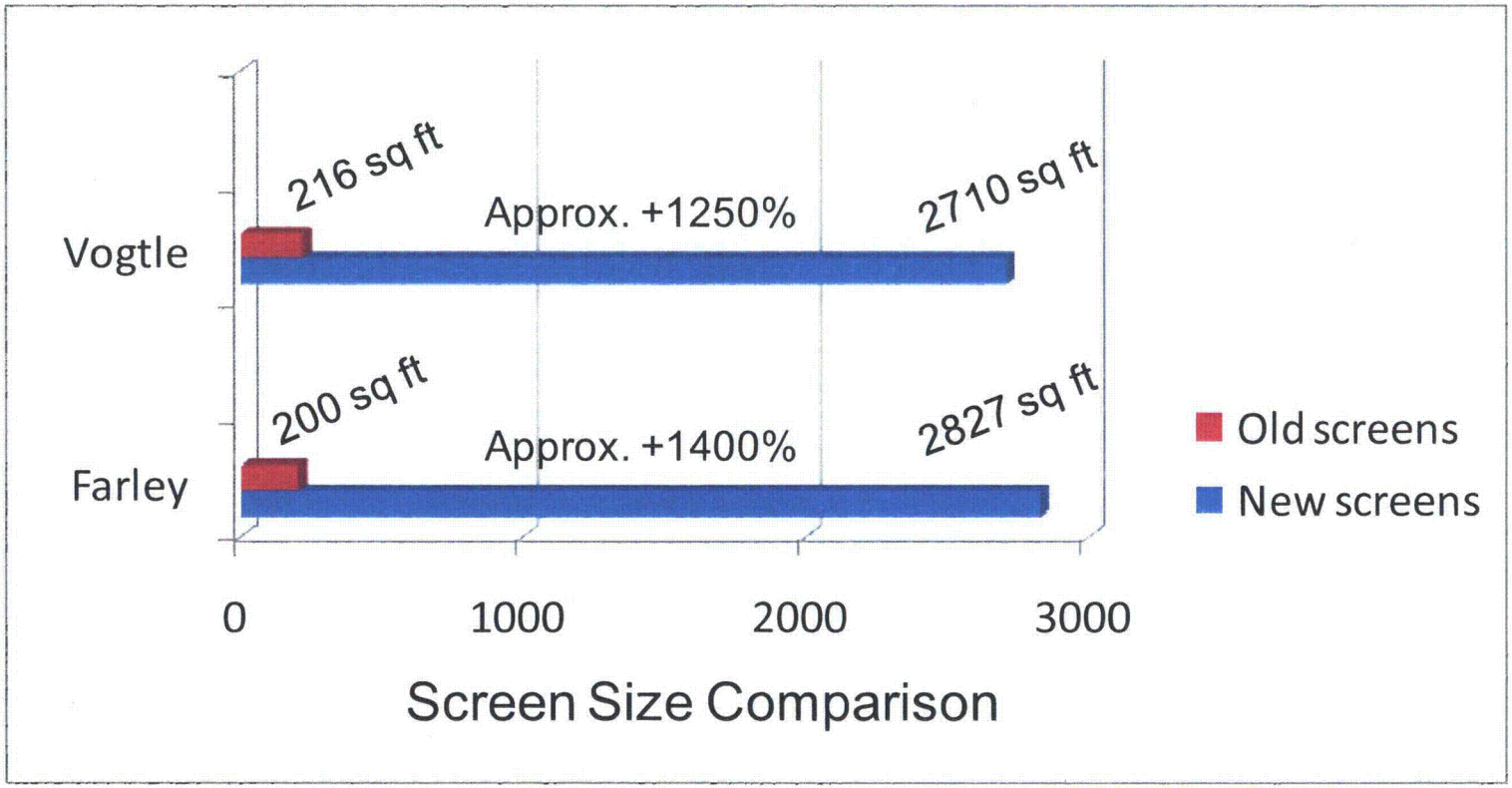
Executive VP & CNO – Southern Nuclear

The SNC GSI-191 Perspective

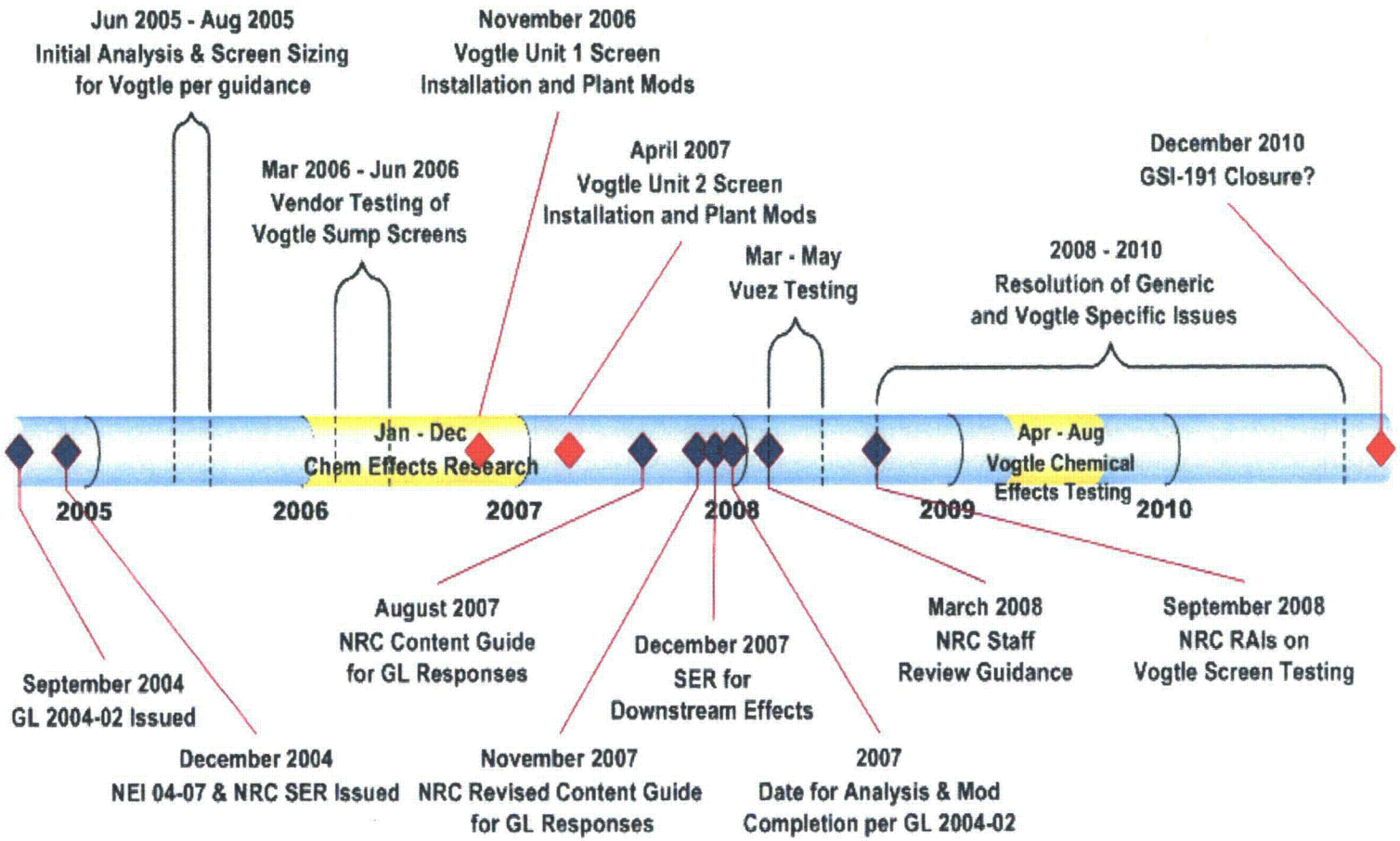
New Screens - Fall 2006 Spring 2007



The SNC GSI-191 Perspective



Vogtle GSI-191 Timeline



The SNC GSI-191 Perspective

Where We Stand Today

- News sump screens 1250% - 1400% increase
- New injection needle valves and/or flow orifices to increase flow reliability (downstream effects)
- Removed problematic micro-porous insulation
- Reasonable assurance of safety exists

The SNC GSI-191 Perspective

Summary

- Required to design, build and test simultaneously before acceptance criteria established
- Cumulative effect of conservative assumptions
- Reasonable Assurance
- Further modifications result in significant worker radiation dose with no appreciable safety benefit
- GDC-4 allows closure now and maintains consistency with current design assumptions

GSI-191 Resolution Actions

- Industry Actions have resolved safety implications of GSI-191
- Commission action is needed to attain closure with no further undue worker exposure
- Current regulations (GDC-4) provide means to resolve remaining issues without further delay
- Commission action to direct the staff to allow licensee use of GDC-4 as one of the acceptable means of closing GSI-191

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Generic Safety Issue 191, PWR Sump Performance

Michael Scott

Chief, Safety Issue Res. Branch

Office of Nuclear Reactor Regulation

April 15, 2010

Agenda

- GSI-191 – Status of Completion
- Path Forward
- BWR Strainer Activities
- Conclusions

GSI-191 – Status of Completion

- Purpose – demonstrate compliance with 10 CFR 50.46(b)(5), long-term core cooling
- Many safety improvements
- Much larger ECCS strainers
- Some removing fibrous insulation
- Strainer test protocols generally acceptable

NRC Staff Actions

- Executed multi-year integrated plan – frequent revisions
- Issued guidance in 2004 and 2008
- Detailed reviews of submittals – some issues largely resolved
- Resolved all strainer performance issues for over half of PWRs

Actions Remaining

- Goal is issue closure in 2010
- Need to resolve issues for remaining plants
- In-vessel effects
- Some licensee test/evaluation methods not technically justified
- Additional modifications possible

Path Forward

- Test strainer performance using approach acceptable to staff
- Make plant configuration match tested one within two cycles
- Open to proposed alternatives, not to delay final completion

Improvements Implemented

- Enhanced communication among NRC staff, licensees, and vendors
- New review approach to balance conservatisms and uncertainties or potential nonconservatisms
- Facilitated sharing of lessons learned among licensees

BWR Strainer Activities

- BWR ECCS strainer performance evaluated in 1990s
- Enlarged strainers
- So BWRs in better place now than PWRs were at start of GSI-191
- But some subjects need work and regulatory review

BWR Strainer Activities (Continued)

- Owners Group implementing evaluation plan
- Starting to see some slips in dates for planned actions
- Staff monitoring carefully for need to take additional measures
- Lessons learned from GSI-191

Conclusions

- PWR licensees have made many safety improvements
- Some challenges remain
- Goal is issue closure in 2010
- Implementing GSI-191 lessons learned in evaluating BWR strainer performance

Acronyms

- BWR – boiling water reactor
- ECCS – emergency Core Cooling System
- GL – generic letter
- GSI – generic safety issue
- PWR – pressurized water reactor