ECCS Suction Strainers Downstream Effects – Systems and Components Issue No. 1

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ECCS Suction Strainers Committee

Chairman

NRC / BWROG Resolution Plans
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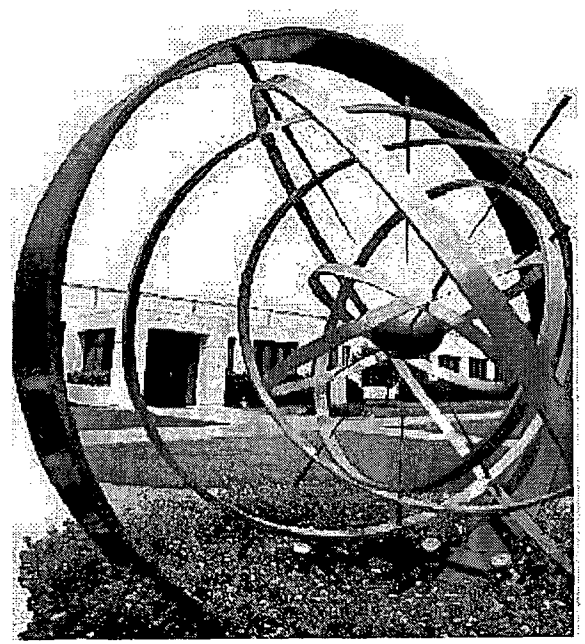

Topics

Issue Overview

BWROG Objective

URG Assessment

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Proposed Resolution

Relationships to Other Issues

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Regulatory Summary

The NRC stated the following in the November 2007 presentation by Ralph Architzel (NRC) to the BWROG:

"Recent evaluations of downstream effects question the technical adequacy of previous evaluations

- erosion of piping and valves
- abrasion of pump internals
- blockage of tight clearance flow areas

...Impact of the more recent evaluations of the issue for BWRs should be evaluated"

Problem Statement

Blockage: Debris materials that pass through strainers might block very small openings in valves, pumps or other ECCS components. The effect of any such blockages should be evaluated to determine if it would prevent sufficient core cooling flow following a LOCA.

Wear: Debris materials that pass through strainers might produce erosive or abrasive wear of ECCS system components. Component wear should be evaluated to determine if it would prevent sufficient core cooling flow following a LOCA.

BWROG Objective

BWROG to create an LTR that defines methods and assumptions for BWR downstream effects analyses

Expectation: BWR Licensees show ECCS system and component acceptability by

- Comparing plant-specific system parameters to LTR generic analyses and showing generic analyses are bounding
- Where plant-specific parameters are not bounded by the generic analyses, use LTR methods for plant-specific analyses

URG Assessment

- Any debris-induced pump damage would not cause the pumps to stop operating
  - Cites Limerick, NMP-1, and Fitzpatrick operating experience with debris
- RHR heat exchanger performance will not deteriorate
- Core spray headers and nozzle openings are larger than the debris materials and therefore will not be plugged by debris

GSI-191 Approach

Westinghouse prepared an LTR, WCAP-16406-P, that defines methods for PWR licensees to use to perform plant-specific downstream effects evaluations

PWR licensees used the WCAP-16406-P methods in evaluation of their systems and components

- Most PWR licensees determined that any damage to plant equipment due to downstream effects would not prevent achieving cold shutdown
- Some PWR licensees needed to modify parts in valves, pumps, and separators/seals in order to meet WCAP acceptability criteria

Proposed Resolution

BWR licensees to pursue rights to WCAP methods

Develop additional methods needed for BWR evaluations

Obtain system configurations, operating parameters, and component descriptions for ECCS systems in BWR fleet

Define BWR ECCS systems, components, and generic parameters

Define generic bypass debris source term(s)

Prepare and submit BWR methods LTR

Perform generic system and component evaluations with conservative parameters for each BWR ECCS system and component type and issue supplement to LTR

Proposed Resolution (cont.)

BWR licensees compare their specific ECCS plant parameters and components to those contained in the generic evaluations:

- If the generic evaluation bounds the specific plant system and component parameters, then the licensee documents that the generic evaluation demonstrates acceptable downstream effects performance for the specific BWR system
- If the generic evaluation does not bound the specific plant system and component parameters, then the licensee will use the procedures defined in the LTR to perform a plant specific downstream evaluation
- Address all NRC DSE guidance review issues

Relationships to Other Issues

Issue 4 – Chemical effects. The chemical effects issue will define potential precipitant properties and quantities

Issue 10 – Debris characteristics. The debris characteristics are used in wear and abrasion evaluations. The size of the debris particles are used in evaluations of plugging of small orifices

Debris source term and debris bypass – The debris source term and bypass fractions are used to determine the amount of downstream debris

Next Steps and Milestones

Procure rights to WCAP	1Q 2012
Draft methods report w/ example	4Q 2013
Obtain system configurations	2Q 2014
Submit LTR	2Q 2015