Proposed Technical Specification Approach in Response to Generic Letter 2008-01

Douglas Coleman
BWROG Chairman
Brian Mann
Technical Specifications Task Force

Background

- Generic Letter (GL) 2008-01 was published because the NRC has published 20 information notices, two GLs, and a NUREG related to management of entrained gas, and events continued to occur.
- Technical Specification requirements to verify the system is “full” (performed by venting systems in limited locations and on a fixed frequency) did not prevent these occurrences.

Industry Response

- In response to the GL, the industry has:
  - Formed a Gas Accumulation Management Team
  - Full industry engagement: BWROG, PWROG, NEI, EPRI, INPO
  - Developed Operability acceptance criteria
  - Conducted testing on gas transport
- In response to the GL, plants have:
  - Performed detailed walk downs of systems to confirm as-built configurations
  - Determined critical locations and established acceptance criteria
  - Implemented numerous improvements in plant:
    - Monitoring for gas
    - Processes (Operations, Work Management, Outage Planning)
    - Procedures
    - Training
    - Corrective Action Programs

Industry Response

- The industry's on-going efforts include:
  - Developing an industry guidance document on preventing and mitigating entrained gas
  - Developing generic industry training modules on entrained gas management
- At this point, the industry believes that we have taken adequate actions to minimize Operability impacts of entrained gas. On-going plant-specific and industry programs will continue to enhance and improve these efforts.

Industry Response

- Generic Letter 2008-01, states, "the NRC staff plans to use this information during activities that are being planned as a follow up to this GL and for guidance in the Technical Specifications Task Force program to develop improved TSs."
- The TSTF formed advisory teams from each Owners Group to determine appropriate TS changes regarding gas management in the subject systems.

Evaluation

- The team's evaluation started with the following facts:
  - In the GL, the NRC referenced General Design Criteria (GDC) 1, 34, 35, 36, 37, 38, 39, and 40 and QA Criteria III, V, XI, XVI, and XVII as the regulatory basis for requiring licensees to ensure that the Operability of the subject systems is not impaired by entrained gas.
  - The NRC also referenced commitments to other QA documents, such as Reg Guide 1.33 which requires instructions for filling and venting the ECCS and DHR systems, as well as for draining and refilling heat exchangers.

Evaluation

- In the GL, the NRC noted that the ISTS and most TS contain SRs to verify that portions of the subject systems are full of water, but did not rely on TS compliance as the regulatory basis for the GL.
  - The scope & frequency of the verification varies between designs and plants, and some plants have no similar TS requirements.
  - The TS requires verification that piping is full of water, which is subject to interpretation.
  - The conclusion of an NRC TIA response, dated 10/21/08, stated, in part: "When voids are discovered in piping, if the licensee can establish through an operability determination that there is a reasonable expectation that the system in question will perform its specified safety function, the system piping can be considered filled with water such that the surveillance requirement is met. "

Evaluation

- The definition of Operability states:
  - "A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, [train/divison], component, or device to perform its specified safety function(s) are also capable of performing their related support function(s)."

Evaluation

- The NRC's Final Policy Statement for Technical Specification Improvements for Nuclear Power Plants (58 FR 39182) states:
  - "The purpose of Technical Specifications is to impose those conditions or limitations upon reactor operation necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety by identifying those features that are of controlling importance to safety and establishing on them certain conditions of operation which cannot be changed without prior Commission approval." (emphasis added)

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Evaluation

- The Final Policy Statement on Technical Specification Improvement also states, "… since 1969 there has been a trend towards including in technical specifications not only those requirements derived from the analyses and evaluation included in the plant's safety analysis report but also essentially all other NRC requirements governing the operation of nuclear power plants. … In the Commission's view, this has diverted both NRC staff and licensee attention from the more important requirements in these documents to the extent that it has resulted in an adverse but unquantifiable impact on safety."
- The ISTS, which were developed in response to the Final Policy Statement, retained in the Tech Specs those parameters that can be tied back to specific safety analysis assumptions, such as setpoints, tank volumes, pump flowrates, etc.

Evaluation

- From these facts, we concluded:
  - A very high standard is set for adding requirements to the Technical Specifications.
  - The requirement to manage entrained gas is imposed on licensees by regulations and TS Operability requirements to ensure systems are capable of performing their specified safety functions.
  - The Staff correctly identified the appropriate basis for managing entrained gas, which is 10 CFR 50, Appendix B and system Operability.

Evaluation

- The industry believes any changes to the TS to address GL 2008-01 should be:
    1. Sufficiently flexible to adjust the scope (including within systems) and frequency of inspections based on past performance and plant-specific vulnerabilities.
        - Evaluations have identified a wide variation in the susceptibility to entrained gas between plants, systems, portions of systems, and operating conditions.
    2. Sufficiently flexible to adjust the acceptance criteria as needed to ensure system Operability.
        - The acceptance criteria will vary by plant, system, location, and plant condition, and will vary over time as inspections are performed and mitigating actions and vulnerabilities are identified.
    3. Able to be submitted for NRC review without including plant-specific variations or evaluations.

Recommendation

- The team recommends that the existing SRs be removed and the management of the effects of entrained gas on the Operability be controlled by:
  - The existing TS requirement that a system be Operable, and
  - The licensee actions in response to GL 2008-01, e.g., improved:
    - Monitoring for gas
    - Processes
    - Procedures
    - Training
    - Corrective Action Programs

Justification

1. A Surveillance is not appropriate for this application:
   a) Surveillances require performance of specific verifications to meet stated acceptance criteria within fixed Frequencies.
   b) Imposition of an SR with specific methods, scope, and acceptance criteria would likely result in substantial over-performance of some activities and under-performance of others, depending on plant design.

Justification

2. A TS Administrative Controls program is unnecessary:

   a) Entrained gas is one of many aspects of Operability, most of which are not explicitly stated in TS, such as cooling water, flow balancing, recirculation flow, component integrity, and lubrication. These are established and verified by licensee design control, operations and maintenance programs, all of which are subject to the Quality Assurance requirements established in 10 CFR 50, Appendix B and the definition of Operability

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Justification

2. A TS Administrative Controls program is unnecessary:

   b) A TS Administrative Controls program would simply restate existing requirements as acknowledged in responses to the Generic Letter.

      i. Licensees have taken actions to monitor and mitigate entrained gas in the specified systems.

      ii. In their response to the GL, licensees have docketed acknowledgment of the requirements to manage gas accumulation as part of system Operability.

      iii. Responses to Generic Letters become part of the plant's licensing basis.

      iv. NRC may inspect compliance with those requirements.

Justification

3. In other similar instances in which the NRC has identified a potential threat to system Operability, TS controls have not been added.
   a) Bulletin 85-03, "Motor-Operated Valve Common Mode Failures During Plant Transients Due to Improper Switch Settings"
   b) Generic Letter 87-12, "Loss of Residual Heat Removal (RHR) While the System (RCS) is Partially Filled"
   c) Generic Letter 88-17, "Loss of Decay Heat Removal"
   d) Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment"

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Justification

e) Generic Letter 97-04, "Assurance of Sufficient Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal Pumps“

f) Generic Letter 04-02, “Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized Water Reactors”

Licensees responded to these issues by revising inspections, procedures, preventive maintenance measures, etc., without the adoption of additional TS requirements.

The NRC inspection process, the Maintenance Rule, and the performance indicators have proven sufficient to ensure these technical issues are addressed without imposing additional TS requirements.

Justification

4. In the GL, the NRC did not rely on TS requirements as the basis for the need to manage entrained gas or to determine Operability of the subject safety systems.

   The NRC's TIA response 2008-03, dated October 21, 2008, acknowledged that the existing SRs are met by determining system operability through an operability determination when gas is found.

   This is the same approach we are suggesting.

Conclusion

- Licensee responses to Generic Letters have historically been effective in addressing Operability concerns.
- NRC and industry efforts to address GL 08-01 have been instrumental in improving licensee awareness of gas management issues, resulting in significant improvement of gas management programs.
- Adding additional TS requirements to address entrained gas is unnecessary to ensure that the issue is adequately addressed.
- We believe that removing the existing SR, combined with the industry actions, clarifies the role of gas management in system Operability.