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Date: 11/30/05 3:18PM
Subject: Comments on NUREG-1829

Dr. Greene,

General Electric is submitting electronic comments on NUREG-1829 (attached) to you and written comments to the Rules Review and Directives Branch as specified in the NUREG. Please contact me with any questions.

We appreciate the opportunity to provide these comments.

10/04/05
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(5)

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November 30, 2005

U.S. Nuclear Regulatory Commission
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Washington, D.C. 20555-0001

Attention: Chief, Rules Review and Directives Branch

Subject: Comments on NUREG-1829, *Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process*

GE appreciates the opportunity to comment on NUREG-1829. This NUREG is important because of the role it played in supporting the NRC's proposed rule for 10 CFR 50.46. We have no concerns about the manner in which the elicitation was performed, but we have significant concerns about lack of credit given by the reviewers for mitigation of some of the failure mechanisms attributed to the BWR piping design. This lack of credit results in the selection of excessively conservative Transition Break Size (TBS) for BWRs. The general concerns are articulated below, and specific comments are provided in the enclosure.

It is apparent that the panel has not given appropriate credit to the IGSCC mitigation measures for the NSSS stainless steel piping that the BWR plants have implemented since the early 1980s. For example, the second paragraph from bottom on page xvii states, in part: "...the biggest frequency contributors for each LOCA size tend to be systems having the smallest pipes, or component, which can lead to that size LOCA. The exception to this general rule is the BWR recirculation system, which is important at all LOCA sizes due to lingering IGSCC concerns." Since the largest pipe size in the recirculation piping system can be up to 28 inches, the preceding statement essentially implies that LB LOCA redefinition is not applicable to BWRs. The panel did not seem to give adequate credit for several effective mitigation measures in terms of better material (e.g., use of nuclear grade stainless steel in replacement lines), stress improvement (e.g., induction heating stress improvement [IHSI], last pass heat sink welding [LPHSW], and mechanical stress improvement process [MSIP]) and water environment (e.g., hydrogen water chemistry [HWC]) and repair measures such as the weld overlays and elimination of creviced geometries. On the other hand, the panel did accept the future effectiveness of mitigation measures for PWSCC issue for the PWR small diameter piping

(p. 6-5) in reducing failure rates for this piping. The NUREG should provide similar credit for the BWR IGSCC mitigation measures noted above with regard to break frequencies.

Another issue is the inclusion of thermal fatigue as a degradation mechanism for the BWR feedwater line. We are not aware of any thermal fatigue issue other than the feedwater nozzles; that issue was taken care in the early 1980s through several mitigation measures including the installation of GE-designed triple thermal sleeve. A rigorous inspection program per NUREG-0619 is currently in place. Not a single one of hundreds of these inspections have turned up any evidence of cracking. Thus, thermal fatigue is not an issue in the NSSS portion of the BWR feedwater line.

In summary, while the expert elicitation process used by the NRC has sufficient rigor for the intended purpose, the information used to assess BWR piping does not take into account the extensive and effective mitigation measures employed by BWRs for many years. This leads to an unrealistically conservative view of the transition break size for LOCA piping in the proposed revision to 10 CFR 50.46, which unduly limits the application of the proposed rule changes for BWRs. This proposed rule will be the subject of additional commentary at a later date.

We would be happy to discuss the technical basis for our concerns in more detail. If you have any questions, please contact Fred Emerson (910) 675-5615 or myself.

Sincerely,

James F. Harrison for

Louis M. Quintana
Manager, Licensing

Project No. 691

Enclosure: Comments on NUREG-1829, *Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process*

cc: NRC Document Control Desk
Dr. Charles A. Greene, RES
Dr. Brian W. Sheron, NRR
Mrs. Michelle Honcharik, NRR
HS Mehta (GE/San Jose)
FA Emerson (GE/Wilmington)
GB Stramback (GE/San Jose)
MJ Colby (GE/Wilmington)
FT Bolger (GE/Wilmington)
DC Pappone (GE/San Jose)

Enclosure to MFN 05-144

Specific Comments on NUREG-1829, Estimating Loss-of-Coolant Accident (LOCA) Frequencies Through the Elicitation Process

1. Table 1 on page xix mentions an effective break size of 41 inches for BWRs. It is likely to be an artifact of an assumed LOCA flow of 500,000 gpm and not representative BWR NSSS geometries.

2. Tables 3.7 and B.1.9 depict the assumed conditions for the base cases. For the BWR recirculation line, the assumed plant water chemistry condition is NWC. This is not representative of the current US BWR fleet where most of the plants are operating on HWC. It is not clear if the panel has factored in the improvements in reactor water conductivity, irrespective of whether the plant is on NWC or HWC, that most BWR plants put in place in the last decade.

3. For the BWR feedwater line base case, Tables 3.7 and B.1.9 mention assumed water chemistry condition as NWC and include flow-assisted corrosion (FAC) as an aging mechanism. We believe that FAC is a potential issue in BWR feedwater lines only when the oxygen level is very low (e.g., few ppb) – a possibility with HWC. During the NWC condition assumed in the base case, the oxygen level is high enough that FAC is not likely to be an issue. Also, most BWR plants with HWC have implemented controls to maintain a certain minimum oxygen level in the incoming feedwater to mitigate likelihood of FAC.

4. Figure D.7 in Appendix D shows two throughwall IGSCC cases for 22 inch and 28 inch stainless steel pipe field history data. We are not aware of any throughwall IGSCC cracks in large diameter (>20-inch) BWR stainless steel pipes. A primary reason for this is the presence of mid-wall compressive weld residual stresses in such pipe that tend to retard deep cracks.

5. Table 4.1 shows a six-orders of magnitude difference between the PFM and the field history estimates of through-wall cracking frequencies for the BWR-2 base case. Although the report suggests that service history data could be analyzed to resolve this difference, it is not clear if this was actually done. This also points out the need for a rigorous examination of the statistical methods used to translate field leak data or service experience data into pipe break frequencies.