

March 30, 1994

Docket No. 52-001

Mr. Joseph F. Quirk  
GE Nuclear Energy  
175 Curtner Avenue, MC-782  
San Jose, California 95125

Dear Mr. Quirk:

SUBJECT: REMAINING ISSUES ON ADVANCED BOILING WATER REACTOR (ABWR) REVIEW

In a letter dated March 9, 1994, the staff provided the Advisory Committee on Reactor Safeguards (ACRS) with revisions to the advance copy of the safety evaluation report (SER) on the ABWR design that addressed 13 of the remaining issues. An issue that was not addressed in that letter involves quality assurance for the ABWR design. The staff is currently preparing the revision to the SER for that issue based upon our recent inspection.

The purpose of this letter is to advise you that the staff has reconsidered its position on Open Item F6.2.1.9-1, Suppression Pool Strainer Size, as set forth in the March 9, 1994, letter. The staff has recently completed its reevaluation of GE's proposed resolution in its letter dated February 14, 1994, and determined that GE has not adequately addressed this issue. The staff's position on this issue is enclosed. I also want to remind you that the missing combined license action item for an updated probabilistic risk assessment, as discussed in Open Item F1.9-1, needs to be included in your standard safety analysis report (SSAR).

The current status of these remaining issues will be addressed in a letter to the ACRS prior to its April full committee meeting. If you have any questions or desire further discussion on these issues, please contact Son Ninh at (301) 504-1125 or Dave Tang at (301) 504-1147.

Sincerely,

Original Signed By:

R. W. Borchardt, Director  
Standardization Project Directorate  
Associate Directorate for Advanced Reactors  
and License Renewal  
Office of Nuclear Reactor Regulation

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GE Nuclear Energy

Docket No. 52-001

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ADVANCED BOILING WATER REACTOR (ABWR) EMERGENCY  
CORE COOLING SYSTEM (ECCS) SUCTION STRAINERS

The technical staff has reassessed the potential impact of clogging of the ECCS suction strainers on the GE ABWR design. The staff has considered GE's position which required that the DHR strainers be sized at three (3) times the area determined according to the method referenced in Regulatory Guide (RG) 1.82, Revision 1, for all loss-of-coolant accidents (LOCAs) except the main steam line (MSL) and reactor core isolation cooling (RCIC) steam line breaks. For those breaks, the strainers must be at least equivalent to the area calculated according to the RG. The GE position allows the high pressure core flooder (HPCF) and RCIC strainers to be sized according to the RG, without the factor of three enhancement.

The staff has conducted a qualitative assessment of the risk associated with not applying the three-times multiplier to (1) the steam line breaks for the decay heat removal (DHR) system and (2) the design of the RCIC and HPCF strainers. The risk analysis shows that the incremental risk is marginal, unless very pessimistic assumptions are used.

Nevertheless, there remain uncertainties in our knowledge of the severity of this phenomenon on the design basis of the ECCS. Recent technical assessments for operating reactors have led the staff to issue NRC Bulletin 93-02, Supplement 1, which requests interim compensatory actions to minimize the potential for loss of ECCS suction pressure as a result of a LOCA. Further analysis is required to assess the impact of non-fibrous debris on the potential for head loss. The staff has not yet bounded the magnitude of this issue.

In light of these uncertainties, and considering the limited impact that this issue could have on the cost of constructing an ABWR, it seems prudent to consider a more conservative position, to ensure compliance with 10 CFR 50.46 regardless of the outcome of the ongoing research program. This approach is in line with the agency's goal of providing a greater margin of safety for next-generation reactor designs.

Within the ECCS design basis, the high pressure systems (HPCF and RCIC) are not credited for long term recirculation and core cooling. However, these systems are options available to the operators and included within the Emergency Operating Procedures (EOP) for response to all accidents, including breaks in the MSL. Accordingly, the staff believes that the suction strainers for these systems should be sized for the spectrum of breaks for which they would be relied upon within the EOPs.

The staff believes that the concerns expressed above should be addressed by requiring that all ECCS suction strainers be sized to three times the area that would be calculated based on RG 1.82, Revision 1. The sizing of each strainer should consider all LOCA scenarios for which that system impacts the design basis or the probabilistic safety assessment (PSA) risk, or is relied upon within the EOPs.

Enclosure