

**GPU Nuclear**

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June 22, 1982  
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Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulations  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)  
Operating License No. DPR-50  
Docket No. 50-239  
Current NRC Staff Consideration of Possible Recommendations  
for PTS Requirements, June 3, 1982 (ACRS)

At the June 9, 1982, meeting you requested input from industry on the subject regulatory position that the NRC Staff is considering for Pressurized Thermal Shock. You requested this input within two weeks.

As Chairman of the B&W Owners Group, I appreciate your request and have consolidated several comments and ideas from the various licensees with B&W-designed reactors and have included them below. Because of the basic differences among the various NSSS designs (e.g. vent valves and OTSG's in B&W units) this letter only addresses the B&W type plant. Furthermore, because there are differences in individual plants within the B&W category, (e.g. pressurizer valve sizes, weld locations, HPI system capacities, integrated plant response, etc.) I expect that you will receive more specific comments from individual licensees.

As you are aware, the PTS concern received considerable attention during the last year and a half when the Staff requested several analyses from the various owner's groups. The B&W Owners Group - Materials Subcommittee proceeded in performing generic and bounding evaluation of the Small Break LOCA as required by NUREG 0737. These evaluations were very conservative in nature indicating that plant specific and more refined analyses were required.

The Owners Group Materials Subcommittee met with the Staff on several occasions during 1981 to review the program and methodology the Owners Group would use in resolving the PTS concerns for both SBLOCA and overcooling transients. During the meetings, we emphasized to the Staff that our program was a related outgrowth of our RV Integrity Program initiated in 1977.

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Since that time and within the last year, a considerable amount of time and resources has been invested in a program to insure vessel integrity not only through extensive analyses but through an integrated surveillance and testing program. During recent meetings with the Staff, we perceived the Staff's concurrence that we were pursuing the right goals and taking a path that would adequately evaluate the integrity of the B&W RV under design basis, operational and selected multiple failure conditions. In fact, in the realm of transient selection, the Staff urged us to examine conservative but realistic scenarios. We felt the events had to be mechanistic in that they could happen physically, they had to be probable and they had to challenge the vessel in a PTS manner.

The Oconee submittal in January 1982 and the preliminary submittal of the TMI-1 PTS analysis meet the Staff's stated goals. Likewise, the Owners Group has worked with EPRI which is pursuing parallel goals in examining the PTS issue. A great deal of time has been spent in developing mixing models that realistically describe fluid temperature conditions directly related to PTS. The Staff suggested that industry pursue these concepts realizing the limitations of the overly conservative nature of the generic analyses. In effect, the show cause letter of August 21, 1981 gave credence to the position that plant specific evaluations are the essential ingredient of any PTS analysis.

While two weeks is not adequate time to perform a thorough review of what the Staff has proposed (even if we had the detailed information), we do not agree that a relatively complex item such as thermal shock can be realistically evaluated by focusing on a single parameter, i.e. RTndt. In the long term we believe that the actual fracture toughness of the materials and plant-specific performance must be considered in the resolution of this issue.

However, based on a review of your June 9, 1982 presentation the following general comments are offered:

1. Generic Position - Member's of the B&W Owners' Group have learned that the evaluation of PTS requires the careful integration of many technical disciplines and the results depend on each individual plant's configuration and performance. Therefore, it appears that a generic position is technically unsound, unrealistic and inappropriate unless used solely as an initial screening basis.

2. Criteria - The NRC approach proposes highly conservative conditions which would seriously distort the picture of risk from PTS. For example, it appears that the proposed approach equates a core melt/containment failure with crack initiation, and furthermore, crack initiation is calculated in a very conservative manner (e.g. using bounding cooldown events, "infinite" flaws, etc.). Realistic acceptance criteria could be selected based on the likelihood of the initiating events postulated.

3. Cooldown Events - The proposed design basis cooldown does not realistically represent an actual B&W plant response. The pressure does not remain at a constant value during a transient. Furthermore, each individual plant has systems/operating procedures in place that will provide differing responses to an initiating event as experience has shown.

4.  $RT_{ndt}$  - Although  $RT_{ndt}$  may be today's accepted index to the change in fracture toughness, the emphasis should be on the real fracture toughness of the material. A B&W Owners Group program is responsibly addressing this issue and an undue emphasis on  $RT_{ndt}$  by the NRC could cause the redirection of technically correct programs just to satisfy an overly conservative NRC staff regulatory requirement.

The B&W Owners Group believes that we have proceeded correctly by performing realistic yet conservative evaluations. The first of these evaluations, Oconee-1, was submitted to the Staff in January, 1982 and we have not heard anything that undermines its basic validity. Because our realistic calculations indicate that there is no near-term safety concern, we feel that time is available to carefully consider any regulatory position. No one wants hasty actions or inflexible regulations that may actually decrease plant safety. Therefore, we recommend the following:

1. The NRC Staff should:

- Evaluate the realistic analyses that have been submitted to the Staff.
- Propose draft criteria for use in future plant specific evaluations.
- Provide to industry for comment, the rationale for developing this criteria.

Thus, the time and resources the industry has already expended on the PTS, issue, would provide the bases for the development of future screening criteria as well as generic criteria for plant specific analyses, if required.

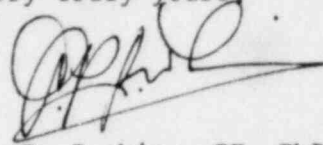
2. As an interim screening position the Staff could use  $RT_{ndt}$  as a means of "flagging" plants with potential concerns. However, the value of  $RT_{ndt}$  used for screening should be established only after a detailed review of the application of the NRC's draft criteria. This would identify those plants that should perform the detailed plant-specific analysis for the NRC review (similar to what Appendix G of 10CFR50 now requires).

3. R&D efforts on other PTS issues like actual fracture toughness, warm prestressing and elastic-plastic fracture mechanics, should continue. Technological advances should be periodically factored into plant specific analyses.

4. Each plant should be analyzed for a realistically probable transient. The B&W Owners are willing to work with the Staff in determining this transient. Because of plant upgrades we expect future operations to be good and a record of events should be kept over the next few years to show current plant performance.

In summary, there is no need for hasty actions. We are willing to work with the Staff, through the B&W Owner's Group, to ensure that the B&W-designed plants continue to operate safely.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'A. P. Rochino', with a long horizontal flourish extending to the right.

A. P. Rochino, PE, PhD  
Chairman, B&W Owners Group  
Materials Subcommittee

PD:dls

cc: Roy Woods, NRC  
G. Vissing, NRC  
J. Taylor, AIF Subcommittee on RV Integrity  
D. Spier, Westinghouse OG  
K. Morris, Combustion Eng. OG