

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 26, 1984

TO ALL BOILING WATER REACTOR (BWR) LICENSEES OF OPERATING REACTORS
(EXCEPT LACROSSE, BIG ROCK POINT, HUMBOLDT BAY AND DRESDEN-1)

Gentlemen:

SUBJECT: REACTOR VESSEL WATER LEVEL INSTRUMENTATION IN BWRs
(GENERIC LETTER NO. 84-23)

The water level instrumentation in a BWR is relied upon for controlling feedwater, actuating emergency systems, and for providing the operators information which is used as basis for actions to assure adequate core cooling. Many of the actions in the emergency procedures guidelines are keyed to reactor water level.

The NRC staff has reviewed the S. Levy, Inc. report SLI-8211, "Review of BWR Reactor Vessel Water Level Measurement System," which was commissioned by the BWR Owners Group. The report provides a generic evaluation of water level instrumentation adequacy of BWR/2 through BWR/6 plants and identifies several improvements in BWR water level measurement and instrumentation systems which will improve the reliability and accuracy of those systems. The staff has concluded that changes identified in the emergency procedure guidelines are adequate for the short term, but permanent physical improvements should be made on a deliberate schedule to reduce the burden on the operator. Three potential improvement categories are presented below:

- ° Improvements to plant(s) that will reduce level indication errors caused by high drywell temperature. These improvements include prevention of reference leg overheating or reduction of the vertical drops in the drywell. (Vertical drop should be measured from the condensation pot to the drywell exit point. Maximum drop would allow an indicated level at the bottom of the normal operating range when actual level is just above lower tap for worst flashing condition.) Those plants for which the vertical drop in the drywell has already been minimized will not have to make additional changes for the drywell heating effect.
- ° Review of plant experience relating to mechanical level indication equipment. Plant experience shows mechanical level equipment is more vulnerable to failure or malfunction than analog equipment. A number of plants have already connected analog trip units to their level transmitters to improve reliability and accuracy. Those plants that use mechanical level indication should replace the mechanical level indication equipment with analog level transmitters unless operating experience confirms high reliability.

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- ° Changes to the protection system logic that may be needed for those plants in which operator action may be required to mitigate the consequences of a break in a reference leg and a single failure in a protection system channel associated with an intact reference leg. Changes will generally result in additional transmitters to satisfy the single failure criterion. This improvement, under evaluation by NRC, may be needed in plants where an analysis has demonstrated a vulnerability.

Implementation of the first two categories of improvements will give increased assurance that the level instrumentation will provide the inadequate core cooling instrumentation required by NUREG-0737, Item II.F.2 and thereby satisfy this requirement. Please submit within 30 days a description of your plans to implement these improvements and your proposed schedule.

The last improvement is still being evaluated by the staff; hence it is not a requirement at this time. However, should the continuing evaluation show that there is a significantly high priority. It will be identified as a new generic letter.

This request for information was approved by the Office of Management and Budget under clearance number 3150-0065 which expires September 30, 1985.

Sincerely,

Frank Miraglia/for

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