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ZWOLINSKI,J.A.
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BLANCH,P.M. Affiliation Not Assigned

SUBJECT: Responds to 970605 electronic message which questioned what addl work NRC staff was undertaking to address extent of level instrumentation inaccuracies at PWRs.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 22, 1997

Mr. Paul M. Blanch
Energy Consultant
135 Hyde Road
West Hartford, Connecticut 06117

Dear Mr. Blanch:

I am responding to your June 5, 1997 electronic message addressed to me in which you questioned what additional work the Nuclear Regulatory Commission (NRC) staff was undertaking to address the extent of level instrumentation inaccuracies at pressurized water reactors (PWRs). Your concern arose from recent level instrument related events that have occurred at several PWR facilities. The staff has initiated several actions to address this issue. I will discuss the major focus of these initiatives in the paragraphs below.

In a letter dated October, 19 1993, the staff requested all three PWR owners groups; Westinghouse, Combustion Engineering, and Babcock and Wilcox (B&W); to evaluate the effect of potential water level inaccuracies caused by the accumulation of noncondensable gases in the reference legs of pressurizer level instrumentation, steam generator level instrumentation, and reactor vessel level instrumentation. Replies to the staff's request were received from all three owners groups in early 1994. The staff assessed the responses and issued its evaluations by letters dated March 21, 1994. The staff concluded that water level instrument inaccuracies due to noncondensable gases are not a significant safety concern for PWRs.

Several events related to PWR level instrumentation have recently occurred which warranted additional attention by the staff on the issue of level instrument inaccuracies. On March 24, 1997, an event occurred at Sequoyah Unit 1 involving an inadvertent drain down of 3300 gallons of water from the reactor coolant system (RCS). This event was the result of operator reliance on a single erroneous nonsafety-related pressurizer level instrument to direct RCS drain down for refueling. Inadequate procedures and training contributed to this event. Another event occurred at Zion Unit 2 on March 7, 1997. During this event, gas accumulation in the reactor vessel head was not promptly identified by the operators. Lack of knowledge of the reactor vessel level instrumentation system (RVLIS) by plant operations and engineering personnel contributed to this event. An information notice will be issued by the staff in the near future to sensitize the industry to such vulnerabilities.

On May 3, 1997, at Oconee Unit 2, a degraded reference leg common to both level indicators for the letdown storage tank resulted in damage to two high pressure injection pumps and could have damaged the third pump. Oconee has made a system modification in response to this event. The staff is evaluating the effectiveness of this modification. On June 24, 1997, the staff issued Information Notice 97-38, "Level-Sensing System Initiates Common-Mode Failure of High Pressure Injection Pumps," that discusses this event. The staff has been interacting with the industry through the B&W Owners Group to aid in the evaluation of this event. Further regulatory actions may be forthcoming based on the final analysis.

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In light of these recent events, the staff revisited the conclusions of its March 21, 1994, evaluation of noncondensable gases in PWR level instrumentation. The rereview focused on the impact of level instrumentation errors due to noncondensable gases on automatic safety system actuations and operator actions during design-basis events. For these scenarios, the conclusions of the staff's previous evaluations are still valid. However, the evaluations did not address the impact of level errors due to noncondensable gases during normal plant evolutions such as drain down for refueling. The evaluations also did not consider level instrumentation inaccuracies due to causes other than noncondensable gases. To determine what additional actions, if any, are necessary to resolve this issue on a generic basis, the staff has initiated a search of licensee event reports to evaluate the extent of events related to level instrumentation inaccuracies.

As noted, the staff has initiated several actions with respect to level instrumentation inaccuracies at PWRs and is continuing to evaluate the extent of the issue. Additional actions to resolve this issue on a generic basis are being evaluated. I trust you find this information useful.

Sincerely,

ORIGINAL SIGNED BY:

John A. Zwolinski, Deputy Director
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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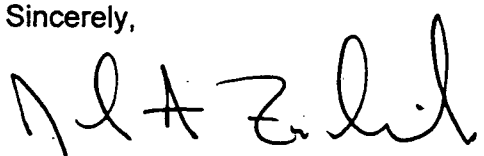
Sincerely,



John A. Zwolinski, Deputy Director
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