

GL82028

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

December 10, 1982

TO: ALL LICENSEES OF OPERATING WESTINGHOUSE AND CE PWRs (EXCEPT
ARKANSAS NUCLEAR ONE - UNIT 2 AND SAN ONOFRE UNITS 2 AND 3)

SUBJECT: INADEQUATE CORE COOLING INSTRUMENTATION SYSTEM (GENERIC LETTER NO.
82-28)

Gentlemen:

On November 4, 1982, the Commission determined that an instrumentation system for detection of inadequate core cooling (ICC) consisting of upgraded subcooling margin monitors, core-exit thermocouples, and a reactor coolant inventory tracking system is required for the operation of pressurized water reactor facilities.

On the basis of analysis of information provided by licensees, meetings with industry groups and independent studies by the NRC Staff, the Commission has found that during a small LOCA, there is a period of time before the core has boiled dry (indicated by core exit thermocouples) when the operators have insufficient information to clearly indicate a void formation in the reactor vessel head or to track the inventory of coolant in the vessel and primary system. The Subcooling Margin Monitor gives early indication of a problem but does not indicate whether the condition is getting worse or better.

The addition of a reactor coolant inventory system will improve the reliability of plant operators in diagnosing the approach of ICC and in assessing the adequacy of responses taken to restore core cooling. The benefit will be preventive in nature in that the instrumentation will assist the operator in avoidance of ICC when voids in the reactor coolant system and saturation conditions result from over cooling events, steam generator tubes ruptures, and small break loss of coolant events. The addition of a reactor coolant inventory system, coupled with upgraded in-core thermocouple instruments and a subcooling margin monitor, provides an ICC instrumentation package which could significantly reduce the likelihood of human misdiagnosis and errors for events such as steam generator tube ruptures, loss of instruments bus or control system upsets, pump seal failures, or overcooling events originating from disturbances in the secondary coolant side of the plant. For less frequent events, involving coincidental multiple faults or more rapidly developing small break LOCA conditions, the ICC could also reduce the probability of human misdiagnosis and subsequent errors leading to ICC.

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The Nuclear Regulatory Commission has completed its review of several generic reactor level or inventory system instrumentation systems which have been proposed for the detection of ICC in PRWs. The Combustion Engineering Heated Junction Thermocouple (HJTC) system and the Westinghouse REactor Vessel Level Instrumentation System (RVLIS) are acceptable for tracking reactor coolant system inventory and provided an enhanced ICC instrument package when used in conjunction with core exit thermocouple systems and subcooling margin monitors designed in accordance with NURGE-0737 and operated within approved Emergency Operating Procedure Guidelines. The details of the NRC staff review of these generic systems are reported in NURGE/CR-2627 and NUREG/CR-2628 for the Combustion Engineering and Westinghouse systems, respectively.

Other differential pressure (d/p) measurement techniques for reactor coolant system inventory tracking are acceptable provided that they meet NURGE-0737 design requirements and monitor the coolant inventory over the range from the vessel upper head top to the bottom of the hot leg as a minimum.

In order for the Commission to complete its review of your ICC system to assure that an acceptable system is installed as soon as practicable, the NRC requires additional information.

Accordingly, in order to determine whether your license should be modified, you are required to submit to the Director, Division of Licensing, NRR, the following information in writing and under oath or affirmation pursuant to Section 182 of the Atomic Energy Act and 10 CFR 50.54 (f) of the Commission's regulations.

1. Within 90 days of the date of this letter, identify to the Director, Division of Licensing, the design for the reactor coolant inventory system selected and submit to the Director, Division of Licensing, detailed schedules for its engineering, procurement and installation. References to generic design descriptions and to prior submittals containing the required information, where applicable, are acceptable.
2. Within 90 days of the date of this letter review the status of conformance of all components of the ICC instrumentation system, including subcooling margin monitors, core-exit thermocouples, and the reactor coolant inventory tracking system, with NUREG-0737, Item II.F.2 and submit a report on the status of such conformance.

3. The installation of the ICC instrumentation system shall be completed during the earliest refueling shutdown consistent with the existing status of the plant and practical design and procurement considerations. It has become apparent, through discussions with owners' groups and individual licensees, that schedules must adequately consider the integration of these requirements with other TMI related

activities. In recognition of this and the difficulty in implementing generic deadlines, the Commission has adopted a plan to establish realistic plant-specific schedules that take into account the unique aspects of the work at each plant. Each licensee is to develop and submit its own plant-specific schedule which will be reviewed by the assigned NRC Project Manger. The NRC Project Manager and licensee will reach an agreement on the final schedule and in this manner provide for prompt implementation of these important improvements while optimizing the use of utility and NRC resources.

Licensees who have completed installation if an approved generic ICC instrumentation system, are authorized to make their system operable prior to final NRC approval for purposes of operator training and familiarization. However, the ICC instrumentation system should not be turned on until the licensee has completed the task analysis portion of the control room design review, and should be used with prudence in relation to any operator actions or decisions until the plant specific design and installation has been approved y the staff and instructions in its use and operation have been incorporated in accordance with the Emergency Operating Procedure Guidelines into approved emergency operating procedures.

For your convenience in preforming the status review (Item 2) of your conformance with NURGE-0737, a check list of the nine items of documentation cited on pp II.F.2-3 and 4 of that document is provided in an appendix to this letter. Even though you may have provided much if the information required for our review, we have not yet received all of the information required to complete our review of plant specific installations for any licensee. In addition, some licensees have modified their positions during the period when NRC was re-reviewing the II.F.2 requirements. Therefore, your status report should review for completeness and reference those earlier submittals, including generic submittals, which remain valid in response to documentation items on the check list. In addition, you should include a proposed schedule for the remaining submittals. Information items to be addressed in the submittal regarding your review of core exit thermocouples for conformance to NURGE-0737,II.F.2, Attachment 1, and your review of the ICC instrumentation for conformance to NURGE-0737, Appendix B, are also listed in the appendix to this letter. The staff review will focus on deviations from the design criteria.

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This request for information was approved by OMB under clearance number 3150-0065 which expires May 31,1983. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports and Management, Room 3208, New Executive Office Building, Washington, D.C.

Sincerely,

Darrell G. Eisenhut, Director
Division of Licensing

Enclosure:
As stated