



**PUBLIC  
SERVICE  
INDIANA**

S. W. Shields  
Senior Vice President -  
Nuclear Division

May 9, 1983  
SVP-0090-83

Mr. D. G. Eisenhut  
Director, Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Docket Nos.: STN 50-546  
STN 50-547  
Construction Permit Nos.:  
CPPR-170  
CPPR-171

Marble Hill Nuclear Generating Station - Units 1 and 2  
Generic Letter No. 83-10c

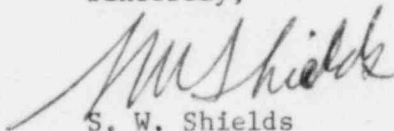
Dear Mr. Eisenhut:

On March 23, 1983, Public Service Company of Indiana, Inc. (PSI) submitted to you our schedule for resolution of TMI Action Item II.K.3.5 "Automatic Trip of Reactor Coolant Pumps." As a member of the Westinghouse Owner's Group (WOG), PSI has utilized information generated by WOG to address the generic issues of the subject letter. This information has been summarized to parallel the organization of the enclosure to Generic Letter No. 83-10c and is attached for your review.

As noted in our March 23, 1983 submittal, PSI's response to items I.1e, I.3a, and I.3c will be addressed in an amendment to Appendix E, Section E.52, of the Final Safety Analysis Report. This amendment is scheduled to be submitted by March 31, 1984.

If you have any questions regarding this matter, please contact me at your convenience.

Sincerely,

  
S. W. Shields

8305130119 830509  
PDR ADOCK 05000546  
A PDR

SWS/DJH/bak

Attachment

cc: J. G. Keppler  
J. E. Konklin  
J. F. Schapker

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PUBLIC SERVICE INDIANA'S  
RESPONSE TO  
NRC GENERIC LETTER 83-10c

TMI ACTION ITEM II.K.3.5  
"AUTOMATIC TRIP OF REACTOR COOLANT PUMPS"

I. Pump Operation Criteria Which Can Result in Reactor Coolant Pump Trip During Transients and Accidents.

1. Setpoints for RCP Trip

The Westinghouse Owners Group (WOG) will undertake a two part program to address the requirements of NRC Generic Letter 83-10c. The purpose of the program is to provide more uniform Reactor Coolant Pump (RCP) trip criteria and methods of determining those criteria. In the first part of the program, revised RCP trip criteria will be developed which provides an indication to the operator to trip the RCPs for small break Loss Of Coolant Accidents (LOCAs) requiring such action but will allow continued RCP operation for steam generator tube ruptures, less than or equal to a double-ended tube rupture. The revised RCP trip criteria will also be evaluated against other non-LOCA transients and accidents where continued RCP operation is desirable in order to demonstrate that a need to trip the RCPs will not be indicated to the operator for the more likely cases. Since this study is to be utilized for Emergency Response Guideline development, better estimate assumptions will be applied in the consideration of the more likely scenarios. The first part of the program will be completed and incorporated into revision 1 of the Emergency Response Guidelines developed by Westinghouse for the WOG. The scheduled date for completion is July 31, 1983. The second part of the program is intended to provide the required justification for manual RCP trip. This part of the program must necessarily be done after the completion of the first part of the program. The schedule for completion of the second part of the program is the end of 1983.

Revision 1 to WOG Emergency Response Guidelines will be reviewed and incorporated into the Marble Hill Emergency Operating Procedures (EOPs) upon receipt. This will be accomplished within the overall schedule for upgrading EOPs, which includes training and verification/validation, by five (5) months prior to fuel load on Unit 1.

- a) As stated above, Westinghouse and the Westinghouse Owners Group are developing revised RCP trip criteria which will assure that the need to trip the RCPs will be indicated to the operator for LOCAs where RCP trip is considered necessary. The criteria will also ensure continued forced RCS flow for:
  - 1) steam generator tube rupture (up to the design bases, double-ended tube rupture)
  - 2) the other more likely non-LOCA transients where forced circulation is desirable (e.g., steam line breaks equal to or smaller than one (1) stuck open PORV)

NOTE: Event diagnosis will not be used. The criteria developed will be symptom based.

The criteria being considered for RCP trip are:

- 1) RCS wide range pressure < constant
- 2) RCS subcooling < constant
- 3) Wide range RCS pressure < function of secondary pressure

Instrument uncertainties will be accounted for. Environmental uncertainty will be included if appropriate.

No partial or staggered RCP trip schemes will be considered. Such schemes are unnecessary and increase the requirements for training, procedures and decision making by the operator during transients and accidents.

- b) The RCP trip criteria selected will be such that the operator will be instructed to trip the RCPs before voiding occurs at the RCP.
- c) The criteria developed in Item 1a above is not expected to lead to RCP trip for the more likely non-LOCA and SGTR transients. However, since continued RCP operation cannot be guaranteed, the emergency response guidelines provide guidance for the use of alternate methods for depressurization.
- d) The Emergency Response Guidelines contain specific guidance for detecting, managing and removing coolant voids that result from flashing. The symptoms of such a situation are described in these guidelines and in detail in the background document for the guidelines. Additionally, explicit guidance for operating the plant with a vaporous void in the reactor vessel head is provided in certain cases where such operation is needed. Marble Hill Emergency Operating Procedures will incorporate the provisions of the WOG Emergency Response Guidelines concerning the detection, management, and removal of coolant voids. In addition, the Background Documents will be used extensively as the basis for operator training
- e) This item will be addressed in an amendment to Appendix E of the FSAR by March 31, 1984 per March 23, 1983 correspondence.
- f) Discussed in 1a and 1c.

## 2. Guidance for Justification of Manual RCP Trip

The Westinghouse Owners Group response to this section of requirements will be reported separately at the end of 1983. The WOG report on justification of manual RCP trip is scheduled for completion by the end of 1983. Marble Hill will review, evaluate, and include this justification in the EOPs when the report is received. At that time the FSAR will be reviewed and compared to said justification to determine

if any changes are necessary. Also upon receipt of this justification, potential changes in the operator training program will be addressed. This review should be completed to correspond to the amendment of the FSAR currently scheduled for March 31, 1984.

- a) A significant number of analyses have been performed by Westinghouse for the Westinghouse Owners Group using the currently approved Westinghouse Appendix K evaluation model for small break LOCA. This evaluation model uses the WFLASH code. These analyses demonstrate for small break LOCAs of concern, if the RCPs are tripped two (2) minutes following the onset of reactor conditions corresponding to the RCP trip setpoint, the predicted transient is nearly identical to those presented in the Safety Analysis Reports for all Westinghouse plants. Thus, the Safety Analysis Reports for all plants demonstrate compliance with requirement 2a. The analyses performed for the Westinghouse Owners Group will be used to demonstrate the validity of this approach.
- b) Better estimate analyses will be performed for a limiting Westinghouse designed plant using the WFLASH computer code with better estimate assumptions. These analyses will be used to determine the minimum time available for operator action for a range of break sizes such that the Emergency Core Cooling System (ECCS) acceptance criteria of 10CFR50.46 are not exceeded. It is expected that the minimum time available for manual RCP trip will exceed the guidance contained in NUREG-0660. This will justify manual RCP trip for all plants.

### 3. Other Considerations

- a) This item will be addressed in an amendment to Appendix E of the FSAR by March 31, 1984 per March 23, 1983 correspondence.
- b) The Emergency Response Guidelines contain guidance for the timely restart of the reactor coolant pumps when conditions which will support safe pump start-up and operation are established. Timely restart of the reactor coolant pumps will be accomplished safely in accordance with the WOG Emergency Response Guidelines. The guidelines will be incorporated into the EOPs in accordance with the schedule to upgrade the Marble Hill Emergency Operating Procedures, which includes training and verification/validation, by five (5) months prior to fuel load on Unit 1.
- c) This item will be addressed in an amendment to Appendix E of the FSAR by March 31, 1984 per March 23, 1983 correspondence.

## II. Pump Operation Criteria Which Will Not Result in RCP Trip During Transient and Accidents.

The preferred and safest method of operation following a small break LOCA is to manually trip the RCPs. Therefore, there is no need to address the criteria contained in this section.