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SUBJECT: Forwards response to Generic Ltr 83-10d plan for resolution of TMI Action Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps," Response developed by Westinghouse Owners Group & tailored to facility.

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April 22, 1983

Director of Nuclear Reactor Regulation
Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Response to Generic Letter No. 83-10d, "Automatic Trip of Reactor Coolant Pumps"
R. E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Crutchfield:

Generic Letter No. 83-10d was received on February 23, 1983. This letter requested that we provide you with our plans and schedules for resolving the reactor coolant pump trip issue for the Ginna plant. Attached is a generic response which was developed by the Westinghouse Owners Group and tailored to the Ginna plant.

Very truly yours,

John E. Maier

John E. Maier

Subscribed and sworn to before me

on this 22nd day of April, 1983.

A001

Lynn I. Hauck

LYNN I. HAUCK
NOTARY PUBLIC, State of N.Y., Monroe County
My Commission Expires March 30, 1984

PLAN FOR RESOLUTION OF TMI ACTION ITEM II.K.3.5

"AUTOMATIC TRIP OF REACTOR COOLANT PUMPS"

INTRODUCTION

The criteria for resolution of TMI Action Plan Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps" were stated in letters from Mr. Darrel G. Eisenhut of the Nuclear Regulatory Commission to all Applicants and Licensees with Westinghouse designed Nuclear Steam Supply Systems (83-10 d) dated February 8, 1983. The following represents the plan for demonstrating compliance with those criteria. In order to avoid confusion, the overall philosophy and plan will first be stated. Then, each section of the attachment to NRC letter 83-10 d will be addressed as to how the overall plan responds to each NRC criteria.

OVERALL PLAN

In the four years that have passed since the event at Three Mile Island, Westinghouse and the Westinghouse Owners Group have held steadfastly to several positions relative to post accident reactor coolant pump (RCP) operation. First, there are small break LOCAs for which delayed RCP trip can result in higher fuel cladding temperatures and a greater extent of zircalloy-water reaction. Using the conservative evaluation model, analyses for these LOCAs result in a violation of the Emergency Core Cooling Systm (ECCS) Acceptance Criteria as stated in 10CFR50.46. The currently approved Westinghouse Evaluation Model for small break LOCAs was used to perform these analyses and found acceptable for use by the NRC in letter 83-10 d. Therefore, to be consistent with the conservative analyses performed, the RCPs should be tripped if indications of a small break LOCA exist.

Secondly, Westinghouse and the Westinghouse Owners Group have always felt that the RCPs should remain operational for non-LOCA transients and accidents where their operation is beneficial to accident mitigation and recovery. This position was taken even though a design basis for the plant is a loss of off-site power. Plant safety is demonstrated in the Final Safety Analysis Reports for all plants for all transients and accidents using the most conservative assumption for reactor coolant pump operation.

In keeping with these two positions, a low RCS pressure (symptom based) RCP trip criterion was developed that provided an indication to the operator to trip the RCPs for small break LOCA but would not indicate a need to trip the RCP for the more likely non-LOCA transients and accidents where continued RCP operation is desirable. The basis for this criterion is included in the generic Emergency Response Guideline (ERG) Background Document (E-0 Basic Revision, Appendix A). Relevant information regarding the expected results of using this RCP trip criterion can be derived

from the transients which resulted from the stuck open steam dump valve at North Anna in 1979, the steam generator tube rupture at Prairie Island in 1980 and the steam generator tube rupture at Ginna in 1982. The RCPs were tripped in all three cases. However, a study of the North Anna and Prairie Island transients indicated that RCP trip would not have been needed based on the application of the ERG trip criterion. The Ginna event, however, indicated a need to review the basis for the RCP trip criterion to allow continued RCP operation for a steam generator tube rupture for low head SI plants.

Thirdly, it has always been the position of Westinghouse and the Westinghouse Owners Group that if there is doubt as to what type of transient or accident is in progress, the RCPs should be tripped. Again, the plants are designed to mitigate the effects of all transients and accidents even without RCP operation while maintaining a large margin of safety to the public. The existing emergency operating procedures reflect this design approach.

Lastly, it remains the position of Westinghouse and the Westinghouse Owners Groups that RCP trip can be achieved safely and reliably by the operator when required. An adequate amount of time exists for operator action for the small break LOCAs of interest. The operators have been trained on the need for RCP trip and the emergency operating procedures give clear instructions on this matter. In fact, one of the initial operator activities is to check if indications exist that warrant RCP trip.

Westinghouse and the Westinghouse Owners Group will undertake a two part program to address the requirements of NRC letter 83-10 d based on the aforementioned positions for the purpose of providing more uniform 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 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 Westinghouse Owners Group. The scheduled date for completion of Revision 1 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.

The preferred and safest method of pump operation following a small break LOCA is to manually trip the RCPs before significant system voiding occurs.

No attempt will be made in this program to demonstrate the acceptability of continued RCP operation during a small break LOCA. Further, no request for an exemption to 10CFR50.46 will be made to allow continued RCP operation during a small break LOCA.

DETAILED RESPONSE TO NRC LETTER 83-10 D

Each of the requirements stated in the attachment to NRC letter 83-10 d will now be discussed indicating clearly how they will be addressed. The organization of this section of the report parallels the attachment to NRC letter 83-10 d.

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

1. Setpoints for RCP Trip

The Westinghouse Owners Group response to this section of requirements will be contained in Revision 1 to the Emergency Response Guidelines scheduled for July 31, 1983. Within 2 months of receipt of revised Westinghouse Owners Group RCP trip criteria, the criteria will be incorporated into the existing emergency procedures and training will be accomplished. It should be noted that this implementation assumes that the required instrumentation is available at Ginna (see response item I.3.a below). Should this not be the case, a schedule will be developed for timely implementation of the revised criteria. (Rochester Gas and Electric Corporation (RG&E) responded to Generic Letter No. 82-33, Integrated Emergency Response Capability, by letter dated April 15, 1983. The implementation date for the Emergency Operating Procedures including Revision 1 is November 1986.)

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 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 criterion developed in Item la 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 of 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.

The Ginna procedures provide guidance for operation with real or suspected reactor vessel upper head voids. Guidance is also provided for safety injection termination and reactor coolant pump restart with voids present.

e) Essential services for RCP operation are available during a Containment Isolation signal at Ginna unless a Safety Injection (SI) signal occurs with a loss of offsite power. Seal injection from the Chemical Volume Control System is terminated by a charging pump trip upon receipt of an SI signal. However, Component Cooling Water (CCW) services to the RCP remain in operation independent of the SI and/or Containment Isolation signals, unless offsite power is lost. A loss of offsite power coincident with an SI signal will trip the CCW pumps, thereby terminating CCW flow to the RCPs. Since the RCPs operate from offsite power, the RCPs are not available while offsite power is lost.

RCP seal integrity is addressed in Emergency Operation Procedures, in that charging pump and/or CCW pump operation is recommended as soon as practical during accident conditions.

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. RG&E will review the WOG report and finalize our technical justification for treatment of the RCPs. It is anticipated that this review and finalization can be accomplished within 90 days of receipt of the report. Implementation of the criteria to existing procedures can be made within this time frame providing no instrumentation modifications are required. If modifications are required, the nature of the modification and schedule will be provided.

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 for 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 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 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 N660. This will justify manual RCP trip for all plants.

3. Other Considerations

a) For the parameter(s) employed in the RCP trip criteria, the level of quality of instrumentation available at Ginna will be compared to the quality assumed in WOG analysis. It is anticipated that the current instrumentation available at Ginna will be acceptable. If the instrumentation must be modified, the nature of the modification and schedule will be included in the response to section 2 as applicability of the WOG report.

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. The existing Emergency Operating Procedure (EOP) guidance at Ginna has incorporated the post-Ginna-tube-rupture RCP restart concerns and is, therefore, at present, the most prudent and timely guidance available.

c) Required EOP training has addressed the RCP trip criteria based on Small Break LOCA. The priority of actions is implied by the location of steps in the EOPs which are consistent with Westinghouse procedural guidance. When revised criteria are incorporated into existing procedures, appropriate training will be conducted. Further training will be factored into the Emergency Response Capability effort identified in our response to Generic Letter No. 82-33.

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.