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K. P. BASKIN MANAGER OF NUCLEAR ENGINEERING, SAFETY, AND LICENSING

July 14, 1983

Director, Office of Nuclear Reactor Regulation Attention: Mr. George W. Knighton, Branch Chief Licensing Branch No. 3 U. S. Nuclear Regulatory Commission Washington, D.C. 20555

Gentlemen:

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Subject: Docket Nos. 50-361 and 50-362 San Onofre Nuclear Generating Station Units 2 and 3

NRC Generic Letter No. 83-10a which provides information relative to the resolution of TMI Action II.K.3.5 "Automatic Trip of Reactor Coolant Pumps" indicated that the NRC staff had concluded that the need for Reactor Coolant Pump (RCP) trip following a transient or accident should be determined by each applicant on a case-by-case basis considering the Owners Group input. NRC Generic Letter No. 83-10a also requested that applicants provide technical justification for the treatment of RCP's during transients and accidents either on an individual utility basis or by reference to a generic Owners Group submittal.

SCE's letter of May 13, 1983 advised you that a program was being developed by the CE Owners Group (CEOG) in order to respond to NRC Generic letter 83-10a regarding the treatment of RCP's during transients and accidents. The CEOG program utilizes a strategy of tripping two RCP's initially (followed by trip of the remaining two RCP) at the time a LOCA is diagnosed ("trip two, leave two" strategy). The letter indicated that the operational strategy currently in use at San Onofre Units 2 and 3 is to trip all four RCP's following receipt of an SIAS and verification that all CEAS have been fully inserted and that this strategy would remain in effect until the CEOG program and subsequent plant specific activities are completed to support the implementation of the "trip two, leave two" strategy. The letter also indicated that SCE would provide, (1) a description of the CEOG approach after the program for addressing this issue was finalized and (2) a schedule for completion of plant-specific activities such as emergency operating guidelines and operator training.

The description of the "trip two, leave two" strategy is described in Enclosure I in more detail and consists of manually tripping two RCP's initially and later manually tripping the remaining two RCP's at the time a LOCA has been diagnosed. It is recognized that the evaluation of pertinent plant parameters might lead to selection of setpoints which could result in tripping of the second two RCP's a short time after tripping the first two

TELEPHONE (213) 572-1401 Mr. G. W. Knighton

RCP's. In this case, the practical difference between a "trip two, leave two" strategy and a trip four strategy might become small enough from an operational point of view to require a reassessment of the "trip two, leave two" strategy.

As indicated in Enclosure I, the CEOG program activity for determination of the RCP trip setpoints is scheduled for completion by December 1983 and the schedule for the follow-on CEOG program activity for development of generic operations-related information to support subsequent plant specific implementation of the "trip two, leave two" strategy is currently being developed. SCE will advise you of the schedule for development of operations-related information after it has been finalized.

If you have any questions or comments, please let me know.

Very truly yours, M. O. Mulford for KPB

Enclosures

1 64 - 57 A A

cc: Mr. M. A. Chaffee (Resident Site Inspector)
Mr. H. Rood, Project Manager (Open by addressee only)

CE Owners Group Program Description for Resolving TMI Action Plan Item II.K.3.5 -"Automatic Trip of Reactor Coolant Pumps"

INTRODUCTION

In accordance with the NRC Guidelines and Criteria provided in Generic Letters No. 83-10a and 83-10b (see Reference 1), the C-E Owners Group (CEOG) has developed a program which will close out TMI Action Plan Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps" for participating utilities. The trip two/leave two" Reactor Coolant Pump (RCP) trip strategy has been identified in the past as the preferred approach and forms the basis for the program which is described in the following section. This trip strategy is described in Appendix A of this enclosure in more detail and consists of manually tripping two RCPs initially and later on manually tripping the remaining two RCPs at the time a LOCA has been diagnosed.

It is recognized that the evaluation of pertinent plant parameters might lead to a selection of setpoints which could result in tripping of the second two RCPs a short time after tripping the first two RCPs. In this case, the practical difference between a trip two/leave two and a trip four strategy might become small enough from an operational point of view to result in a reassessment of the trip two/leave two strategy after the determination of the trip setpoints is completed.

Regardless of what trip strategy will be implemented, the objective is to avoid tripping the RCPs for non-LOCA and steam generator tube rupture accidents and to provide the appropriate justifications for the adopted trip scheme.

DESCRIPTION OF PROGRAM

The program will provide information which both meets the NRC guidelines stated in Reference 1 and provides the operational requirements for participating utilities to use in developing emergency operating procedures and conducting training. The program consists of selection of RCP trip setpoints, justification of the manual RCP trip relative to the NRC Guidelines and Criteria in Reference 1, and development of information for use in implementing the trip two/leave scheme into emergency operating procedures.

The basic approach in selecting and justifying the trip setpoints is to determine on the basis of Conservative Best Estimate (CBE) considerations for small break LOCA and non-LOCA events the setpoints for manually tripping the first two RCPs and for tripping the second two RCPs. Thereafter, on the basis of ECCS Evaluation Model (EM) considerations, compliance with 10 CFR 50.46 limits for the LOCA events will be evaluated. If the limits are exceeded, the

possibility of requesting an exemption from specific requirements of 10 CFR 50.46 will be considered. In addition, compliance with draft ANSI Standard N660 will be demonstrated for LOCA events.

The use of conservative best estimate methods for the determination of the setpoints includes the assumption of availability of only one high pressure safety injection pump, a 1.0 factor on the ANS decay heat curve, homogeneous equilibrium break flow model, and a best estimate pump head degradation model from C-E/EPRI Pump Tests. The 2700 Mwt Reference Plant selected for this program will conservatively bound the core cooling performance of plants of other participating utilities (e.g., 3410 Mwt and System 80 classes). This CBE approach provides setpoints for tripping the first two RCPs for depressurization transients. The second setpoints are selected so that the second two RCPs will not be tripped for non-LOCA depressurization events but will be tripped for LOCAs.

Justification of manual RCP trip is performed relative to the criteria in 10 CFR 50.46 and the draft ANSI Standard N660. Using the ECCS Evaluation Model (EM), it will be determined whether the limits of 10 CFR 50.46 are met if the RCPs are tripped according to the selected setpoint scheme. The EM methods are based on Appendix K groundrules which include flowrate of only one HPSI pump, 1.2 factor on the ANS decay heat curve, and use of the Moody break flow model. Compliance with the draft ANSI standard will be demonstrated relative to the version ANS 58.8/ANSI N 660, Rev. 2 of March 1981.

The justification of the RCP trip setpoints assumes that Section II of the NRC Guidelines and Criteria of Reference 1, "Pump Operation Criteria Which Will Not Result in RCP Trip", does not apply to the trip two/leave two strategy because the strategy will result in tripping of all RCPs for LOCAs.

To support implementation of the trip two/leave two scheme into operator guidance, applicable items from the Guidance and Criteria in Reference 1 will be addressed. In addition, instrumentation capabilities needed for implementation of the RCP trip scheme will be examined on a generic basis. This operations-related information will be applied toward the development of generic bases which can be used by participating utilities in modifying operator guidance.

The CEOG program activity for determination of the RCP trip setpoints is scheduled for completion by December, 1983 and the schedule for development of follow-on generic operations-related information is currently being developed.

REFERENCE

 NRC Letter from Darrell G. Eisenhut (Director of Licensing, NRC) to All Applicants (or Licensees) with Combustion Engineering Designed Nuclear Steam Supply Systems, Resolution of TMI Action Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps", (Generic Letter No. 83-10a and 83-10b), February 8, 1983.

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APPENDIX A

THE TRIP TWO/LEAVE TWO STRATEGY

Tripping the RCPs during a small break LOCA minimizes the loss of coolant from the primary system. Keeping the RCPs running during non-LOCA depressurizaton events, however, maximizes the margin to fuel failure or radiological releases. The trip two/leave two RCP operating strategy reconciles the conflicting preference of RCP operation for small break LOCAs and non-LOCAs.

The trip two/leave two RCP strategy is shown schematically in Figure 1. The sequence of events during a depressurization which results in RCP trip begins with event initiation, t_1 . This could be a small break LOCA, steam generator tube rupture, certain secondary breaks, or anticipated operational occurences which result in primary system depressurization (e.g., increase in main or auxiliary feedwater flow, decrease in main feedwater temperature, etc). The reactor trip occurs, for example, on low primary system pressure, at t₂. At t₃*, the setpoint for trip of the first two RCPs is reached. The operator then trips two RCPs in opposing loops (to maintain pressurizer spray) at t₃. Tripping the second two RCPs depends on whether or not the second trip setpoint is reached. For a LOCA, the setpoint for trip of the remaining two RCPs at t₄. For a non-LOCA, the second trip setpoint will not be reached and the remaining two RCPs will continue running.

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