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EISENHUT,D.G. Division of Licensing

SUBJECT: Forwards response to Generic Ltr 83-10C re plans & schedules for resolution of TMI Action Item II.K.3.5, "Automatic Trip of reactor Coolant Pumps." Util not required to submit analyses supporting selection of pump trip criteria.

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J. O. SCHUYLER
VICE PRESIDENT
NUCLEAR POWER GENERATION

May 31, 1983

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

Re: Docket No. 50-275, OL-DPR-76
Docket No. 50-323
Diablo Canyon Units 1 and 2
Generic Letter No. 83-10c

Dear Mr. Eisenhut:

Pursuant to our letter of March 24, 1983, enclosed is PGandE's response to Generic Letter 83-10c. The response provides our plans and schedules for resolution of TMI Action Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps". As recommended, PGandE is working with owners of similar plants through the Westinghouse Owners Group to develop a consistent approach to resolving this issue.

Because the NRC Operating License Safety Evaluation Reports have been issued for Diablo Canyon Units 1 and 2, PGandE is not required to formally submit analyses supporting selection of reactor coolant pump trip criteria. Copies of these supporting analyses will be available for inspection by NRC.

A046

Subscribed to in San Francisco, California, this 31st day of May, 1983.

Respectfully submitted,

Pacific Gas and Electric Company

By _____
J. O. Schuyler
Vice President
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Robert Ohlbach
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By _____
Philip A. Crane, Jr.

Subscribed and sworn to before me this
31st day of May, 1983

_____ SEAL
Nancy J. Lemaster, Notary Public
in and for the City and County of
San Francisco, State of California

My Commission expires April 14, 1986

NANCY J. LEMASTER
NOTARY PUBLIC-CALIFORNIA
CITY AND COUNTY OF
SAN FRANCISCO
My Commission Expires April 14, 1986

Enclosure

cc: Mr. John B. Martin, NRC
Service List

ATTACHMENT

PGandE's RESPONSE
TO
GENERIC LETTER 83-10c
PLANS AND SCHEDULES 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 Generic Letter 83-10c dated February 8, 1983 from Mr. Darrel G. Eisenhut of the Nuclear Regulatory Commission to all Applicants with Westinghouse designed Nuclear Steam Supply Systems. The following presents PGandE's plan for demonstrating compliance with those criteria. The overall philosophy and plan are stated first; then, each section of the attachment to NRC letter 83-10c is addressed and related to the overall plan and NRC criteria. Best estimate schedule information is included where appropriate.

OVERALL PLAN

In the four years 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 zircaloy-water reaction. Using the conservative evaluation model, analyses for these LOCAs result in a violation of the Emergency Core Cooling System (ECCS) Acceptance Criteria as stated in 10 CFR 50.46. 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 Generic Letter 83-10c. 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 a 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 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 plants with low head safety injection pumps.

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 (EOPs) reflect this design approach.

Lastly, it remains the position of Westinghouse and the Westinghouse Owners Group 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.

Westinghouse and the Westinghouse Owners Group will undertake a two part program to address the requirements of NRC Generic Letter 83-10c 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 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 used for ERG 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 ERGs 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 10 CFR 50.46 will be made to allow continued RCP operation during a small break LOCA.

DETAILED RESPONSE TO GENERIC LETTER 83-10c

The attachment to Generic Letter 83-10c contains recommended guidance for use in developing methods for RCP operation during transients and accidents. PGandE's plans and schedules for each of the items in the attachment are presented in this section.

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 ERGs scheduled for completion by July 31, 1983. PGandE will base their EOPs on the revised ERGs. Implementation of PGandE's EOPs is planned by July 1, 1984, or within one year of receipt of the revised Westinghouse Owners Group ERGs, whichever occurs later.

a) As stated above, Westinghouse and the Westinghouse Owners Group are developing revised RCP trip criteria to ensure 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 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 instruct the operator to trip the RCPs before voiding occurs at the RCP.

c) The criteria developed in Item 1a above are not expected to lead to RCP trip for the more likely non-LOCA and steam generator tube rupture transients. However, since continued RCP operation cannot be guaranteed, the ERGs will provide guidance for the use of alternate methods for depressurization.

d) The ERGs 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 for those cases where such operation is needed. The Diablo Canyon Power Plant (DCPP) has an EOP based on current Westinghouse Owners Group guidelines for removing voids from the primary coolant. During the operator requalification program, plant operators were trained to comply with this procedure. When Revision 1 of the ERGs is received, the DCPP EOP will be revised and operators retrained as necessary in accordance with the EOP implementation schedule (July 1, 1984 or within one year of receipt of the revised ERGs, whichever occurs later).

e) A steam line break inside the containment could result in containment pressure exceeding the high-high setpoint and consequent containment isolation. The RCP auxiliary systems would be isolated, in which case operators are trained and directed by EOP to shut down the RCPs. Procedures also address restoration of auxiliary water services essential for RCP operation in a timely manner to prevent RCP damage or failure. Restart of the RCPs is accomplished by the operator, who is directed by procedure to restart the RCPs when specified conditions are met.

f) To the extent possible, parameters used to determine when the RCPs should be tripped are unambiguous indicators of a LOCA. These parameters are discussed in Items 1a and 1b above.

2. Guidance for Justification of Manual RCP Trip

The Westinghouse Owners Group response to this section of requirements will be completed by the end of 1983. PGandE will review the Westinghouse Owners Group report and finalize technical justification for treatment of DCPP RCPs based on that report. Completion of this effort is anticipated six months after receipt of the report.

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 that for small break LOCAs of concern, if the RCPs are tripped two 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 10 CFR 50.46. 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 10 CFR 50.46 are not exceeded. It is expected that the minimum time available for manual RCP trip will exceed the guidance contained in Draft ANSI Standard N660. This will justify manual RCP trip for all plants.

3. Other Considerations

Generic Letter 83-10c identifies several areas for which acceptance criteria are not specified, however, applicants are required to demonstrate they have been considered and good engineering practice has been followed. The current status of PGandE efforts in these areas is discusssed in this section.

a) DCPP EOPs currently use a Reactor Coolant System wide range pressure setpoint of 1220 psig for RCP trip. The device is a Class 1A, two-channel instrument. Environmental qualification is not required because both pressure transmitters are located outside containment.

b) The revised ERGs being prepared by the Westinghouse Owners Group will contain guidance for the timely restart of the reactor coolant pumps when conditions to support safe pump start-up and operation are established. PGandE will incorporate this guidance, as appropriate, in existing DCPP EOPs to ensure timely restart of the RCPs when conditions permit. EOP revision will be completed by July 1, 1984 or within one year of receipt of the revised ERGs, whichever occurs later.

c) PGandE will revise the DCPP operator training program as necessary to reflect changes in the EOPs made as a result of recommendations adopted from Revision 1 of the ERGs. Present EOPs provide operators with guidance on starting and tripping RCPs. Operators are required to use these procedures during annual simulator requalification classes.

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

The Westinghouse Owners Group has concluded that the preferred and safest method of operation following a small break LOCA is to manually trip the RCPs. Therefore, the criteria contained in this section are not addressed.