VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

April 22, 1983

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attn: Mr. Darrell G. Eisenhut, Director
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Serial No. 095
NO/DWL:acm
Docket Nos. 50-280
50-281
50-338
50-339
License Nos. DPR-32
DPR-37
NPF-4
NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
RESPONSE TO GENERIC LETTER 83-10d
NUREG-0737, ITEM II.K.3.5

Attached is the Vepco plan and schedule for the resolution of NUREG-0737, Item II.K.3.5 for the North Anna and Surry Power Station. This information was requested by NRC Generic Letter 83-10d dated February 8, 1982.

The attached information for the resolution of Item II.K.3.5, "Automatic Trip of Reactor Coolant Pumps", represents a generic program sponsored by the Westinghouse Owners Group of which Vepco is a member. Vepco supports this Owners Group program and will implement the results of the program (revised Reactor Coolant Pump Trip Criteria) into the North Anna and Surry Emergency Procedures following receipt and safety review of the results.

As requested in NRC Generic Letter 83-10d, the information transmitted herein is submitted under oath, pursuant to 10CFR50.54(f). It must be stated, however, that the Vepco schedule for implementation of revised RCP trip criteria and resolution of Item II.K.3.5 is contingent on the Westinghouse Owners Group schedule for completion of this effort. Although no delays are anticipated, any delays which may occur in the generic program completion may impact our implementation schedule.

A046

Contact us if additional information is required.

Very truly yours,

W. L. Stewart

Attachment

cc: Mr. James P. O'Reilly
Regional Administrator
Region II

Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing

Mr. Robert A. Clark, Chief
Operating Reactors Branch No. 3
Division of Licensing

Mr. Donald J. Burke
NRC Resident Inspector
Surry Power Station

Mr. Milton B. Shymlock
NRC Resident Inspector
North Anna Power Station

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA AND SURRY POWER STATIONS
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 the letter from Mr. Darrell G. Eisenhut of the Nuclear Regulatory Commission to all Applicants and Licensees with Westinghouse designed Nuclear Steam Supply Systems (Generic Letter 83-10d) dated February 8, 1983. Vepco will demonstrate compliance with these criteria through a program which implements revised Reactor Coolant Pump (RCP) trip criterion as developed by the Westinghouse Owners Group and by reference to the justification prepared by the Westinghouse Owners Group for the trip criteria and associated operator response time. The following information represents the Westinghouse Owners Group plan and schedule for demonstrating compliance with those criteria. First, the overall philosophy and plan for resolution will be stated. Then, the details of the overall plan will be addressed to demonstrate compliance with each section of the attachment to NRC Generic Letter 83-10d.

OVERALL PLAN

In the four years that have passed since the event at Three Mile Island, the Westinghouse Owners Group and Westinghouse 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 System (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 was found acceptable for use by the NRC as stated in Generic Letter 83-10d. Therefore, to be consistent with the conservative analyses performed, the RCPs should be tripped if indications of a small break LOCA exist.

Secondly, the Westinghouse Owners Group and Westinghouse 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 the 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) which was submitted to the NRC on November 30, 1981,

Letter No. OG-64. 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 (SGTR) 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 the Westinghouse Owners Group and Westinghouse 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 the Westinghouse Owners Group and Westinghouse 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 existing 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.

The Westinghouse Owners Group will undertake a two part program to address the requirements of Generic Letter 83-10d 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 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 these 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 (revised RCP trip criteria). 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. Accordingly, no attempt will be made in this program to demonstrate the acceptability of continued RCP operation during a small break LOCA. Additionally, no request for an exemption to 10CFR50.46 will be made to allow for continued RCP operation during a small break LOCA.

DETAILED RESPONSE TO GENERIC LETTER 83-10d

Each of the requirements stated in the attachment to Generic Leter 83-10d will be discussed in the following sections indicating how the requirements will be addressed. The organization of the following sections parallels the attachment to Generic Letter 83-10d.

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. Surry and North Anna Power Stations plan to implement new emergency procedures based on the Westinghouse Emergency Response Guidelines (Revision 0) by October 1, 1983 and April 15, 1984, respectively. Implementation of Revision 1 to the Emergency Response Guidelines will not be until after NRC staff review and issuance of a Revision 1 SER. Vepco does plan, however, to implement the Revision 1 RCP trip criteria at Surry and North Anna following receipt and safety review of the new criteria. Implementation of the RCP trip criteria is independent of which revision to the Emergency Response Guidelines is in place.

a) As stated above, the Westinghouse Owners Group and Westinghouse 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 basis, 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 I.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 are discussed in detail in the background document for the guidelines. Additionally, the Emergency Response Guidelines provide explicit guidance for operating the plant with a vaporous void in the reactor vessel head for cases where such operation may be needed. At the present time, Surry and North Anna have not implemented new emergency procedures based on the generic guidelines (refer to procedure implementation schedule given in response to item I.1). However, procedures are in place at both stations which provide guidance to prevent vessel head voiding during cooldown while in natural circulation. Additionally, the operator training and requalification program emphasize the detection of system voids and the conditions under which such voids may exist. Once the revised emergency procedures are implemented at Surry and North Anna, the full benefit of the Emergency Response Guidelines guidance on system voids will be in effect.

e) North Anna and Surry presently have procedures which require tripping of the Reactor Coolant Pumps upon loss of various auxiliaries and/or abnormal RCP conditions. Procedures are in place which address the restart of RCPs, provided essential RCP auxilaries are established. These procedures are in effect at all times during unit operation. At Surry and North Anna, component cooling and seal injection water supplies are not interupted upon a signal which initiates the early phases of containment isolation. Later phases of containment isolation will, however, isolate component cooling water and require RCP trip per procedure Seal injection is maintained to the RCP seals for any containment isolation condition.

f) Discussed in I.1a and I.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. Upon receipt of this information from Westinghouse, Vepco will review the manual RCP trip justification to verify the applicability of the information to the Surry and North Anna units.

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 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 to be 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 the draft ANSI Standard N660. As per the guidance of NRC Generic Letter 83-10d, this will justify manual RCP trip for all plants.

3. Other Considerations

a) All instrumentation specified in the Emergency Response Guidelines (as applied to the plant-specific Surry and North Anna emergency procedures) will have a level of quality and redundancy comensurate with their function in the emergency procedures as determined by our review of Regulatory Guide 1.97, Revision 2. Instrumentation to indicate the need for RCP trip will be Class 1E, environmentally qualified equipment. Instrument uncertainty will be applied as appropriate and evaluated to ensure confidence in the parameter is not reduced.

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. This guidance will be incorporated in the Surry and North Anna Emergency procedures when the Emergency Response Guidelines are implemented (refer to schedule of Item I.1).

c) Current training programs at Surry and North Anna specifically address the requirement to trip the RCPs for the small break LOCA event. The current emergency procedure set checks the existing RCP trip criteria early in an event. Training emphasizes that the RCPs should be tripped at the specified trip criteria whether or not a SBLOCA has been identified. The Westinghouse Emergency Response Guidelines and background documentation will provide additional guidance and training material to deal with the RCP trip criteria. When the Emergency Response Guidelines are implemented at Surry and North Anna, the emergency procedure training programs will be concurrently upgraded to reflect the new RCP trip and restart information.

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.

COMMONWEALTH OF VIRGINIA)
)
CITY OF RICHMOND)

The foregoing document was acknowledged before me, in and for the City and Commonwealth aforesaid, today by W. L. Stewart, who is Vice President-Nuclear Operations, of the Virginia Electric and Power Company. He is duly authorized to execute and file the foregoing document in behalf of that Company, and the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 22nd day of April, 19 83.

My Commission expires: 2-26, 19 85.

Ann C. McSee
Notary Public

(SEAL)

M2/004