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DOCTYPE: LETTER NOTARIZED: NO
SUBJECT:
FORWARDING METHODS AND RESULTS OF ANALYSIS DEMONSTRATING THE EFFECTIVENESS OF RE GINNA ECCS AS PER REQUEST DTD 12/16/77. NO ADDITIONAL OPERATING LIMITS ARE APPROPRIATE.

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LEON D. WHITE, JR.
VICE PRESIDENT

TELEPHONE
AREA CODE 716 546-2700

50-244

January 16, 1978

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Operating Reactor Branch #1
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Schwencer:

In a letter from Mr. Edson Case dated December 16, 1977, it was stated that the NRC staff has re-evaluated the acceptability of the calculational model used to evaluate the performance of the emergency core cooling system (ECCS) in Westinghouse designed two reactor coolant loop plants. The letter asked that we develop additional bases for continued safe operation of the R. E. Ginna facility and asked that we propose any additional operating limits which might be required.

We have performed analyses to demonstrate the effectiveness of the R.E. Ginna ECCS and have developed bases for continued safe operation in accordance with 10 CFR 50.46 and Appendix K to 10 CFR Part 50. The methods and results of our analysis are presented in Attachment A. Based upon this analysis no additional operating limits are appropriate.

Sincerely yours,

L D White Jr.

L. D. White, Jr.

Att.

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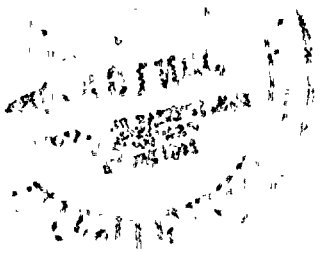

ATTACHMENT A

BASES FOR CONTINUED OPERATION OF WESTINGHOUSE DESIGNED TWO LOOP PLANTS WITH UPPER PLENUM INJECTION

INTRODUCTION

On December 16, 1977, the United States Nuclear Regulatory Commission issued a letter to the owners and operators of Westinghouse designed two loop plants with upper plenum injection. Attached to this letter were Safety Evaluation Reports from both the Analysis Branch and the Operating Reactors Branch of the NRC. The letter requested that an analysis be performed which conservatively accounted for upper plenum low head safety injection in order to provide additional bases for continued operation. The following discussion outlines the interim basis for continued safe operation of the plant.

METHOD

An analysis has been performed to assess the possible safety and operation impact of the NRC conclusions regarding two loop plants with upper plenum injection. The basis for this analysis is the "Staff Model" described in the NRC Analysis Branch "Safety Evaluation Report on ECCS Evaluation Model for Westinghouse Two Loop Plants", November, 1977 (SER).

Westinghouse Electric Corporation wrote a computer program based on the description in the SER. This program was verified as giving results consistent with the staff model by comparing it to a listing and sample output of the NRC staff model. Following this verification, the following changes were made to the model.

1) The clad temperature rise versus flooding rate curve, Figure 24 in the SER, was replaced by a more realistic curve. The new curve was based on the Westinghouse design FLECHT correlation with input more specific to the Westinghouse two loop plants.

2) The input was changed to allow transient input for pressure, injection rates, flooding rates and decay heat.

3) The carryover fraction, CRF, discussed on page 40 of the SER was changed from 0.8 in the staff model to 0.7 in the Westinghouse model. Carryover fractions of 0.7 are more typical of the two loop plants.

4) The bottom quench front in the staff model was initialized at 0.0 feet. Since this calculation starts some 20 seconds into reflood, the Westinghouse model initiates the bottom quench front at 1.5 feet which is a lower bound value from the Westinghouse ECCS Evaluation Model results.

5) The heat transfer model, described on page 37 of the SER, was altered to account for the amount of heat transfer in the unquenched region which is going to the bottom generated steam rather than the top generated steam. This was done by reducing the heat transfer to the top generated steam by 25 per cent. This is a conservative lower bound.

6) The metal heat model was altered to take into account the finite amount of heat stored in the upper plenum metal. The heat capacity of the upper plenum metal is 5930 (BTU/°F). This metal energy is removed in a finite period of time after which no energy is added to the fluid from the metal resulting in increased subcooling for the remainder of the transient.

In addition to these code changes, the input was also changed from the NRC staff model to more accurately match the plant conditions. These changes involve the transient core pressure and decay heat obtained from the Appendix K Analyses of Record, submitted for R.E. Ginna on April 7, 1977. Finally, 100 percent of ANS decay heat was used for upper plenum injection water steam generation. The base case was 120 percent of ANS decay heat. Therefore, the hot rod temperature rise calculation was performed with 120 percent of ANS decay heat. This treatment of decay heat is in accordance with Appendix K to 10 CFR Part 50 since the base case includes the 120 percent of ANS decay heat.

RESULTS

The results for the six units involved are summarized in the attached table. The results for Ginna, identified as RG&E in the attached table, show a reduced peak clad temperature. Thus, the current plant Technical Specifications continue to ensure compliance with Appendix K to 10 CFR Part 50 and to 10 CFR Section 50.46 and no plant operating restrictions are necessary. It should be pointed out that this simple calculation remains overly conservative since 100 percent upper injection distribution and no hot spot cooling by the upper plenum injection water were assumed. Also, a dynamic calculation incorporating all of the hydraulic feedback mechanisms would yield more favorable results.

UPPER PLENUM INJECTION RESULTS

PLANT	CURRENT WESTINGHOUSE EVALUATION MODEL ANALYSIS		NEW U.P.I. ANALYSIS	
	F_q	PEAK CLAD TEMPERATURE	F_q	PEAK CLAD TEMPERATURE
WEP/WIS	2.32	1965	2.32	1872
RGE	2.32	1957	2.32	1852
NSP/NRP	2.32	2187	2.32	2067
WPS	2.25	2172	2.25	2052