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SUBJECT: Forwards addl info re analysis supporting installation of thermowell mounted RTDs,per 930827 application for amend to License NPF-63,as result of questions from NRC.

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United States Nuclear Regulatory Commission
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SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
RTD BYPASS MANIFOLD ELIMINATION - SUPPLEMENT

Gentlemen:

On August 27, 1993 Carolina Power & Light Co. (CP&L) submitted a Technical Specification Change Request for the Shearon Harris Nuclear Power Plant (SHNPP) that would allow the replacement of the RTD bypass system with thermowell-mounted RTDs in the Reactor Coolant System piping.

As a result of questions from the NRC staff, CP&L is herein submitting additional information regarding the analysis supporting the installation of thermowell mounted RTDs. The additional information serves only to provide additional detail, therefore, the conclusions with respect to 10 CFR 50.92 remain valid, as stated in the August 27, 1993 letter. The supplemental information is included as an enclosure to this letter.

Please refer any questions regarding this submittal to Mr. D. C. McCarthy at (919) 362-2100.

Yours very truly,

W. R. Robinson

SDC/sdc
Enclosure

W. R. Robinson, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

LEWIS S. ROWELL NOTARY PUBLIC WAKE COUNTY, N.C.

Lewis S. Rowell
Notary (Seal)

My commission expires: 7/12/94

cc: Mr. Dayne H. Brown
Mr. S. D. Ebneter
Mr. N. B. Le
Mr. J. E. Tedrow

A001

SHEARON HARRIS NUCLEAR POWER PLANT
NRC DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
RTD BYPASS MANIFOLD ELIMINATION - SUPPLEMENT

Question 1: Provide a table showing the RTD response time (breakdown).

Response: The overall response time for the manifold RTD system is six seconds. The overall response time for the thermowell RTD system will continue to be six seconds, but the six seconds are distributed differently with respect to the time constants involved. With the current RTD Bypass System, the SHNPP FSAR (Chapter 15, Table 15.0.6-1, "Trip Points and Time Delays to Trip Assumed in Accident Analyses") lists a six second time delay for OTDT and OPDT reactor trips. It further states that the six second delay is the total time delay (including RTD bypass loop fluid transport delay effect, bypass loop piping thermal capacity, RTD time response, and trip circuit channel electronic delay) from the time the temperature difference in the coolant loops exceed the trip setpoint until the rods are free to fall. This time delay is presently allocated as follows:

1)	RTD Bypass loop fluid transport delay	1 Seconds
2)	Bypass loop piping thermal capacity (thermal time constant)	1 Seconds
3)	RTD response time (thermal time constant)	2 Seconds
4)	Trip circuit electronics delay	2 Seconds
	Total	6 Seconds

With the replacement of the RTD bypass system with thermowell-mounted RTDs, the six second time delay will be allocated as follows:

1)	Hot leg scoop thermal lag and transport delay	0.25 Seconds
2)	RTD/Thermowell response time (thermal time constant)	4.50 Seconds
3)	Trip circuit electronics delay	1.25 Seconds
	Total	6.0 Seconds

The present time delay analysis uses a value of 2 seconds for the trip circuit electronics delay. The actual measured value for the trip circuit electronics delay is approximately 0.5 seconds. In order to maintain the same total analyzed time delay, the revised analysis will use a trip circuit electronics delay value of 1.25 seconds.

The Staff also inquired about how the analysis accounted for the uncertainty in the means by which the RTD/thermowell response time is measured (at each refueling outage) as well as how it accounted for the potential degradation of response time over the fuel cycle.

The loop current step response (LCSR) test will be used to measure the response time of the installed RTD and thermowell. The acceptance criteria for this test, when it is conducted at the site, will be less than or equal to 4 seconds. It

is recognized that allowances should be made for the accuracy of the LCSR test. Since the safety analysis uses 4.5 seconds, sufficient margin is available to account for the accuracy of the LCSR test.

With respect to the potential for degradation of response time, the actual measured value for the trip circuit electronics delay is approximately 0.5 seconds. The safety analysis as revised above assumes 1.25 seconds. This provides an approximate 0.75 second margin. Therefore, there is sufficient margin to account for the possibility of degradation in the RTD/thermowell response time during a fuel cycle. It should be noted that numerous plants (including CP&L's H. B. Robinson, Unit 2) have had these RTDs and thermowells installed for several fuel cycles and no significant problems have been noticed with response time degradation.

Question 2: Provide an uncertainty calculation for the RCS flow uncertainty and determine if the C_1 value should be changed in Technical Specification 3.2.3, Power Distribution Limits - RCS Flow Rate and Nuclear Enthalpy Rise Hot Channel Factor.

Response: The RCS flow uncertainty (with allowances for temperature streaming) was calculated in WCAP-12340, which was transmitted to the NRC on February 27, 1992, (CP&L correspondence NLS-92-066) as part of the Reactor Coolant System Flow Measurement Calibration Technical Specification Change Request. This was approved by the NRC as Amendment No. 32 to the operating license.

CP&L's analysis shows that this calculation is conservative (i.e., bounding) for the thermowell-mounted RTD system as well, and therefore, no changes are required to the C_1 value in Technical Specification 3.2.3.