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SUBJECT: Responds to NRC 870511 request for addl info re util 861017 application for amend to License NPF-16, reflecting installation of time delay circuit in auxiliary feedwater actuation sys.

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JULY 15 1987

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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Re: St. Lucie Unit 2
Docket No. 50-389
Auxiliary Feedwater Actuation System Time Delay

By letter L-86-360 dated October 17, 1986, Florida Power & Light Company (FPL) submitted a proposed license amendment to reflect the installation of a time delay circuit in the Auxiliary Feedwater Actuation System (AFAS). By letter dated May 11, 1987, (E. G. Tourigny to C. O. Woody), the NRC staff requested additional information it needed to continue its review of the proposed license amendment. Attached is FPL's response to this request for additional information.

If additional discussion is required on this topic, please contact us.

Very truly yours,

C. O. Woody
Group Vice President
Nuclear Energy

COW/EJW/cn

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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NRC REQUEST FOR ADDITIONAL INFORMATION
FOR
USE OF A TIME DELAY IN AUXILIARY FEEDWATER ACTUATION
AT
ST. LUCIE UNIT 2

1. Please clarify and explain the difference between the Auxiliary Feedwater response times in the St. Lucie Unit 1 Technical Specifications (Table 3.3-5) and those proposed for Unit 2. It appears that in both the Unit 1 and 2 Technical Specifications the time delay given should be the actual delay (with a tolerance) that will be attained by the time delay system. It also appears that this value should not be dependent on whether or not offsite power is available. If something other than the actual time delay is in the Technical Specifications, please describe how you verify acceptable operation of the system.

Response

As stated in the definitions section of the Technical Specifications, Engineered Safety Features Response Time is defined as follows:

> "The ENGINEERED SAFETY FEATURES RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays where applicable."

In accordance with this definition, the Auxiliary Feedwater (AFW) System response time proposed in Table 3.3-5 represents the total system response time required to obtain pump discharge pressure. The actual AFAS time delay value represents only a portion of the total AFW System response time.

The AFW System response time is presently verified during the periodic integrated test of the Engineered Safety Features. This test is performed while in Mode 3. The AFW System is secured and the steam generator levels are slowly decreased. Once the AFAS low steam generator level trip value is reached, the timing process begins. When each AFW pump has started and pump discharge pressure has been attained, the timing process is stopped. This total AFW System response time is then verified to be within that allowed by Technical Specification 3.3-5. This system response time would include all instrument processing delays, the AFAS time delay, and associated equipment delays.

For the loss of offsite power (LOOP) case, diesel generator starting, loading and sequencing times are also considered as part of the total system response time. As such, the maximum system response time allowed by the Technical Specifications includes these additional delays.

The difference in the actual AFW System response time in the St. Lucie Unit 1 Technical Specifications and that proposed for St. Lucie Unit 2 results from the limiting Final Updated Safety Analysis Report (FUSAR) Chapter 15 accident scenarios and assumptions.

[illegible]

[illegible]

[illegible]

2. In Table 3.3-4 of the St. Lucie Unit 1 Technical Specifications the trip value for Auxiliary Feedwater Actuation for low steam generator water level is $\geq$ 29.0% whereas the proposed value for the Unit 2 Technical specifications is only $\geq$20.6%. Please explain why there is a difference and justify the lower value for Unit 2.

Response

The difference in the Auxiliary Feedwater Actuation low steam generator water level trip value between St. Lucie Units 1 and 2 can be attributed solely to the differences in the level transmitters. The present St. Lucie Unit 1 trip value of $\geq$ 29.0% is based on the use of Rosemount Model 1154 DP5 transmitters. The present St. Lucie Unit 2 trip value of $\geq$ 20.6% is based on the use of ITT Barton Model 764 transmitters.

The uncertainties associated with these two transmitters are different. Analysis has shown that the ITT Barton transmitter uncertainty (St. Lucie Unit 2) is significantly less than the Rosemount transmitter uncertainty (St. Lucie Unit 1). In each case, the uncertainties are added directly to the 5% analytical setpoint to obtain the Technical Specification trip value.

3. In Table 3.3-4 of the St. Lucie Unit 2 Technical Specifications the present trip value for Auxiliary Feedwater Actuation for high differential pressure through the steam generator is $\leq$ 180.0 psid, whereas the proposed value is $\leq$ 275 psid with a maximum of 281 psid. Please justify raising this value for Unit 2.

Response

The original value of $\leq$ 180 psid for AFW isolation on high steam generator differential pressure was originally specified by the equipment vendor, Combustion Engineering, based upon engineering judgement and acceptable analytical results. The purpose of the $\leq$ 180.0 psid trip value for AFW isolation on high steam generator differential pressure was to ensure that auxiliary feedwater would not enter a ruptured steam generator during a postulated Main Steam Line Break (MSLB) event. However, FPL, based on operational experience, was concerned that this value could cause inadvertent AFW isolation as a result of operation of the main steam isolation valves, main steam safety valves or atmospheric dump valves.

The new limiting MSLB event submitted with FPL's proposed AFAS time delay amendment utilized an analytical setpoint of 530 psid for AFW isolation on high steam generator differential pressure (see Sequence of Events, Table 3.2.1.5C-2). In addition, the MSLB analysis conservatively assumed that the delivery of AFW flow occurred immediately (i.e., with no time delay) at the time of trip. As stated in the Safety Evaluation included in FPL's proposed AFAS time delay amendment, the MSLB analysis results are well within the established acceptance criteria.

The proposed Technical Specification setpoint of $\leq$ 275.0 psid for AFW isolation on high steam generator pressure is determined by subtracting the associated instrument uncertainties from the analytical setpoint of 530 psid.

4. In Table 3.3-4 of the St. Lucie Unit 2 Technical Specifications the present trip value for Auxiliary Feedwater Actuation for high differential pressure through the feedwater header is $\leq$100.0 psid, whereas the proposed value is $\leq$150.0 psid with a maximum of 157.5 psid. Please justify raising this value for Unit 2.

Response

As stated above in the response to Question 3, the original value of $\leq$ 100.0 psid for AFW isolation on high feedwater header differential pressure was originally specified by Combustion Engineering based upon engineering judgement and acceptable analytical results. The purpose of the original $\leq$ 100.0 psid trip value for AFW isolation on high feedwater header differential pressure was again to ensure that no auxiliary feedwater entered a ruptured steam generator during a MSLB event. FPL was concerned that this trip value, based on operational experience, could cause inadvertent AFW isolation as a result of the operation of the main feedwater regulating system.

Credit is no longer taken for this AFW isolation feature in the limiting MSLB event submitted with FPL's proposed AFAS time delay amendment. The proposed trip value of $\leq$ 150.0 psid was selected to be lower than the $\leq$ 275.0 trip value proposed for high steam generator differential pressure to ensure that the faulted steam generator remains isolated for an extended time period following a MSLB event. This feature is desirable since the intact steam generator pressure will eventually decrease below 275 psig. Note that the proposed trip value of $\leq$ 150.0 psid was also selected to be consistent with the trip value utilized at St. Lucie Unit 1.