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SUBJECT: Application for amends to Licenses NPF-14 & NPF-22, revising Tech Specs to allow adjustment of required tolerance for diesel generator loading timers associated w/RHR pumps. Fee paid.

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Director of Nuclear Reactor Regulation
Attention: Dr. W. R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENTS 104 AND 54 TO
LICENSE NOS. NPF-14 AND NPF-22
PLA-2931 FILES A17-2, R41-2

Docket Nos. 50-387
and 50-388

Dear Dr. Butler:

The purpose of this letter is to propose changes to the Susquehanna SES Units 1 and 2 Technical Specifications in order to allow adjustment of the required tolerance for the diesel generator loading timers associated with the RHR pumps.

BACKGROUND

Technical Specification Surveillance Requirement 4.8.1.1.2d.12 states the following:

> "(Each of the above required diesel generators shall be demonstrated OPERABLE (by)): Verifying that each diesel generator loading sequence timer shown in Table 4.8.1.1.2-2 is OPERABLE with its setpoint within ±10% of its design setpoint."

There is no explicit Bases provided for this requirement, but ±10% is an accepted tolerance for these instruments when their setpoints are at the midpoint of their range. In the specific case of the RHR pump timers, difficulty has been experienced in meeting the upper (+10%) side of the setpoint tolerance, and it is believed that this is because the setpoint (3.0 seconds) is at the low end of the timer range (1.5 to 15 seconds).

PP&L is proposing that Specification 4.8.1.1.2d.12 be revised as follows (see attached marked up pages):

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> "(Each of the above required diesel generators shall be demonstrated OPERABLE (by)): Verifying that each diesel generator loading sequence timer shown in Table 4.8.1.1.2-2 is OPERABLE with its setpoint within ±10% of its design setpoint, except for the RHR pump timers, which may have a tolerance of +20%, -10%. "

This change is acceptable based on our review of the impact of this change on both ECCS response time and diesel generator load sequencing as described below. Please be advised that we have considered replacement of the subject timers in order to preclude the need for this request, but our conclusion was that the costs associated with such an action considerably outweighed any perceptible safety benefit from being able to achieve +10% precision on the timer setting.

JUSTIFICATION

The setpoints for the RHR pump timers are selected such that:

1) the Low Pressure Coolant Injection (LPCI) flow enters the vessel to cool the core in sufficient time to assure peak fuel cladding temperature remains below 2200°F during a LOCA, and

2) the diesel generator electrical bus voltage remains high enough to prevent an undervoltage trip during the loading of all major equipment.

The proposed change in the upper tolerance of the timer setting from +10% (0.3. seconds) to +20% (0.6 seconds) is evaluated below against both of the above criteria.

- **Criterion 1: ECCS Response Time**

  Both of the fuel suppliers for Susquehanna, General Electric and Advanced Nuclear Fuels (ANF), have analyzed the timing of the ECCS pump startup and valve opening sequence during a large, suction-side, recirculation break LOCA. These analyses indicate that an additional 0.3 second delay in the RHR pump startup would have no effect on LPCI injection time. This is because even with the additional delay, the RHR pumps reach rated speed at least one full second prior to the vessel pressure reaching the assumed LPCI injection valve opening permissive of 400 psi. The discharge side recirculation break and small break LOCAs result in reaching the LPCI valve opening permissive even later into the event sequence. Therefore the proposed additional 0.3 second delay in the RHR pump start signal has no affect on these events either.

- **Criterion 2: Diesel Generator Load Sequencing**

  The concern with this criterion is to ensure that the RHR and Core Spray pumps are not started close enough together that an undervoltage trip could occur.

The RHR and Core Spray pump timers are normally set at 3.0 and 10.5 seconds, respectively, with a ±10% margin on pickup. With the proposed change to +20% in place for the RHR timers, the worst case scenario would have the RHR pump starting at 3.0 + 0.6 = 3.6 seconds and the Core Spray pump starting at 10.5 - 1.1 = 9.4 seconds. This provides a 5.8 second (9.4-3.6) window for the RHR pump to start; the diesel generator response when the RHR pump motor is energized was evaluated against this interval.

Strip Charts for each diesel were investigated for minimum/maximum voltage levels and the time at which each occurs. Diesel generator "D" was used as a basis because it exhibited the longest response time to reach maximum voltage after the RHR pump starts (see figure 1). A minimum voltage of 3100V (75% of maximum) is reached 0.25 seconds after the RHR pump starts. 100% voltage (4160V) is reached 2.6 seconds after the RHR pump starts.

Our calculations indicate a start time of 2.7 seconds for an RHR pump at 100% voltage. Thus, the worst case start time for an RHR pump is 2.6 + 2.7 = 5.3 seconds. This value is conservative because it does not take into account the acceleration of the RHR pump motor during the time the motor voltage is less than 100%. Comparing the start time of the RHR pump (5.3 seconds) with the available window (5.8 seconds) conservatively provides 0.5 seconds margin to avoid an undervoltage trip. This time is sufficient to justify changing the upper tolerance of the RHR timer from +10% to +20%.

NO SIGNIFICANT HAZARDS DETERMINATION

The proposed changed does not:

I. Involve a significant increase in the probability or consequences of an accident previously evaluated. Both ECCS response time and diesel generator load sequencing were evaluated in light of this proposal. The conclusions of these evaluations were:

   a. LPCI injection is unaffected for the LOCA break spectrum since injection cannot begin until the vessel low pressure permissive is reached, and even with the proposed change, this pressure still occurs after the RHR pump start.

   b. Sufficient time exists between the starting of the RHR and the Core Spray pumps to ensure that diesel generator loading capability is not jeopardized.

   Based on these conclusions, no significant change occurs to the probability or consequences of any previously analyzed accident.

II. Create the possibility of a new or different kind of accident from any accident previously evaluated. This change only affects the timing of previously analyzed event sequences as analyzed in I above. It does not propose any physical or functional changes that could create the possibility of a new event.

III. Involve a significant reduction in a margin of safety. With respect to ECCS response time, no delay occurs in LPCI injection due to this change. For diesel generator load sequencing, the worst-case scenario was conservatively evaluated and the gap between RHR and Core Spray pump starts changed from 0.8 to 0.5 seconds. This change is not significant because the gap has not been reduced to the level where calculational uncertainties could overcome it and thereby result in overlap between the pump starts. Based on the above, no significant reduction in any safety margin will occur due to this change.

Any questions on the above material should be directed to Mr. R. Sgarro at (215) 770-7916. Pursuant to 10CFR170, the appropriate fee is enclosed.

Very truly yours,

H Keiser

H. W. Keiser
Vice President-Nuclear Operations

Attachments

cc: NRC Document Control Desk (original)
NRC Region I
Mr. L. R. Plisco, NRC Resident Inspector
Mr. M. C. Thadani, NRC Project Manager
Mr. T. M. Gerusky, Pa DER