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

Perry Nuclear Power Plant
Docket No. 50-440
Technical Specification
Change Request: Relocation of
the Simulated Thermal Power
Time Constant to the COLR

Gentlemen:

Attached is a request for amendment of Facility Operating License NPF-58 for the Perry Nuclear Power Plant (PNPP), Unit 1. In accordance with the requirements of 10 CFR 50.91(b)(1), a copy of this request for amendment has been sent to the State of Ohio as indicated below.

This amendment requests revision to Technical Specification 3.3.1 "Reactor Protection System Instrumentation" and Specification 6.9.1.9 "Core Operating Limits Report (COLR)" to transfer the specific value of the simulated thermal power time constant from the Technical Specifications to the COLR. The simulated thermal power time constant is an inherent characteristic of the fuel and can change cycle to cycle (as different fuel designs are utilized in the reactor), therefore it is appropriate to relocate this parameter to the COLR.

Attachment 1 provides the Summary, Description of Changes, and the Significant Hazards and Environmental Considerations. Attachment 2 is a copy of the marked up Technical Specification pages. Attachment 3 provides an example of how the cycle-specific information formerly within the Technical Specifications might be formatted when it is relocated to the Core Operating Limits Report.

If you have any questions, please feel free to call.

Sincerely,

Michael D. Lyster

MDL:RAL:ss

Attachment
cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III
State of Ohio

A001
1/1

Summary

This proposed change revises the PNPP Unit 1 Technical Specifications to replace the specific value of the simulated thermal power time constant with a reference to the Core Operating Limits Report (COLR) for the current value.

Description of Change

With the advent of newer Boiling Water Reactor (BWR) fuel designs, one of the major changes is the increase in number of fuel rods per bundle, from the current 8x8 array designs to 9x9 or 10x10 arrays. With changes in array designs comes changes in parameters that are related to the array or fuel design; for example the number of fuel rods, length of the fuel rods, diameter of the fuel rods, time constant for heat transfer through the fuel pellets, number of water rods, and size of the water rods, etc. Changes made in the advanced fuel designs offer advantages in thermal limit performance and fuel cycle economics.

In order for the newer fuel designs to fit within the same locations in the reactor core as the older designs, the cross-sectional a must be the same as that for the existing fuel designs. This requires tha[illegible] fuel rod diameter (and hence the fuel pellet diameter) be decreased. A decrease in fuel pellet diameter causes a decrease in the thermal power time constant (a description of how the simulated thermal power time constant is used as part of a thermal power trip function is provided below). Since the thermal power time constant is an inherent characteristic of the fuel and may change each cycle with the installation of new fuel designs, it is appropriate to relocate the simulated thermal power time constant to the Core Operating Limits Report. This change is consistent with the guidance provided in Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from the Technical Specifications." Several BWRs have instituted this change already. While PNPP has not as yet committed to purchasing any new fuel designs where this parameter would need to be changed, some designs under consideration for the next cycle might require a change to this parameter. Therefore, it is prudent to request this amendment now.

Description of the APRM Flow Biased Simulated Thermal Power-High Trip Function

The Average Power Range Monitor (APRM) Flow Biased Simulated Thermal Power-High function modifies the neutron flux signal to conservatively approximate the thermal power being transferred to the reactor coolant. As described within Section 15.1.1.2.2 of the PNPP Updated Safety Analysis Report (USAR), and approved by the NRC in the Perry Safety Evaluation Report (SER), the flow biased thermal power monitor (TPM) is the primary protection system trip in mitigating the consequences of a loss of feedwater heating (or any decrease in core coolant temperature) event.

The SER Section 15.1 notes that the "TPM conservatively estimates thermal power by passing the APRM signal through a time constant." This simulated thermal power time constant is dependent, in part, on the fuel pellet diameter. The fuel pellet diameter is reduced when the number of fuel rods is increased as is the case with the 9x9 or 10x10 fuel designs. As the fuel pellet diameter decreases, the thermal power time constant also decreases. This is because it takes less time for the heat to reach the outer surface of

the fuel pellet as the radius decreases. The simulated, conservative, time constant for the 8x8 designs is 6±0.6 seconds (as compared to the actual time constant of seven to 10 seconds). For the 9x9 and 10x10 designs the actual time constant is smaller, and hence the corresponding simulated thermal power time constant may also be smaller. The smallest value of the simulated thermal power time constant for all the fuel types installed in the core for the cycle will be listed in the COLR. Therefore, it is necessary to provide for changes in this parameter within the Technical Specifications and it is appropriate to transfer this value to the COLR.

The APRM Flow Biased Simulated Thermal Power-High trip level automatically varies as a function of recirculation drive flow but is clamped at an upper limit which is lower than the APRM Neutron Flux-High Setpoint. The APRM Flow Biased Simulated Thermal Power-High function provides protection against transients where thermal power increases slowly (such as the Loss of Feedwater Heating event) and protects the fuel cladding integrity by ensuring the Minimum Critical Power Ratio (MCPR) Safety Limit is not exceeded. During these events, the thermal power increase does not significantly lag the neutron flux response and, because of a lower trip setpoint the APRM Flow Biased Simulated Thermal Power-High function will initiate a scram before the high neutron flux function. For rapid neutron flux increase events, the thermal power lags the neutron flux and the APRM Neutron Flux-High function will provide a scram signal before the APRM Flow Biased Simulated Thermal Power-High function setpoint is exceeded.

Proposed Changes

Page 3/4 3-6 Table 3.3.1-2, "Reactor Protection System Response Times", Functional Unit 2.b: Average Power Range Monitor, Flow Biased Simulated Thermal Power-High, Note **

Replace the specific value of the simulated thermal power time constant, "6±0.6 seconds" with the words "specified in the COLR."

Page 3/4 3-8 Table 4.3.1.1-1, "Reactor Protection System Instrumentation Surveillance Requirements", Note (i)

Replace the specific value of the simulated thermal power time constant, "the 6±0.6 seconds" with the words "that the", and add at the end of the sentence the phrase, "is within the limits specified in the COLR."

Page 6-21 Technical Specification 6.9.1.9, "Core Operating Limits Report"

Add a new item (4) before the second paragraph stating, "The Simulated Thermal Power Time Constant for Technical Specification 3.3.1."

Page B 2-7 Bases for Table 2.2.1-1, "Reactor Protection System Instrumentation Setpoints", Item 2. Average Power Range Monitor.

Replace the specific value of the simulated thermal power time constant, "of 6±0.6 seconds" with the words "specified in the COLR."

See Attachment 2 for a marked-up copy of the Technical Specification pages.

The format for how the simulated thermal power time constant value will be presented is shown in the sample COLR pages provided in Attachment 3.

No Significant Hazards Evaluation

The standards used to arrive at a determination that a request for amendment involves no significant hazards considerations are included in the Commission's Regulations, 10 CFR 50.92, which states that the operation of a facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety.

The proposed amendment has been reviewed with respect to these three factors and it has been determined that the proposed changes do not involve a significant hazard consideration because:

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   There will be no change in the operation of the facility as a result of this amendment. No safety-related equipment or function will be altered. The proposed amendment merely transfers the specific value of the cycle-specific simulated thermal power time constant from the Technical Specifications and references its inclusion in the Core Operating Limits Report section of the Plant Data Book. The simulated thermal power time constant specified in the COLR will continue to be used for calibration of the APRM Flow Biased Simulated Thermal Power-High trip function within the Technical Specifications. NRC approved analytical methodology will continue to be used as a basis for the generation of the simulated thermal power time constant that will now be contained in the COLR.

   The transfer of the specific value of the fuel and cycle-specific simulated thermal power time constant from the PNPP Technical Specifications has no influence or impact on the probability of any transient or accident occurrence. This value, although not in Technical Specifications, will still be utilized in operating the Perry Nuclear Power Plant. The proposed Technical Specification still requires exactly the same actions to be taken if this value is not met as are required by the current Technical Specification.

2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   As stated above, no safety-related equipment, safety functions, or plant operations will be altered as a result of this amendment. The requested change does not create any new accident mode. The proposed change is in accordance with the guidance provided in Generic Letter 88-16 for requesting removal of the values of cycle-specific parameters from Technical Specifications. The establishment of the simulated thermal power time constant is in accordance with an NRC approved methodology and the incorporation of this value into the Core Operating Limits Report section of the Plant Data Book in accordance with the PNPP administrative control procedures ensures that proper steps have been taken to establish and maintain the value of this parameter. Furthermore, the submittal of Core Operating Limits Report revisions to the Commission as required by Technical Specification 6.9.1.9 will allow the Staff to continue to trend and review the values.

   As stated earlier, the removal of the cycle-specific values has no influence on, nor does it contribute in any way to, the probability or consequence of an accident. The cycle-specific simulated thermal power time constant will continue to be calculated using NRC approved methods. The Technical Specification requirements regarding the simulated thermal power time constant are unchanged.

3. The proposed change does not involve a significant reduction in a margin of safety.

   The essential issue, relative to plant safety, is conformance with the appropriate value of the simulated thermal power time constant. Whether the value is located within the Technical Specifications or the COLR is immaterial. The thermal power time constant value is fuel design dependent and is determined in accordance with NRC approved methods. The proposed amendment does not alter the requirement that the plant be operated in accordance with the value established for the simulated thermal power time constant, nor alter the required remedial action that must be taken if this value is not met. The removal of this value from the PNPP Technical Specifications is coincident with its incorporation into the Core Operating Limits Report section of the Plant Data Book, which is submitted to the Commission. The PNPP administrative procedures control revisions of this value. Therefore, the proposed change is administrative in nature and does not impact the operation of the facility in a manner that involves a reduction in the margin of safety.

   The margin of safety is not affected by the transfer of the simulated thermal power time constant from the Technical Specifications to the COLR. The margin of safety presently provided by the current Technical Specifications remains unchanged. The proposed amendment still requires operation with the value obtained from NRC approved GE reload design methodologies (currently those described within GESTAR-II) and the actions to be taken if the value is not met remain unchanged.

Environmental Consideration

The proposed Technical Specification change request has been revieved against the criteria of 10 CFR 51.22 for environmental considerations. As shovn above, the proposed change does not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, it has been concluded that the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.

TABLE 3.3.1-2

REACTOR PROTECTION SYSTEM RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME (Seconds)
1. Intermediate Range Monitors:	
a. Neutron Flux - High	NA
b. Inoperative	NA
2. Average Power Range Monitor*:	
a. Neutron Flux - High, Setdown	NA
b. Flow Biased Simulated Thermal Power - High	$\leq$ 0.09**
c. Neutron Flux - High	$\leq$ 0.09
d. Inoperative	NA
3. Reactor Vessel Steam Dome Pressure - High	$\leq$ 0.35
4. Reactor Vessel Water Level - Low, Level 3	$\geq$ 1.05
5. Reactor Vessel Water Level - High, Level 8	$\leq$ 1.05
6. Main Steam Line Isolation Valve - Closure	$\leq$ 0.06
7. Main Steam Line Radiation - High	NA
8. Drywell Pressure - High	NA
9. Scram Discharge Volume Water Level - High	NA
10. Turbine Stop Valve - Closure	$\leq$ 0.06
11. Turbine Control Valve Fast Closure, Valve Trip System Oil Pressure - Low	$\leq$ 0.07#
12. Reactor Mode Switch Shutdown Position	NA
13. Manual Scram	NA

*Neutron detectors are exempt from response time testing. Response time shall be measured from the detector output or from the input of the first electronic component in the channel.

**Not including the simulated thermal power time constant ~~6 ± 0.6 seconds~~ specified in the COLR.

#Measured from start of turbine control valve fast closure.