Duke Power
A Duke Energy Company

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November 14, 2002

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, 270, and 287
License Amendment Request for Reactor Protective System Instrumentation Technical Specification 3.3.1, Surveillance Requirement 3.3.1.3
Technical Specification Change (TSC) Number 2001-06

Pursuant to Title 10, Code of Federal Regulations, Part 50, Section 90 (10 CFR 50.90), Duke Energy (Duke) proposes to amend Appendix A, Technical Specifications, for Facility Operating Licenses DPR-38, DPR-47 and DPR-55 for Oconee Nuclear Station, Units 1, 2, and 3. Technical Specification (TS) 3.3.1 Reactor Protective System (RPS) Instrumentation, Surveillance Requirement (SR) 3.3.1.3 currently requires the out of core measured axial power imbalance be compared to incore measured axial power imbalance to determine imbalance error. If the absolute difference between the power range and incore measurements is ≥ 2% RTP, then the power range channel output must be adjusted. This SR is done on a 31 day frequency. TS 3.3.1, SR 3.3.1.3, currently does not account for a correlation slope in the formula for imbalance error. The proposed license amendment request (LAR) revises TS 3.3.1 SR 3.3.1.3 to add a correlation slope to the formula for imbalance error. The SR is also being changed to require an adjustment of the power range channel output if the absolute value of the imbalance error is ≥ 2% RTP. The SR currently requires an adjustment when the absolute difference between the power range and incore measurements is ≥ 2% RTP.

The revised Technical Specification pages are included in Attachment 1. Attachment 2 contains the markup of the current Technical Specification pages. The Technical

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Justification for the amendment request is included in Attachment 3. Attachments 4 and 5 contain the No Significant Hazards Consideration Evaluation and the Environmental Impact Analysis, respectively.

This proposed change to the TS has been reviewed and approved by the Plant Operations Review Committee and Nuclear Safety Review Board.

Approval of this proposed LAR is requested by June 30, 2003.

Implementation of these changes will not result in an undue risk to the health and safety of the public.

The Oconee Updated Final Safety Analysis Report has been reviewed and no changes are necessary to support this LAR.

Pursuant to 10 CFR 50.91, a copy of this proposed amendment is being sent to the South Carolina Department of Health and Environmental Control for review, and as deemed necessary and appropriate, subsequent consultation with the NRC staff.

If there are any additional questions, please contact Reene' Gambrell at (864) 885-3364.

Very truly yours,

R. A. Jones, Vice President
Oconee Nuclear Site

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R. A. Jones, being duly sworn, states that he is Vice President, Oconee Nuclear Site, Duke Energy Corporation, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this revision to the Renewed Facility Operating License Nos. DPR-38, DPR-47, DPR-55; and that all the statements and matters set forth herein are true and correct to the best of his knowledge.

R. A. Jones, Vice President
Oconee Nuclear Site

Subscribed and sworn to before me this 14th day of November, 2002

Notary Public

My Commission Expires:
2-12-03

ATTACHMENT 1

TECHNICAL SPECIFICATION

Remove Page	Insert Page
3.3.1-3	3.3.1-3
B 3.3.1-23	B 3.3.1-23
B 3.3.1-24	B 3.3.1-24
B 3.3.1-25	B 3.3.1-25

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.2	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. ---------- Compare results of calorimetric heat balance calculation to the power range channel output and adjust power range channel output if calorimetric exceeds power range channel output by ≥ 2% RTP.	24 hours
SR 3.3.1.3	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. ---------- Compare out of core measured AXIAL POWER IMBALANCE (API_0) to incore measured AXIAL POWER IMBALANCE (API_I) as follows: (RTP/TP)(API_0 – (CS X API_I)) = imbalance error where CS is CORRELATION SLOPE Adjust power range channel output if the absolute value of imbalance error is ≥ 2% RTP.	31 days
SR 3.3.1.4	Perform CHANNEL FUNCTIONAL TEST.	45 days on a STAGGERED TEST BASIS

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2 (continued)

assumed in the safety analyses of UFSAR, Chapter 15 (Ref. 2). These checks and, if necessary, the adjustment of the power range channels ensure that channel accuracy is maintained within the analyzed error margins. The 24 hour Frequency is adequate, based on unit operating experience, which demonstrates the change in the difference between the power range indication and the calorimetric results rarely exceeds a small fraction of 2% in any 24 hour period. Furthermore, the control room operators monitor redundant indications and alarms to detect deviations in channel outputs.

SR 3.3.1.3

A comparison of power range nuclear instrumentation channels against incore detectors shall be performed at a 31 day Frequency when reactor power is ≥ 15% RTP. A Note clarifies that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP. If the absolute value of imbalance error is ≥ 2% RTP, the power range channel is not inoperable, but an adjustment of the measured imbalance to agree with the incore measurements is necessary. The Imbalance error calculation is adjusted for conservatism by applying a correlation slope (CS) value to the error calculation formula. This ensures that the value of the API_o is > API_i. The CS value is listed in the COLR and is cycle dependent. If the power range channel cannot be properly recalibrated, the channel is declared inoperable. The calculation of the Allowable Value envelope assumes a difference in out of core to incore measurements of 2.5%. Additional inaccuracies beyond those that are measured are also included in the setpoint envelope calculation. The 31 day Frequency is adequate, considering that long term drift of the excore linear amplifiers is small and burnup of the detectors is slow. Also, the excore readings are a strong function of the power produced in the peripheral fuel bundles, and do not represent an integrated reading across the core. The slow changes in neutron flux during the fuel cycle can also be detected at this interval.

SR 3.3.1.4

A CHANNEL FUNCTIONAL TEST is performed on each required RPS channel to ensure that the entire channel will perform the intended function. Setpoints must be found within the Allowable Values specified in Table 3.3.1-1. Any setpoint adjustment shall be consistent with the assumptions of the current setpoint analysis.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.4 (continued)

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis. The requirements for this review are outlined in BAW-10167

The Frequency of 45 days on a STAGGERED TEST BASIS is consistent with the calculations of Reference 7 that indicate the RPS retains a high level of reliability for this test interval.

SR 3.3.1.5

A Note to the Surveillance indicates that neutron detectors are excluded from CHANNEL CALIBRATION. This Note is necessary because of the difficulty in generating an appropriate detector input signal. Excluding the detectors is acceptable because the principles of detector operation ensure virtually instantaneous response.

A CHANNEL CALIBRATION is a complete check of the instrument channel, including the sensor. The test verifies that the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift to ensure that the instrument channel remains operational between successive tests. CHANNEL CALIBRATION shall find that measurement errors and bistable setpoint errors are within the assumptions of the setpoint analysis. CHANNEL CALIBRATIONS must be performed consistent with the assumptions of the setpoint analysis. Whenever a sensing element is replaced, the next required CHANNEL CALIBRATION of the resistance temperature detectors (RTD)sensors is accomplished by an inplace cross calibration that compares the other sensing elements with the recently installed sensing element.

The Frequency is justified by the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. UFSAR, Chapter 7.

2. UFSAR, Chapter 15.

3. 10 CFR 50.49.

4. EDM-102, "Instrument Setpoint/Uncertainty Calculations."

BASES

REFERENCES (continued)

5. NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1979.

6. BAW-1893, "Basis for Raising Arming Threshold for Anticipating Reactor Trip on Turbine Trip," October 1985.

7. BAW-10167, May 1986.

8. 10 CFR 50.36.

ATTACHMENT 2

MARKUP OF TECHNICAL SPECIFICATION

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.1.2	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. --- Compare results of calorimetric heat balance calculation to the power range channel output and adjust power range channel output if calorimetric exceeds power range channel output by ≥ 2% RTP.	24 hours
SR 3.3.1.3	----------NOTE---------- Not required to be performed until 24 hours after THERMAL POWER is ≥ 15% RTP. --- Compare out of core measured AXIAL POWER IMBALANCE (API_0) to incore measured AXIAL POWER IMBALANCE (API_I) as follows: ~~(RTP/TP)(API_0 - API_I) = imbalance error~~ $(RTP/TP)(API_0 - (CS \times API_I)) =$ IMBALANCE ERROR Adjust power range channel output if the absolute ~~difference between the power range and incore measurements is~~ VALUE OF IMBALANCE ERROR IS ≥ 2% RTP. where CS is CORRELATION SLOPE	31 days
SR 3.3.1.4	Perform CHANNEL FUNCTIONAL TEST.	45 days on a STAGGERED TEST BASIS

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2 (continued)

assumed in the safety analyses of UFSAR, Chapter 15 (Ref. 2). These checks and, if necessary, the adjustment of the power range channels ensure that channel accuracy is maintained within the analyzed error margins. The 24 hour Frequency is adequate, based on unit operating experience, which demonstrates the change in the difference between the power range indication and the calorimetric results rarely exceeds a small fraction of 2% in any 24 hour period. Furthermore, the control room operators monitor redundant indications and alarms to detect deviations in channel outputs.

SR 3.3.1.3

A comparison of ~~power range~~ nuclear instrumentation channels against ~~incore detectors~~ shall be performed at a 31 day Frequency when reactor power is ≥ 15% RTP. A Note clarifies that 24 hours is allowed for performing the first Surveillance after reaching 15% RTP. If the absolute VALUE OF ~~difference between the power range and incore measurements~~ is ≥ 2% RTP, the power range channel is not inoperable, but an adjustment of the ~~measured imbalance to agree~~ with the incore measurements is necessary. If the power range channel cannot be properly recalibrated, the channel is declared inoperable. The calculation of the Allowable Value envelope assumes a difference in out of core to incore measurements of 2.5%. Additional inaccuracies beyond those that are measured are also included in the setpoint envelope calculation. The 31 day Frequency is adequate, considering that long term drift of the excore linear amplifiers is small and burnup of the detectors is slow. Also, the excore readings are a strong function of the power produced in the peripheral fuel bundles, and do not represent an integrated reading across the core. The slow changes in neutron flux during the fuel cycle can also be detected at this interval.

IMBALANCE ERROR

IMBALANCE ERROR CALCULATION IS ADJUSTED FOR CONSERVATISM BY APPLYING A CORRELATION SLOPE(CS) VALUE TO THE ERROR CALCULATION FORMULA. THIS ENSURES THAT THE VALUE OF THE API_0 IS > THAN API_t. THE CS VALUE IS listed in the COLR ~~DETERMINED USING THE POWER IMBALANCE DETECTOR CORRELATION (PIDC) TEST~~ AND IS CYCLE DEPENDENT.

SR 3.3.1.4

A CHANNEL FUNCTIONAL TEST is performed on each required RPS channel to ensure that the entire channel will perform the intended function. Setpoints must be found within the Allowable Values specified in Table 3.3.1-1. Any setpoint adjustment shall be consistent with the assumptions of the current setpoint analysis.

The as found and as left values must also be recorded and reviewed for consistency with the assumptions of the surveillance interval extension analysis. The requirements for this review are outlined in BAW-10167 (Ref. 7).

Attachment 3

Technical Justification

Attachment 3

Technical Justification

Background

Core imbalance is monitored using two different sets of instrumentation: excore and incore.

The excore instrumentation utilizes the power range nuclear instruments (NI), which are ion chambers. Each power range NI has an upper and lower chamber. The imbalance is calculated by taking the difference between the chambers. These detectors are located outside of the reactor vessel, so they detect the flux that leaks outside of the vessel, but provide a real time response to changing conditions in the core.

The incore detectors are located in fixed fuel assembly locations. They utilize Rhodium detectors at seven discrete levels. These detectors reside in the instrument tube in the fuel assembly at the fixed locations for the entire cycle. While these detectors are located inside the vessel and provide a more accurate indication of core parameters in a steady state condition, their response is delayed since they utilize radioactive decay to generate their signal. Only certain string levels in prescribed core locations are used to calculate incore detector imbalance.

The response of the incore detectors is too slow to provide safety function input. Thus, the excore detectors are used as input to the Reactor Protective System (RPS) for the reactor protective trip function for imbalance. In order to use the excore detectors for this trip function, it is necessary to correlate the excore detectors to the incore detectors. This is typically displayed in the form of a graph of excore response versus incore response, with incore response on the horizontal axis. The relationship between the response is shown as a linear line on this graph. The slope of this line is a measure of the response of the excore for a given incore response.

Safety analyses assume a slope of 0.95. This means that the excore response could be slightly sluggish or behind the incore response and meet the analyses. As a measure of conservatism, this slope has been currently set at 1.15. In this case the excore detectors are more responsive for a given incore response. This is considered to be conservative

since the excores will always show a greater magnitude than the corresponding incore value. This means that the excore detectors would reach the RPS trip setpoint before the incores would. This relationship (correlation slope) is verified during the initial startup as part of Power Escalation Testing (PIDC test).

Babcock & Wilcox (FTI) identified Preliminary Safety Concern (PSC) 3-85 in a letter dated November 22, 1985, requesting that Utilities review the Nuclear Instrumentation Calibration Procedure. The safety concern was that Utilities were not accounting for the out-of-core detector/in-core detector power offset relationship in routine calibration of NI detectors. The PSC identified a method for correcting the problem. Duke confirmed that the method described in the PSC had already been adopted.

When Duke converted to Improved TS in March of 1997, the standard B&W TS SR, which employed a method that assumed a correlation slope of 1, was adopted. Duke later determined that although the method was conservative with respect to plant operations, it could for some conditions of calibration result in the SR not being met at certain power levels.

In current TS 3.3.1, SR 3.3.1.3, the current correlation slope factor (1.15) is not accounted for. Any slope factor greater than 0.95 should be acceptable since it would meet the safety analysis (or be more conservative since the excores would be more responsive than what is assumed in the safety analysis). The way the TS SR is currently written assumes a correlation slope of 1. This assumed slope does not match the slope used currently to set up the NIs. The CS used by Duke is more conservative than the inherent slope of the current TS equation.

Description of the Technical Specification Change and Technical Justification

The proposed revision to TS will revise the TS and Bases section of 3.3.1, Reactor Protection System (RPS) Instrumentation, specifically SR 3.3.1.3.

The formula for imbalance error of TS SR 3.3.1.3 will be revised to incorporate a factor for Correlation Slope (CS) that is derived from the performance of the Power Imbalance Detector Correlation (PIDC) test performed during cycle startup testing. Currently, The CS is 1.15, is listed in the COLR and is cycle dependent. The addition of the CS is

recommended by the NSSS vendor and adds conservatism to the error calculation. The power range channel output should be adjusted if the absolute value of imbalance error is ≥ 2% RTP.

During Power Escalation Testing (PET), at each power plateau, and before the PIDC test, the excore detectors are calibrated for imbalance according to the following equation:

Excore %Imbalance = (1.15 x Incore %Imbalance) ± 0.02 x %FP

This is also the relationship that the calibration procedure is written to implement. This calibration relationship maintains the 1.15 slope for excore response while also specifying that the values displayed by the two sets of detectors fall within a prescribed band. The following note accompanies the step in the PET procedure, which describes the purpose of this calibration:

> This step ensures that excore offset agrees acceptably with incore offset. Excore offset must equal 115% of the incore offset value plus or minus 2% offset. The calibration is performed using feedback from OAC imbalance values. Since these values are not directly correlated in time, transient situations should be avoided as much as possible to aid accuracy.

Note that this formula provides for a calibration band that widens with increasing power. If the NI imbalance is calibrated to within a narrow band at low power, there would be a greater probability that it would still be in the band at higher power. If the full band were used at low power and power is increased by the same factor in the top and bottom of the core, it is likely that the band would be exceeded. For example, suppose the reactor is at 50% power with 26% in the top half and 24% in the bottom half, for an imbalance of 2%. Doubling power in this proportion would result in 52% and 48% for an imbalance of 4%. Thus, since power increased by the same factor in both portions of the core, so did the imbalance.

The formula in the TS provides a calibration band by artificially scaling the difference between the two imbalance readings and keeping the band constant. Since Rated Thermal Power is divided by current thermal power, this quotient will always yield a value greater than or equal to one. If this ratio were inverted and applied to the 2% limit, it would be

what is specified in the equation above.

ATTACHMENT 4

NO SIGNIFICANT HAZARDS CONSIDERATION

Attachment 4
No Significant Hazards Consideration

Pursuant to 10 CFR 50.91, Duke Power Company (Duke) has made the determination that this amendment request involves a No Significant Hazards Consideration by applying the standards established by the NRC regulations in 10 CFR 50.92. This ensures that operation of the facility in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated:

No. This change will add a correlation slope (CS) to Imbalance Error that is derived from the Power Imbalance Detector Correlation (PIDC) test performed during cycle startup testing. The formula currently exists in the technical specification. The CS will add nuclear conservatism to the error calculation.

Since the calculation already exists and the CS adds more conservatism, this proposed change does not involve an 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 kind of accident previously evaluated:

No. As stated above, the proposed revision adds a conservative CS to the existing error calculation. This change is bounded by all of the existing accidents and does not create the possibility of a new or different kind of accident from any kind of accident previously evaluated.

(3) Involve a significant reduction in a margin of safety.

No. The proposed change does not adversely affect any plant safety limits, set points, or design parameters. The change also does not adversely affect the fuel, fuel cladding, Reactor Coolant System, or containment integrity. Therefore, the proposed change does not involve a reduction in a margin of safety.

Duke has concluded, based on the above, that there are no significant hazards considerations involved in this amendment request.

ATTACHMENT 5

ENVIRONMENTAL ASSESSMENT

ATTACHMENT 5

Environmental Assessment

Pursuant to 10 CFR 51.22(b), an evaluation of the license amendment request (LAR) has been performed to determine whether or not it meets the criteria for categorical exclusion set forth in 10 CFR 51.22(c)9 of the regulations. The LAR does not involve:

1) A significant hazards consideration.

   This conclusion is supported by the determination of no significant hazards contained in Attachment 4.

2) A significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

   This LAR will not change the types or amounts of any effluents that may be released offsite.

3) A significant increase in the individual or cumulative occupational radiation exposure.

   This LAR will not increase the individual or cumulative occupational radiation exposure.

In summary, this LAR meets the criteria set forth in 10 CFR 51.22 (c)9 of the regulations for categorical exclusion from an environmental impact statement.