



Carolina Power & Light Company

SEP 10 1990

SERIAL: NLS-90-181
10CFR50.90

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
REACTOR COOLANT SYSTEM PRESSURE-TEMPERATURE LIMITS

Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, Carolina Power & Light Company (CP&L) hereby requests a revision to the Technical Specifications for the Shearon Harris Nuclear Power Plant (SHNPP), Unit 1.

This Technical Specification change revises Specification 3.4.9 by replacing the current three year heatup and cooldown limitations with revised limitations based on the predicted reactor vessel neutron exposure at five Effective Full Power Years of operation.

The revisions affect the Reactor Coolant System pressure-temperature limitations, the effective ranges of the RCS heatup and cooldown rates, and incorporate a lower temperature limit for using the Low Temperature Overpressure Protection System. In addition, the proposed amendment includes other associated changes such as recalculated limiting material RT_NDT and revised Technical Specification BASES.

Enclosure 1 provides a detailed description of the proposed changes and the basis for the changes.

Enclosure 2 details the basis for the Company's determination that the proposed changes do not involve a significant hazards consideration.

Enclosure 3 is an environmental evaluation which demonstrates that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the amendment.

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Enclosure 4 provides the proposed Technical Specification pages.

Carolina Power & Light Company requests that the enclosed Technical Specification Change be issued by January 3, 1991 and that it becomes 'effective within 30 days after issuance' so that sufficient time remains for implementation of the changes before the basis for the existing heatup and cooldown limitation curves expires.

Please refer any questions regarding this submittal to Mr. Steven Chaplin at (919) 546-6623.

Yours very truly



A. B. Cutter
Vice President
Director - Special Nuclear Projects

ABC/SDC

Enclosures:

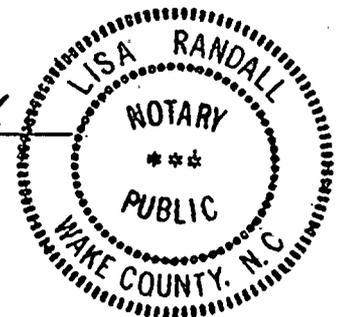
1. Basis for Change Request
2. 10CFR50.92 Evaluation
3. Environmental Evaluation
4. Technical Specification Pages

cc: Mr. R. A. Becker
Mr. J. E. Tedrow
Mr. Dayne H. Brown
Mr. S. D. Ebnetter

A. B. Cutter, 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.


Notary (Seal)

My commission expires: June 7, 1993





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ENCLOSURE 1

SHEARON HARRIS NUCLEAR POWER PLANT
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REQUEST FOR LICENSE AMENDMENT

BASIS FOR CHANGE REQUEST

Proposed Change

This Technical Specification change revises Specification 3.4.9 by replacing the current three year heatup and cooldown limitations with revised limitations based on the predicted reactor vessel neutron exposure at five Effective Full Power Years (EFPY) of operation.

The revisions affect the Reactor Coolant System (RCS) pressure-temperature limitations, the effective ranges of the RCS heatup and cooldown rates, and incorporate a lower temperature limit for using the Low Temperature Overpressure Protection System (LTOPS). In addition, the proposed amendment includes other associated changes such as recalculated limiting material RT_{NDT} and revised Technical Specification BASES.

Basis for the Change

Technical Specifications 3.4.9.1 and 3.4.9.2 "REACTOR COOLANT SYSTEM PRESSURE/TEMPERATURE LIMITS" provide RCS pressure-temperature limits to protect the reactor pressure vessel from brittle fracture by clearly separating the region of normal operations from the region where the vessel may be subject to brittle fracture. The heatup and cooldown rates of Specifications 3.4.9.1 and 3.4.9.2, and LTOP setpoints in Specification 3.4.9.4 are designed to ensure that the 10 CFR 50 Appendix G pressure-temperature limits for the RCS are not exceeded during any condition of normal operation including anticipated operational occurrences and system hydrostatic tests.

General Design Criterion 31 of Appendix A to 10 CFR 50 requires that the reactor coolant boundary shall be designed with sufficient margin to assure that when stressed under operating, maintenance, testing, and postulated accident conditions (1) the boundary behaves in a nonbrittle manner and (2) the probability of rapidly propagating fracture is minimized.

Title 10 of the Code of Federal Regulations Part 50 Appendix G, "Fracture Toughness Requirements," requires the effects of changes in the fracture toughness of reactor vessel materials caused by neutron radiation throughout the service life of nuclear reactors to be considered in the pressure-temperature limits. Regulatory Guide 1.99 contains procedures for calculating the effects of neutron radiation embrittlement of the low-alloy steels currently used for light-water-cooled reactor vessels.

The current RCS pressure-temperature limitations for SHNPP were developed in accordance with Revision 2 of this Regulatory Guide for a predicted reactor vessel neutron irradiation equivalent to three Effective Full Power Years (EFPY) of operation and 10 CFR 50 Appendix G criteria. The three EFPY curves were issued on May 31, 1990 as Amendment 19 to the Operating License.

Using the RG 1.99 Revision 2 and 10 CFR 50 Appendix G criteria, new Nil Ductility Reference Temperatures (RT_{NDT}) and limiting pressure-temperature curves were prepared for the projected reactor vessel exposure at five Effective Full Power Years (EFPY) of operation. The new five EFPY curves impose more restrictive limits on plant operations than do the previous three EFPY curves. As a result, the effective ranges for the heatup and cooldown rates were adjusted. The revised ranges, in conjunction with the current rates and LTOP setpoints, were chosen to: 1) ensure that the Appendix G pressure-temperature curves are not challenged given a limiting mass or heat input to the RCS¹ during normal operations, anticipated occurrences and system hydrostatic testing, and 2) ensure that operational flexibility is maintained.

The impact of the revised Appendix G pressure-temperature curves was predominantly below 140°F, that is on the lower rates of both heating up and cooling down. The time required to heatup and cooldown the plant was increased by extending the range of the lowest rate for both heating up and cooling down. The upper limit of the 5°F per hour cooldown rate was extended from 110°F to 130°F. The upper limit of the 10°F per hour heatup rate extended from 135°F to 140°F. These changes are shown in table 4.4-6.

In addition to the changes necessitated as a result of revised Appendix G curves, the following changes were also included.

1) The lower limit for both the 50°F per hour heatup and cooldown rates were reduced by 10°F and 25°F respectively. This allows the greatest available operating flexibility by removing excess margin. Removal of this excess margin does not adversely impact the ability of the automatic protection provided by the LTOPS system to mitigate the effects of a limiting mass or temperature input to the RCS.

2) Specification 3.4.9.4(b) was modified to add an effective lower temperature limit for usage of the LTOPS setpoints for protection of the RCS. The limit was added to ensure that LTOP setpoints are used only in a region where the system can provide the necessary protection. Otherwise, the LTOP setpoint design basis remains the same as that used previously for three EFPY setpoints. Technical Specification Figure

¹ Limiting mass input - inadvertent startup of one charging/safety injection pump

Limiting heat input - inadvertent startup of one reactor coolant pump while the steam generator secondary side is 50°F higher than the primary side

3.4-4 was revised to reflect the lower limit by the extension of the low and high LTOP PORV setpoint lines from 100°F down to 90°F.

Plant operation with the RCS temperatures below 90°F will be controlled by procedures that will implement Technical Specification 3.4.9.4(a), i.e. the RCS depressurized with a vent area greater than 2.9 square inches.

3) The revised BASES are included for your information. Technical Specification BASES 4.4.9 was updated to reflect the title change for Regulatory Guide 1.99 and to clarify the value of RT_{NDT} computed from Reg. Guide 1.99. Prior to the implementation of Revision 2 to Reg. Guide 1.99, the value of the shift in RT_{NDT} , i.e. ΔRT_{NDT} , was the largest value computed using either Reg. Guide 1.99, Revision 1 or Westinghouse Copper Trend Curves previously included as Technical Specification Figure B 3/4.4-2. Since Reg. Guide 1.99 Revision 1 has been superseded by Revision 2 and since Copper Trend Curves were deleted from the basis and are no longer used, only one method of calculating RT_{NDT} is now being utilized. Therefore, "the largest value" is no longer applicable. In addition, these BASES were revised to reflect five EFPY service life operation as previously discussed.

ENCLOSURE 2

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT

10 CFR 50.92 EVALUATION

The Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if 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, (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. Carolina Power & Light Company has reviewed this proposed license amendment request and determined that its adoption would not involve a significant hazards consideration. The bases for this determination are as follows:

Proposed Change

This Technical Specification change revises Specification 3.4.9 by replacing the current three year heatup and cooldown limitations with revised limitations based on the predicted reactor vessel neutron exposure at five Effective Full Power Years (EFPY) of operation.

The revisions affect the Reactor Coolant System (RCS) pressure-temperature limitations, the effective ranges of the RCS heatup and cooldown rates, and incorporate a lower temperature limit for using the Low Temperature Overpressure Protection System (LTOPS). In addition, the proposed amendment includes other associated changes such as recalculated limiting material RT_{NDT} and revised Technical Specification BASES.

Basis

The change does not involve a significant hazards consideration for the following reasons:

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

Technical Specifications 3.4.9.1 and 3.4.9.2 "REACTOR COOLANT SYSTEM PRESSURE/TEMPERATURE LIMITS" provide RCS pressure-temperature limits to protect the reactor pressure vessel from brittle fracture by clearly separating the region of normal operations from the region where the vessel is subject to brittle



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fracture. The heatup and cooldown rates of Specifications 3.4.9.1 and 3.4.9.2, and LTOP setpoints in Specification 3.4.9.4 are designed to ensure that the 10 CFR 50 Appendix G pressure-temperature limits for the RCS are not exceeded during any condition of normal operation including anticipated operational occurrences and system hydrostatic tests.

General Design Criterion 31 of Appendix A to 10 CFR 50 requires that the reactor coolant boundary shall be designed with sufficient margin to assure that when stressed under operating, maintenance, testing, and postulated accident conditions (1) the boundary behaves in a nonbrittle manner and (2) the probability of rapidly propagating fracture is minimized.

Title 10 of the Code of Federal Regulations Part 50 Appendix G, "Fracture Toughness Requirements," requires the effects of changes in the fracture toughness of reactor vessel materials caused by neutron radiation throughout the service life of nuclear reactors to be considered in the pressure-temperature limits. The 'change' is used in conjunction with the initial material reference temperature (RT_{NDT}) to establish the limiting pressure-temperature curves. Regulatory Guide 1.99 contains procedures for calculating the effects of neutron radiation embrittlement of the low-alloy steels currently used for light-water-cooled reactor vessels.

Using the RG 1.99 Revision 2 and Appendix G to 10 CFR 50, new Nil Ductility Reference Temperatures (RT_{NDT}) and limiting pressure-temperature curves were prepared for the projected reactor vessel exposure at five Effective Full Power Years (EFPY) of operation. These new curves in conjunction with the associated changes in the heatup and cooldown ranges and the existing Low Temperature Overpressure Protection System setpoints provide the required assurance that the reactor pressure vessel is protected from brittle fracture up to five EFPY of operation.

Therefore, the proposed amendments to the pressure-temperature limitations, the heatup and cooldown ranges, and the recalculated limiting material RT_{NDT} do not involve a significant increase in the probability or consequences of an accident previously evaluated; collectively they maintain the required buffer necessary to protect the reactor vessel from brittle fracture given a limiting mass or temperature input to the RCS for up to five EFPY of operation.

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

This amendment does not introduce any new equipment, operating procedures or constraints. It simply adjusts the existing operating limits to compensate for the shift in the nil ductility reference temperature of the reactor vessel due to neutron

exposure. Therefore no new accident or malfunction mechanism is introduced by this amendment.

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

The heatup and cooldown rates of Specifications 3.4.9.1 and 3.4.9.2, and LTOP setpoints in Specification 3.4.9.4 are designed to ensure that the 10 CFR 50 Appendix G pressure-temperature limits for the RCS are not exceeded during any condition of normal operation including anticipated operational occurrences and system hydrostatic tests.

New Nil Ductility Reference Temperatures and limiting pressure-temperature curves were prepared for the projected reactor vessel exposure at five Effective Full Power Years of operation. This resulted in a lowering of the Appendix G curves. To compensate, the effective ranges of the heatup and cooldown rates were shifted, where necessary, in order to maintain the reactor vessel protection provided by LTOPs.

The revised heatup and cooldown ranges, in conjunction with the current rates and LTOP setpoints ensure that the Appendix G pressure-temperature curves are not challenged given a limiting mass or heat input to the RCS during normal operations, anticipated occurrences and system hydrostatic testing.

Since restrictions remain in place to ensure the Appendix G operating limits of the reactor vessel are not challenged, the margin of safety defined in the Technical Specification Bases is not significantly reduced by this change.



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ENCLOSURE 3

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT

ENVIRONMENTAL CONSIDERATION

10 CFR 51.22(c)(9) provides criterion for and identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment to an operating license for a facility requires no environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; and (3) result in a significant increase in individual or cumulative occupational radiation exposure. Carolina Power & Light Company has reviewed this request and determined that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the amendment. The basis for this determination follows:

Proposed Change

This Technical Specification change revises Specification 3.4.9 by replacing the current three year heatup and cooldown limitations with revised limitations based on the predicted reactor vessel neutron exposure at five Effective Full Power Years (EFPY) of operation.

The revisions affect the Reactor Coolant System (RCS) pressure-temperature limitations, the effective ranges of the RCS heatup and cooldown rates, and incorporate a lower temperature limit for using the Low Temperature Overpressure Protection System (LTOPS). In addition, the proposed amendment includes other associated changes such as recalculated limiting material RT_NDT and revised Technical Specification BASES.

Basis

The change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) for the following reasons:

1. As demonstrated in Enclosure 2, the proposed amendment does not involve a significant hazards consideration.
2. The proposed amendment does not result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite. The changes proposed are to systems,

administrative controls and limits unrelated to effluents generated or released from the facility.

3. The proposed amendment does not result in an increase in individual or cumulative occupational radiation exposure. The changes proposed are to systems, administrative controls and limits unrelated to personnel radiation exposure.

