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SUBJECT: Application for amend to license NPF-63, revising TSS to allow reduced power operation as function of RCS total flow rate for flow rate reductions of up to 5% below currently specified flow rate.

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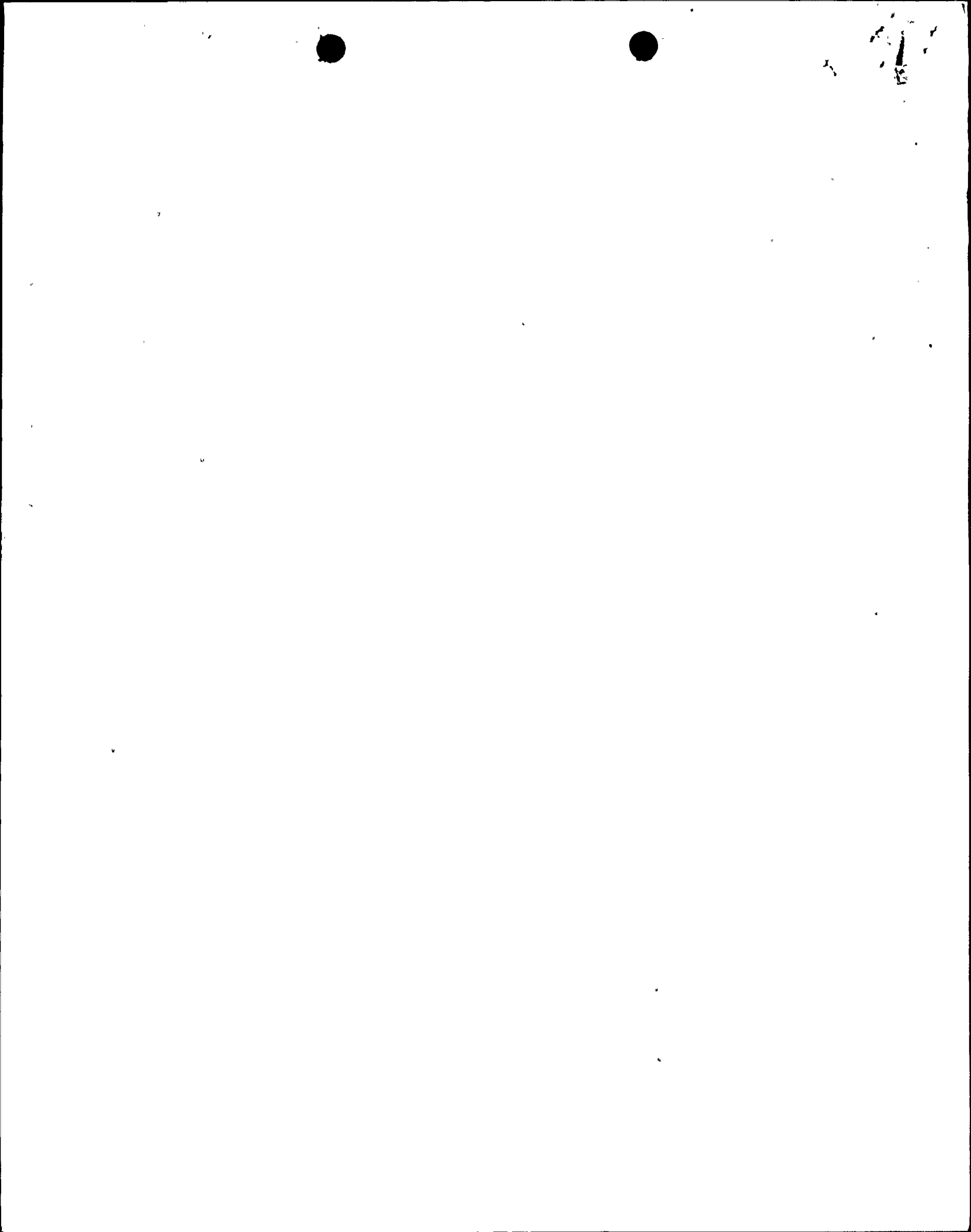
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Carolina Power & Light Company  
Harris Nuclear Plant  
PO Box 165  
New Hill NC 27562

Letter Number: HO-940314

SERIAL: HNP-94-038  
10 CFR 50.90

MAY 11 1994

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 (RCS) FLOW RATE

Gentlemen:

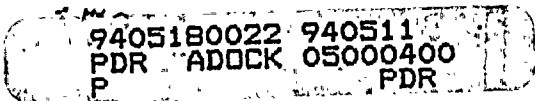
In accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, Carolina Power & Light Company (CP&L) hereby requests a revision to the Technical Specifications (TS) for the Shearon Harris Nuclear Power Plant (SHNPP). Technical Specification 3/4.2.3, RCS Flow Rate and Nuclear Enthalpy Rise Hot Channel Factor requires that RCS flow be maintained such that the total flow rate is greater than or equal to  $(293,540 \text{ gpm} \times (1.0 + C_1))$  where  $C_1$  is a nominal flow measurement allowance as defined in the Bases of the Technical Specifications. With total flow less than this rate, power must be reduced initially to less than 50 percent and subsequently to less than 5 percent of RATED THERMAL POWER.

The proposed amendment would allow reduced power operation as a function of RCS total flow rate for flow rate reductions of up to 5 percent below the currently specified flow rate. Specifically, operation would be allowed at total flow rates slightly lower than  $(293,540 \text{ gpm} \times (1.0 + C_1))$  if RATED THERMAL POWER is reduced by 1.5 percent for each one percent that RCS total flow is less than this rate. Thus, this change would provide for needed operational margin and flexibility without the unnecessary penalty of a large power reduction. The NRC has previously approved similar amendments for other Westinghouse plants of the same vintage as SHNPP.

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

Enclosure 2 details, in accordance with 10 CFR 50.91(a), the basis for the Company's determination that the proposed changes do not involve a significant hazards consideration.

Enclosure 3 provides 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 assessment needs to be prepared in connection with the issuance of the amendment.



State Road 1134 New Hill NC

ADD 11



Enclosure 4 provides page change instructions for incorporating the proposed revision.

Enclosure 5 provides the proposed Technical Specification pages.

In accordance with 10 CFR 50.91(b), CP&L is providing the State of North Carolina with a copy of the proposed license amendment.

In order to allow time for procedure revision and orderly incorporation into copies of the Technical Specifications, CP&L requests that the proposed amendment, once approved by the NRC, be issued such that implementation will occur within 60 days of issuance of the amendment.

Please refer any questions regarding this submittal to Mr. D. C. McCarthy at (919) 362-2100.

Sincerely,

*W. R. Robinson*  
W. R. Robinson

LSR/lsr

Enclosures:

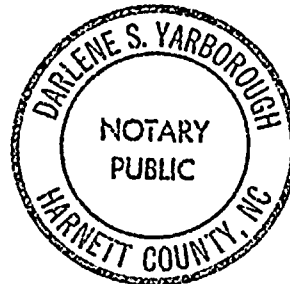
1. Basis for Change Request
2. 10 CFR 50.92 Evaluation
3. Environmental Considerations
4. Page Change Instructions
5. Technical Specification Pages

W. R. Robinson, 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.

*Darlene S. Yarborough*  
Notary (Seal)

My commission expires: 2-5-95

c: Mr. Dayne H. Brown  
Mr. S. D. Ebnetter  
Mr. N. B. Le  
Mr. J. E. Tedrow



## ENCLOSURE 1

SHEARON HARRIS NUCLEAR POWER PLANT  
NRC DOCKET NO. 50-400/LICENSE NO. NPF-63  
REQUEST FOR LICENSE AMENDMENT  
REACTOR COOLANT SYSTEM (RCS) FLOW RATE

BASIS FOR CHANGE REQUESTBackground

Shearon Harris Nuclear Power Plant (SHNPP) Technical Specification (TS) 3/4.2.3, RCS Flow Rate and Nuclear Enthalpy Rise Hot Channel Factor, requires that RCS flow be maintained such that the total flow rate is greater than or equal to  $(293,540 \text{ gpm} \times (1.0 + C_1))$  where  $C_1$  is a nominal flow measurement allowance as defined in the Bases of the Technical Specifications. With total flow less than this rate, power must be reduced initially to less than 50 percent of RATED THERMAL POWER (RTP) and subsequently to less than 5 percent of RATED THERMAL POWER if total flow is not restored. The total calculated RCS flow based upon a precision calorimetric performed during startup from the last refueling outage was 304,554 gpm (1.52 % margin).

Several significant changes have been incorporated into the facility design during the current refueling outage. Specifically, a modification has been completed to eliminate the resistance temperature detector (RTD) bypass manifold system and replace it with RTDs mounted in thermowells that extend directly into the flow stream of the RCS (Operating License Amendment No. 43). Additionally, during the current refueling outage, a transition to nuclear fuel supplied by Siemens Power Corporation (SPC) has been undertaken. This transition in core design was approved by the NRC in Operating License Amendment Nos. 44 and 46. In conjunction with these efforts, CP&L implemented a reduction in RCS average temperature ( $T_{avg}$ ). Although none of these changes is expected to alter actual RCS flow, each of these changes or the combination of changes could affect the parameters upon which the RCS flow precision calorimetric is based. Because of these and other uncertainties associated with the calculated RCS total flow rate, there is a potential that total RCS flow could either increase or decrease slightly. Since there was less than a two percent (1.52 %) margin based on the precision calorimetric performed during startup from the last refueling outage, the calorimetric to be performed during the upcoming startup and future startups could yield calculated RCS flow rates less than the currently specified minimum. Since the establishment of a new minimum total RCS flow rate would require extensive reanalysis, a Technical Specification which allows reduced power operation as a function of total flow rate would enable continued plant operation while such analyses are undertaken, without the unnecessary penalty of the large power reduction currently specified.

Proposed Change

The proposed amendment would allow reduced power operation as a function of total flow rate for RCS total flow rate reductions of up to 5 percent below (293,540 gpm x (1.0 + C<sub>1</sub>)). Specifically, operation would be allowed at total flow rates slightly lower if RATED THERMAL POWER is reduced by 1.5 percent for each one percent that RCS total flow is less than this rate.

Basis

To support RCS total flow rates less than the currently specified minimum, RCS total flow rate and RATED THERMAL POWER must be traded off against one another to maintain current departure from nucleate boiling ratio (DNBR) margins. Along with a reduction in RTP,  $F_{\Delta H}$  must be maintained at a value that is less than or equal to the 100 percent RTP Technical Specification limit on  $F_{\Delta H}$ , including measurement uncertainty. In addition, the Power Range Neutron Flux-High Trip Setpoint is reduced by the same amount (% RTP) as the required power reduction (1.5% RTP per 1% RCS flow). The reduction of the Power Range Neutron Flux-High Trip Setpoint ensures that the DNBR margin for the analyses of record is maintained for those Final Safety Analysis Report (FSAR) Chapter 15 events which utilize the Power Range Neutron Flux-High Trip Setpoint trip function.

With the proposed Technical Specification revision, DNBR margin for the analyses of record will be maintained for those events that depend on Overtemperature  $\Delta T$  (OTAT) protection. In the OTAT equation, the term  $\Delta T$  is the measured  $\Delta T$  and the term  $\Delta T_0$  is the indicated  $\Delta T$  at RTP. The ratio of  $\Delta T/\Delta T_0$  is thus the equivalent of %RTP and is compared to the OTAT trip setpoint. By maintaining  $\Delta T_0$  at or below the equivalent  $\Delta T$  at 100% RTP and the current Technical Specification minimum flow rate, any flow decrease will result in an increase in the actual  $\Delta T$  and an overestimation of power level. The overestimation of power is equivalent to a trip setpoint reduction of approximately 1% RTP per 1% flow decrease and therefore maintains DNBR margin for those events that rely on the OTAT trip.

Siemens Power Corporation (SPC) has used the approved methodologies as defined in Section 6.0 of the Technical Specifications and the generically approved 17 X 17 Mechanical Design Report to verify that the current design criteria are satisfied for the reduced flow cases with reduced power. These evaluations included the thermal hydraulic compatibility, the transient response for anticipated operational occurrences and postulated accidents, and the mechanical design. In all cases the same criteria were satisfied for the reduced flow/power cases as for the current analyses of record. That is, for anticipated operational occurrences, the specified acceptable fuel design limits were satisfied; e.g., the Minimum DNBR remained above the 95/95 limit. For the postulated accidents, the impact of the power/flow reduction allowance was demonstrated to not result in additional fuel failures from the previously analyzed cases. The mechanical design evaluation verified that the HTP/IFM fuel assemblies continue to comply with the SPC design criteria provided in the NRC-approved generic 17 X 17 Mechanical Design Report.

Conclusions

Based upon this review, the proposed Technical Specification change to reduce the power consistent with a reduction in the minimum allowed primary loop flow would not result in an unreviewed safety question as defined in 10 CFR 50.59.



ENCLOSURE 2

SHEARON HARRIS NUCLEAR POWER PLANT  
NRC DOCKET NO. 50-400/LICENSE NO. NPF-63  
REQUEST FOR LICENSE AMENDMENT  
REACTOR COOLANT SYSTEM (RCS) FLOW RATE

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 determination. The bases for this determination are as follows:

Proposed Change

The proposed amendment would allow reduced power operation as a function of total flow rate for RCS total flow rate reductions of up to 5 percent below  $(293,540 \text{ gpm} \times (1.0 + C_1))$ . Specifically, operation would be allowed at total flow rates slightly lower if RATED THERMAL POWER (RTP) is reduced by 1.5 percent for each one percent that RCS total flow is less than this rate.

Basis

This 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.

Since the proposed amendment does not involve any changes in the Reactor Coolant System (RCS) configuration, the precursors to those Final Safety Analysis Report (FSAR) accidents previously evaluated are unchanged. RCS total flow and RTP are traded off against one another to maintain the current departure from nucleate boiling ratio (DNBR) margins. NRC-approved methodologies and the NRC-approved 17 X 17 Mechanical Design Report have been used to verify that current design criteria continue to be satisfied. Therefore, there would be no increase in the probability or consequences of an accident previously evaluated.

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

The proposed amendment does not involve any modifications or additions to plant equipment and the design and operation of the unit will not be affected. The allowable reduction in the Power Range Neutron Flux-High Trip Setpoint will not introduce any new FSAR Chapter 15 accident precursors. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

The proposed change does not involve a reduction in the margin of safety as defined in the Bases to the Technical Specifications. The RATED THERMAL POWER is reduced consistent with RCS total flow to maintain the margin of safety. This margin has been assessed by the evaluations performed with the approved methodologies as defined in the Technical Specifications. The reduction of the Power Range Neutron Flux-High Trip Setpoint ensures that the DNBR margin for the analyses of record is maintained for those FSAR Chapter 15 events that utilize the Power Range Neutron Flux-High Trip Setpoint trip function. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

ENCLOSURE 3

SHEARON HARRIS NUCLEAR POWER PLANT  
NRC DOCKET NO. 50-400/LICENSE NO. NPF-63  
REQUEST FOR LICENSE AMENDMENT  
REACTOR COOLANT SYSTEM (RCS) FLOW RATE

ENVIRONMENTAL CONSIDERATIONS

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; (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

The proposed amendment would allow reduced power operation as a function of total flow rate for RCS total flow rate reductions of up to 5 percent below  $(293,540 \text{ gpm} \times (1.0 + C_1))$ . Specifically, operation would be allowed at total flow rates slightly lower if RATED THERMAL POWER (RTP) is reduced by 1.5 percent for each one percent that RCS total flow is less than this rate.

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 proposed amendment does not introduce any new equipment, nor does it require existing systems to perform a different type of function than they are currently designed to perform. The reduction of the Power Range Neutron Flux-High Trip Setpoint ensures that the DNBR margin for the analyses of record is maintained for those Final Safety Analysis Report (FSAR) Chapter 15 events that utilize that setpoint trip function. As such, the change can not affect the types or amounts of any effluents that may be released offsite.

3. The proposed amendment does not result in a significant increase in individual or cumulative occupational radiation exposure.

The proposed change does not result in additional work or surveillance within radiation controlled areas and does not affect personnel radiation exposure. Therefore, the amendment has no affect on either individual or cumulative occupational radiation exposure.

ENCLOSURE 4

SHEARON HARRIS NUCLEAR POWER PLANT  
NRC DOCKET NO. 50-400/LICENSE NO. NPF-63  
REQUEST FOR LICENSE AMENDMENT  
REACTOR COOLANT SYSTEM (RCS) FLOW RATE

PAGE CHANGE INSTRUCTIONS

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iii	iii
v	v
2-2	2-2
2-4	2-4
2-10	2-10
3/4 2-9	3/4 2-9
3/4 2-10	3/4 2-10
-	3/4 2-10a
-	3/4 2-10b
B 3/4 2-4	B 3/4 2-4
B 3/4 2-5	B 3/4 2-5
B 3/4 2-6	B 3/4 2-6