

October 18, 1989

Docket No. 50-400

DISTRIBUTION
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Mr. Lynn W. Eury
Executive Vice President
Power Supply
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602

Dear Mr. Eury:

SUBJECT: ISSUANCE OF AMENDMENT NO. 14 TO FACILITY OPERATING LICENSE
NO. NPF-63 - SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1, REGARDING
REFUELING OPERATIONS - LOW WATER LEVEL (TAC NO. 72627)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 14 to Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit 1 (Harris). This amendment consists of changes to the Technical Specifications in response to your request dated February 22, 1989, as supplemented June 7, 1989, August 22, 1989 and October 1989.

The amendment changes the Harris Surveillance Requirement (SR) 4.9.8.2., which is part of Technical Specification (TS) 3.9.8.2, Refueling Operations - Low Water Level. The existing SR covers operation over the entire range of low water levels encountered for refueling operations. The requested change would divide the existing SR into two separate surveillances and reduce the minimum flow requirement to 900 gpm when the water level is below the top of the reactor vessel flange.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's regular Bi-weekly Federal Register notice.

Sincerely,

Original Signed By:

Richard A. Becker, Project Manager
Project Directorate II-1
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 14 to NPF-63
2. Safety Evaluation

cc w/enclosures:
See next page

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DATE	: 10/17/89	: 10/13/89	: 10/17/89	: 10/17/89



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Richard A. Becker
Richard A. Becker, Project Manager
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Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 14 to NPF-63
2. Safety Evaluation

cc w/enclosures:
See next page

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Shearon Harris

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-400

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 14
License No. NPF-63

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Carolina Power & Light Company (the licensee), dated February 22, 1989, as supplemented June 7, 1989, August 22, 1989 and October 11, 1989 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. NPF-63 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 14, are hereby incorporated into this license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David B. Matthews/for

Gus C. Lainas, Assistant Director
for Region II Reactors
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 18, 1989

* See previous concurrence

DM for

ADH

OFC	: LA: PD21: DRPR: PM: PD21: DRPR: NRR: SRXB	: OGC	: D: PD21: DRPR	: AB: PD21: DRPR: RBP#1: RII
NAME	: PAnderson: RBecker: *MHodges	: AHogdon	: EAdensam	: GLainas : DVerrelli
DATE	: 10/13/89 : 10/13/89 : 06/27/89	: 10/16/89	: 10/17/89	: 10/17/89 : 10/13/89

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ATTACHMENT TO LICENSE AMENDMENT NO. 14

FACILITY OPERATING LICENSE NO. NPF-63

DOCKET NO. 50-400

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages

3/4 9-10

B 3/4 9-2

Insert Pages

3/4 9-10

B 3/4 9-2

REFUELING OPERATIONS

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two independent residual heat removal (RHR) loops shall be OPERABLE, and at least one RHR loop shall be in operation.*

APPLICABILITY: MODE 6, with irradiated fuel in the vessel when the water level above the top of the reactor vessel flange is less than 23 feet.

ACTION:

- a. With less than the required RHR loops OPERABLE, immediately initiate corrective action to return the required RHR loops to OPERABLE status or to establish greater than or equal to 23 feet of water above the reactor vessel flange as soon as possible.
- b. With no RHR loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required RHR loop to operation. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

SURVEILLANCE REQUIREMENTS

4.9.8.2.1 At least one RHR loop shall be verified in operation and circulating reactor coolant at a flow rate of greater than or equal to 2500 gpm at least once per 12 hours whenever the water level is at or above the reactor vessel flange.

4.9.8.2.2 At least one RHR loop shall be verified in operation and circulating reactor coolant at a flow rate of greater than or equal to 900 gpm at least once per 12 hours whenever the water level is below the reactor vessel flange.

*The operating RHR loop may be removed from operation for up to 1 hour per 2-hour period during the performance of CORE ALTERATIONS and core loading verification in the vicinity of the reactor vessel hot legs.

REFUELING OPERATIONS

BASES

3/4.9.6 REFUELING MACHINE

The OPERABILITY requirements for the refueling machine ensure that: (1) refueling machine will be used for movement of drive rods and fuel assemblies, (2) each crane has sufficient load capacity to lift a drive rod or fuel assembly, and (3) the core internals and reactor vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - FUEL HANDLING BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel and control rod assembly and associated handling tool over other fuel assemblies in the storage pool ensures that in the event this load is dropped: (1) the activity release will be limited to that contained in a single fuel assembly, and (2) any possible distortion of fuel in the storage racks will not result in a critical array. This assumption is consistent with the activity release assumed in the safety analyses.

3/4.9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

The requirement that at least one residual heat removal (RHR) loop be in operation ensures that: (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have two RHR loops OPERABLE when there is less than 23 feet of water above the reactor vessel flange ensures that a single failure of the operating RHR loop will not result in a complete loss of residual heat removal capability. With the reactor vessel head removed and at least 23 feet of water above the reactor pressure vessel flange, a large heat sink is available for core cooling. Thus, in the event of a failure of the operating RHR loop, adequate time is provided to initiate emergency procedures to cool the core.

The minimum RHR flow requirement is reduced to 900 gpm when the reactor water level is below the reactor vessel flange. The 900 gpm limit reduces the possibility of cavitation during operation of the RHR pumps and ensures sufficient mixing in the event of a MODE 6 boron dilution incident.

3/4.9.9 CONTAINMENT VENTILATION ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment purge makeup and exhaust penetrations will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 14 TO FACILITY OPERATING LICENSE NO. NPF-63

CAROLINA POWER & LIGHT COMPANY, et al.
SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-400

1.0 INTRODUCTION

By letters dated February 22, 1989, as supplemented June 7, 1989, August 22, 1989, and October 11, 1989, the Carolina Power & Light Company (CP&L) submitted and supplemented a request for changes to the Shearon Harris Nuclear Power Plant, Unit 1, (Harris) Surveillance Requirement (SR) 4.9.8.2, which is part of Technical Specification (TS) 3.9.8.2, Refueling Operations - Low Water Level. The original request was noticed in the FEDERAL REGISTER (54 FR 15823) on April 19, 1989. The staff review determined that a minimum flow rate limit on the residual heat removal (RHR) flow was necessary when the water level was below the reactor vessel flange. Since this was a substantive change to the original request, the change was renoticed in the FEDERAL REGISTER (54 FR 39485) on September 26, 1989. The existing surveillance requirement covers operation over the entire range of low water levels encountered for refueling operations. The requested change would divide the existing SR into two separate surveillances and reduce the minimum flow requirement to 900 gpm when the water level is below the top of the reactor vessel flange.

The SR for water levels between 23 feet and the top of the reactor vessel flange would continue to require the verification of one RHR loop flowing at equal to or greater than 2500 gpm at least once every 12 hours. When the water level is below the top of the reactor vessel flange, the SR would verify at least once every 12 hours that one RHR loop was operating and at a flow rate equal to or greater than 900 gpm.

Reducing the minimum flow rate when the water level is below the top of the reactor vessel flange reduces the potential for cavitation and subsequent damage to the RHR pump.

The staff's review of these proposed changes to the Refueling Operations Low Water Level SR and associated basis follows.

2.0 EVALUATION

The CP&L evaluation of the proposed changes is as follows. The present TS for Refueling Operations - Low Water Level, 3.9.8.2, and the SR 4.9.8.2,

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require at least one RHR loop to be in operation, which ensures that: (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor vessel below 140°F as required in Mode 6 and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and to prevent boron stratification. The Mode 6 minimum flow limit of 2500 gpm was established to alleviate the potential for boron stratification when the refueling cavity is full of water. Administrative controls to isolate potential sources of non-borated water from the reactor are established by TS 3/4.9.1 to prevent a boron dilution event while in Mode 6. Some operations in Mode 6, however, require that the water level be taken below the top of the reactor vessel flange to the reduced water level of mid-loop operation. A flow rate of 2500 gpm at mid-loop water level could cause cavitation and eventual damage of the RHR pump. Therefore, the minimum flow restriction for refueling operation where the water level is below the reactor vessel flange should be reduced to minimize cavitation potential consistent with other accident considerations.

Although the valves in systems that might introduce unborated water into the Reactor Coolant System (RCS) are administratively controlled by TS 3/4.9.1, if these controls should be ignored, a flow rate in the RHR system that would ensure thorough mixing of boration would also ensure that the boron dilution accident would progress as slowly as possible and would allow maximum reaction time for operator discovery and action. Therefore, an optimum flow requirement, which minimizes the potential for vortexing and subsequent cavitation damage to the RHR pump while being sufficient to ensure thorough mixing to maximize operator reaction duration, is desirable. Westinghouse, the reactor manufacturer, has recommended a value of 900 gpm. Further, Westinghouse has performed an engineering evaluation to confirm that a minimum RHR flow requirement of 900 gpm will provide sufficient mixing should a Mode 6 boron dilution event occur.

The NRC staff has reviewed the above reasoning and finds the proposed change acceptable because it will eliminate the potential for damage and loss of an RHR pump during mid-loop or similar operations while still mitigating a boron dilution accident should it occur under those conditions. In addition, the proposed amendment is consistent with Generic Letter 88-17, "Loss of Decay Heat Removal," dated October 17, 1988, which advises licensees to submit changes to those TSs that restrict or limit the safety benefit of the action identified by the generic letter.

3.0 EMERGENCY CIRCUMSTANCES

The licensee's October 11, 1989 letter presents the following with regard to justification of the need for emergency consideration of the August 22, 1989 application:

Due to the recent fire at the Shearon Harris Nuclear Power Plant, the Refueling Outage originally scheduled to begin on October 22, 1989 commenced on October 10, 1989. The requested license amendment is required prior to the plant entering Mode 6 and draining down to mid-loop operation to allow installation of the nozzle dams needed to support

Steam Generator Tube inspections. Entry into Mode 6 and these inspections are critical path activities for this outage and any delay in the completion of these activities will directly affect the length of the outage. Entry into Mode 6 is currently scheduled to begin on October 23, 1989. In order to implement revised procedures associated with this Technical Specification change and complete the requisite operator training, issuance of this license amendment is required to avoid delay of startup of the unit.

We conclude that failure to grant the emergency license amendment would delay resumption of operation of Harris.

Based upon the above, we conclude that the licensee has adequately addressed the standards of 10 CFR 50.91(a)(5) with regard to demonstrating the need for an emergency license amendment. We further conclude that the licensee has not abused the emergency provision by failing to make a timely application for the amendment.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92 state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not:

- (1) Involve a significant increase in the probability or consequences of any accident previously evaluated; or
- (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.

This amendment has been evaluated against the standards in 10 CFR 50.92. The proposed amendment 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. The existing requirement of Specification 3/4.9.8.2 that at least one RHR loop be in operation ensures that: (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor vessel below 140°F as required in Mode 6, and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification. The Mode 6 minimum flow limit of 2500 gpm was rates, to preclude boron stratification when the water level is below the reactor vessel flange. For the boron dilution event, administrative controls to isolate potential sources of non-borated water from the reactor, established in Technical Specification 3/4.9.1., prevent a boron dilution event while in Mode 6. However, even if a boron

dilution event is assumed to occur, an evaluation has been completed which demonstrates that an RHR flow rate of 900 gpm provides sufficient mixing of the RCS volume used in the Mode 6 boron dilution analysis and that the existing FSAR analysis remains valid.

Since boron stratification is not a concern at reduced RCS water inventories and since the minimum RHR flow of 900 gpm when the RCS water level is below the reactor vessel flange does not significantly increase 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 splits the existing surveillance requirement into two separate surveillances. The first, Surveillance Requirement 4.9.8.2.1, is applicable when the RCS water level is at or above the reactor vessel flange and maintains the 2500 gpm minimum flow limit. The second, Surveillance Requirement 4.9.8.2.2, is applicable when the RCS water level is below the reactor vessel flange and requires that on RHR loop be verified in operation and circulating reactor coolant at a flow rate greater than or equal to 900 gpm at least once per 12 hours. As stated above, the proposed amendment does not involve any physical changes, additions, modifications, or deletions to existing equipment or systems. Therefore, the proposed amendment cannot create the possibility of a new or different kind of accident.
3. Reducing the minimum RHR flow limit from 2500 gpm to 900 gpm when the RCS water level is below the reactor vessel flange does not involve a significant reduction in the margin of safety. As stated above, the Mode 6 minimum flow limit of 2500 gpm was established to alleviate the potential for boron stratification under refueling conditions. Boron stratification is only a concern with the large volumes of water present when the refueling cavity is filled. Sufficient mixing exists, even at low RHR flow rates, to preclude boron stratification when the water level is below the reactor vessel flange. For the boron dilution event, administrative controls to isolate potential sources of non-borated water from the reactor, established in Technical Specification 3/4.9.1, prevent a boron dilution event while in Mode 6. However, even if a boron dilution event is assumed to occur, an evaluation has been completed which demonstrates that an RHR flow rate of 900 gpm provides sufficient mixing of the RCS volume used in the Mode boron dilution analysis and that the existing FSAR analysis remains valid. Since the boron stratification is not a concern at reduced RCS water inventories and since the minimum RHR flow of 900 gpm is sufficient to ensure adequate mixing for a postulated boron dilution event, the proposed amendment does not result in a significant reduction in the margin of safety.

Accordingly, the Commission has determined that the application for amendment, dated February 22, 1989, as supplemented by letters dated June 7, 1989, August 22, 1989 and October 11, 1989, involves no significant hazards consideration.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted areas as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration, and there has been no public comment on such finding. Accordingly, this 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 need be prepared in connection with the issuance of this amendment.

6.0 CONCLUSION

The Commission made a proposed determination that this amendment involves no significant hazards consideration which was published originally in the Federal Register (54 FR 15823) on April 19, 1989, and a renotece was published on September 26, 1989 (54 FR 39485) and consulted with the State of North Carolina. No public comments or requests for hearing were received, and the State of North Carolina did not have any comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Richard A. Becker

Dated: October 18, 1989

AMENDMENT NO. 14 TO FACILITY OPERATING LICENSE NO. NPF-63 - HARRIS, UNIT 1

Docket File

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HARRIS FILE