

October 3, 2001

Mr. James Scarola, Vice President  
Shearon Harris Nuclear Power Station  
Carolina Power & Light Company  
Post Office Box 165, Mail Code: Zone 1  
New Hill, North Carolina 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER STATION - ENVIRONMENTAL  
ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT - POWER  
UPRATE MODIFICATION (TAC NO. MB0782)

Dear Mr. Scarola:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for a License Amendment to Permit Uprated Power Operations at Shearon Harris Nuclear Power Station (HNP) dated October 4, 2000, and December 14, 2000, as supplemented on March 8, March 27, April 26, May 14, May 18, June 4, June 11, June 26, June 29, July 3, July 16 (2 letters), July 17, August 17, and September 20, 2001. The supplemental letters provided responses to requests for additional information. The proposed amendment would increase the licensed reactor power from 2775 Megawatts thermal (MWt) to 2900 MWt at HNP, an approximate 4.5 percent increase.

The assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

***/RA by K. Kalyanam Acting for/***

Richard J. Laufer, Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-400

Enclosure: Environmental Assessment

cc w/encl: See next page

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Mr. James Scarola

cc:

Mr. William D. Johnson  
Vice President and Corporate Secretary  
Carolina Power & Light Company  
Post Office Box 1551  
Raleigh, North Carolina 27602

Resident Inspector/Harris NPS  
c/o U.S. Nuclear Regulatory Commission  
5421 Shearon Harris Road  
New Hill, North Carolina 27562-9998

Ms. Karen E. Long  
Assistant Attorney General  
State of North Carolina  
Post Office Box 629  
Raleigh, North Carolina 27602

Public Service Commission  
State of South Carolina  
Post Office Drawer  
Columbia, South Carolina 29211

Mr. Mel Fry, Director  
Division of Radiation Protection  
N.C. Department of Environment  
and Natural Resources  
3825 Barrett Dr.  
Raleigh, North Carolina 27609-7721

Mr. Terry C. Morton  
Manager  
Performance Evaluation and  
Regulatory Affairs CPB 7  
Carolina Power & Light Company  
Post Office Box 1551  
Raleigh, North Carolina 27602-1551

Mr. Robert J. Duncan II  
Plant General Manager  
Carolina Power & Light Company  
Shearon Harris Nuclear Power Plant  
P.O. Box 165, Mail Zone 3  
New Hill, North Carolina 27562-0165

Mr. John H. O'Neill, Jr.  
Shaw, Pittman, Potts & Trowbridge  
2300 N Street, NW.  
Washington, DC 20037-1128

Shearon Harris Nuclear Power Plant

Mr. Chris L. Burton  
Director of Site Operations  
Carolina Power & Light Company  
Shearon Harris Nuclear Power Plant  
Post Office Box 165, MC: Zone 1  
New Hill, North Carolina 27562-0165

Mr. Robert P. Gruber  
Executive Director  
Public Staff NCUC  
Post Office Box 29520  
Raleigh, North Carolina 27626

Chairman of the North Carolina  
Utilities Commission  
Post Office Box 29510  
Raleigh, North Carolina 27626-0510

Mr. Vernon Malone, Chairman  
Board of County Commissioners  
of Wake County  
P. O. Box 550  
Raleigh, North Carolina 27602

Mr. Richard H. Givens, Chairman  
Board of County Commissioners  
of Chatham County  
P. O. Box 87  
Pittsboro, North Carolina 27312

Mr. Richard J. Field, Manager  
Regulatory Affairs  
Carolina Power & Light Company  
Shearon Harris Nuclear Power Plant  
P.O. Box 165, Mail Zone 1  
New Hill, NC 27562-0165

Mr. John R. Caves, Supervisor  
Licensing/Regulatory Programs  
Carolina Power & Light Company  
Shearon Harris Nuclear Power Plant  
P. O. Box 165, Mail Zone 1  
New Hill, NC 27562-0165

UNITED STATES NUCLEAR REGULATORY COMMISSION  
CAROLINA POWER & LIGHT COMPANY  
DOCKET NO. 50-400  
SHEARON HARRIS NUCLEAR POWER PLANT  
ENVIRONMENTAL ASSESSMENT AND FINDING OF  
NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.90 for Facility Operating License No. NPF-63, issued to Carolina Power and Light Company (CP&L, the licensee) for operation of the Shearon Harris Nuclear Power Station, Unit 1 (HNP), located in Wake and Chatham Counties, North Carolina. As required by 10 CFR 51.21, the NRC is issuing this environmental assessment and finding of no significant impact.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would allow CP&L to increase the maximum reactor core power level from 2775 megawatts thermal (MWt) to 2900 MWt, which is an increase of 4.5 percent of rated core thermal power for HNP. The proposed action is in accordance with the licensee's application for amendment dated October 4, 2000, and December 14, 2000, as supplemented on March 8, March 27, April 26, May 14, May 18, June 4, June 11, June 26, June 29, July 3, July 16 (2 letters), July 17, August 17, and September 20, 2001, to revise HNP Facility Operating License and Technical Specifications to support steam generator replacement and to allow operation at an updated reactor core power level of 2900 MWt.

### The Need for the Proposed Action:

The proposed action permits an increase in the licensed core thermal power from 2775 MWt to 2900 MWt for HNP and provides the flexibility to increase the potential electrical output of HNP.

### Environmental Impacts of the Proposed Action:

CP&L has submitted an environmental evaluation supporting the proposed power uprate and provided a summary of its conclusions concerning the radiological and non-radiological environmental impacts of the proposed action.

### Radiological Environmental Assessment:

#### Radwaste Systems

The reactor coolant contains activated corrosion products, which are the result of metallic materials entering the water and being activated in the reactor region. Under power uprate conditions, the feedwater flow increases with power and the activation rate in the reactor region increases with power. The net result may be an increase in the activated corrosion product production. However, the evaluation has shown that the power uprate will not cause a significant change in the types or a significant increase in the amounts of any radiological effluent that may be released offsite.

Non-condensable radioactive gas from the main condenser, along with air in-leakage, normally contains activation gases (principally N-16, O-19 and N-13) and fission product radioactive noble gases. This is the major source of radioactive gas (greater than all other sources combined). These non-condensable gases, along with non-radioactive air, are continuously removed from the main condensers, which discharge into the offgas system. The changes in gaseous effluents are small and are well within the uncertainty of the calculation of the original limits following implementation of the power uprate.

CP&L has concluded that there will be no significant change in the level of controls or methodology used for the processing of radioactive effluents; or handling of solid radioactive waste at HNP will not be impacted by operation at uprated power conditions, and the slight increase in effluents discharged would continue to meet the requirements of 10 CFR Part 20 and 10 CFR Part 50, Appendix I. Therefore, the power uprate will not appreciably affect the ability to process liquid or gaseous radioactive effluents and there are no significant environmental effects from radiological releases.

#### Dose Consideration

CP&L evaluated the potential effects of power uprate conditions on the radiation sources within the plant and the radiation levels during normal and post-accident conditions. The original calculations for determining the normal operational doses and radiation shielding requirements were very conservative and had additional margin assumed in the calculations. It was determined that these margins are sufficient to accommodate any increases attributed to the 4.5 percent increase in rated thermal power. The power uprate has no significant effect on plant normal operation radiation zones and shielding requirements. In addition, the normal operation component of the total integrated dose used for radiological equipment qualification is not affected by the power uprate.

The power uprate does not involve significant increases in the offsite doses to the public from noble gases, airborne particulates, iodine, tritium, or liquid effluents. An upper bound analysis for the potential impact of the power uprate indicates that the increase in radiological releases and resultant dose impact is bounded by the percentage increase in the reactor core power. Therefore, the normal offsite doses are not significantly affected by operation at the uprated power level and remain below the limits of 10 CFR Part 20 and 10 CFR Part 50, Appendix I.

The uprate program included a reanalysis or evaluation of all other aspects of large-break loss-of-coolant accident (LBLOCA), small-break loss-of-coolant accidents (SBLOCA), non-LOCA accidents, and Nuclear Steam Supply System (NSSS) and balance-of-plant (BOP) structures, systems, and components. Major NSSS components (e.g., reactor pressure vessel, pressurizer, reactor coolant pumps, and steam generators); BOP components (e.g., turbine, generator, and condensate and feedwater pumps); and major systems and sub-systems (e.g., safety injection, auxiliary feedwater, residual heat removal, electrical distribution, emergency diesel generators, containment cooling, and the ultimate heat sink) have been assessed with respect to the bounding conditions expected for operation at the uprated power level. Control systems (e.g., rod control, pressurizer pressure and level, turbine overspeed, steam generator level, and steam dump) have been evaluated for operation at uprated power conditions. Reactor trip and Engineered Safety Feature actuation setpoints have been assessed and no needed changes were identified as a result of uprated power operations. The results of all of the above analyses and evaluations have yielded acceptable results and demonstrate that all design basis acceptance criteria will continue to be met during uprated power operations.

For post-accident conditions, the existing post-accident dose rate maps are adequate for power uprate conditions, and variances from existing calculated values are insignificant. The resulting radiation levels were determined to be within current regulatory limits, and there would be no effect on the plant equipment, access to vital areas, or habitability of the control room envelope and the Technical Support Center. The licensee has determined that access to areas requiring post-accident occupancy will not be significantly affected by the power uprate.

The calculated whole body and thyroid doses at the exclusion area boundary that might result from a postulated design basis LOCA were evaluated. All offsite doses evaluated at uprated power conditions remain below established regulatory limits. Therefore, the results of

the radiological analyses remain below the 10 CFR Part 100 guidelines and all radiological safety margins are maintained.

#### Non-Radiological Environmental Assessment:

The licensee reviewed the non-radiological environmental impacts of the power uprate based on information submitted in the Environmental Report (ER), Operating License Stage (OL), the NRC Final Environmental Statement (FES), and the requirements of the Environmental Protection Plan. Based on this review, the licensee concluded that the proposed power uprate has no significant effect on the non-radiological elements of concern and the plant will be operated in an environmentally acceptable manner as established by the FES. In addition, the licensee states that existing Federal, State, and local regulatory permits presently in effect accommodate the power uprate without modification.

#### Effluent Analysis and Evaluation

According to the licensee, the proposed power uprate will result in cooling tower duty of approximately  $4.2\text{E}+08$  BTU/hr over the current operating condition, with a corresponding increase in evaporation, makeup, and cooling tower blowdown temperature. This heat duty includes a component from the normal service water system, which is not expected to change as a result of the power uprate, according to the licensee. However, the increase in cooling tower duty from  $6.67\text{E}+09$  BTU/hr evaluated in the ER-OL (for a single unit) is  $2.4\text{E}+08$  BTU/hr or 3.6 percent.

Cooling tower flowrate does not change as a result of the power uprate. However, the licensee has a concurrent project to retube the main condenser, which will result in an increase in the circulating water system flow by approximately 4,600 gpm. Cooling tower drift, which is a small fraction (0.002%) of the total cooling tower flowrate (circulating water system plus normal service water system), will increase slightly. However, the impact on the production of cooling tower drift is negligible.

The average temperature of the cooling tower blowdown is predicted by the licensee to increase by 0.4°F in the winter and 0.1°F in the summer. These values are based on the average January and July wet bulb temperatures presented in the ER-OL Table 3.4.2-2.

CP&L's original analyses predicted the mixing zone for the cooling tower blowdown to be 120 acres in the winter and 20 acres in the summer. The FES (Section 5.3.1.2.1) concluded that CP&L's original analysis conducted under extreme temperature conditions was conservative and protective of water quality standards. The analyses were done assuming two units in operation. The FES reported independent analyses that predicted that the mixing zone would remain less than 0.7 acres under all conditions.

The additional heat load to the Harris Lake associated with the power uprate of a single unit does not significantly impact the conclusions of the FES relative to the thermal impact, according to the licensee. The minimal increase in blowdown temperature associated with the power uprate is conservative and protective of water quality standards. As discussed in the FES, adequate mixing occurs such that the size of the thermal plume is acceptably small. This remains valid in view of the fact that the original analyses were done assuming two units in operation.

The licensee had the thermal impact associated with the power uprate evaluated relative to the HNP National Pollutant Discharge Elimination System (NPDES) permit. North Carolina Department of Environment, Health, and Natural Resources issued NPDES Permit No. NC0039586 to HNP. The permit was last renewed on July 31, 1996. The NPDES permit specifies a mixing zone of an area no greater than 200 acres. The original NPDES permit contained a requirement to monitor the cooling tower blowdown to ensure compliance with the requirements of the mixing zone. However, the monitoring results subsequently led to the deletion of the requirement blowdown temperature in the NPDES. In view of the conservatism in the original CP&L analyses, the deletion of Unit 2, and the small change in cooling tower

blowdown temperature, the licensee states that there will be no difficulty in meeting the 200 acre limitation on the size of the mixing zone.

The amount of water required to make up for forced evaporation from the cooling tower is expected to increase. The ER-OL predicted the annual average, forced evaporation at a power level of 100% to be 22.1 cubic feet per second (cfs). The revised comparable value for the power uprate is 22.8 cfs. The increase in the average forced evaporation loss is 0.7 cfs assuming 95% capacity factor and annual average meteorology according to the licensee.

The increase (0.7 cfs) is small relative to the total water demand from the operation of Unit 1 and the flow available from the inputs to the main reservoir. The total water consumption of 32.2 cfs includes forced evaporation (assuming a capacity factor of 95%), natural evaporation from the reservoirs, seepage, and miscellaneous plant consumption. The total inputs to the main reservoir averages 67.6 cfs. The licensee states that there is no significant impact on the main reservoir.

With regard to downstream water uses, the change is small compared to the total Cape Fear River flow (downstream of the main dam) of 3,125 cfs. The NRC, in FES Section 5.3.2.1 stated, "...less than 1% of the average flow of the Cape Fear River [3,125 cfs] will be used by the plant. Thus, the staff's conclusion in the RFES-CP that the consumptive water use by a four-unit plant would not adversely affect other downstream water users is valid for a two-unit plant." The revised water consumption by HNP is approximately 1.03% of the average Cape Fear River flow.

#### Noise Evaluation

The noise effects due to operation of HNP at uprated power conditions were reviewed. No increase in noise from the turbine or reactor building will result due to uprated power operations. In addition, the turbine and the reactor building supply and exhaust fans will continue to operate at current speeds, and the associated noise levels will also be unaffected

by uprated power operations. In summary, the overall noise levels at HNP will not increase due to the power uprate.

The non-radiological environmental impacts related to the proposed power uprate at HNP have been reviewed and there are no adverse impacts or significant changes required to the current NPDES Permits or other plant administrative limits. No changes to land use would result and the proposed action does not involve any historic sites. Therefore, no new or different types of non-radiological environmental impacts are expected.

### Summary

The NRC has completed its evaluation of the proposed action and concludes that there are no significant environmental impacts associated with the proposed action.

The proposed action will not significantly increase the probability or consequences of accidents, no changes are being made in the types of effluents that may be released off site, and there is no significant increase in occupational or public radiation exposure. Therefore, there are no significant radiological environmental impacts associated with the proposed action.

With regard to potential nonradiological impacts, the proposed action does not have a potential to affect any historic sites. It does not affect nonradiological plant effluents and has no other environmental impact. Therefore, there are no significant nonradiological environmental impacts associated with the proposed action.

Accordingly, the NRC concludes that there are no significant environmental impacts associated with the proposed action.

### Environmental Impacts of the Alternatives to the Proposed Action:

As an alternative to the proposed action, the staff considered denial of the proposed action (i.e., the “no-action” alternative). Denial of the application would result in no change in current environmental impacts, but would reduce the operational flexibility that would be

afforded by the proposed change. The environmental impacts of the proposed action and the alternative action are similar.

Alternative Use of Resources:

This action does not involve the use of any different resources than those previously considered in the Final Environmental Statement for HNP.

Agencies and Persons Consulted:

On October 3, 2001, the NRC staff consulted with the North Carolina State official, Mr. Johnny James, of the Division of Radiation Protection, regarding the environmental impact of the proposed action. The State official had no comments.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letters dated October 4, 2000, and December 14, 2000, as supplemented by letters dated March 8, March 27, April 26, May 14, May 18, June 4, June 11, June 26, June 29, July 3, July 16 (2 letters), July 17, August 17, and September 20, 2001. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the ADAMS Public Library component on the NRC Web site, <http://www.nrc.gov> (the Public Electronic Reading Room). If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or by e-mail at [pdr@nrc.gov](mailto:pdr@nrc.gov).

Dated at Rockville, Maryland, this 3rd day of October 2001.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Richard P. Correia, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation