September 11, 1997

Mr. Leon R. Eliason
Chief Nuclear Officer & President-
Nuclear Business Unit
Public Service Electric & Gas
Company
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: EMERGENCY CORE COOLING SUBSYSTEMS TECHNICAL SPECIFICATIONS, SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 (TAC NOS. M98476 AND M98477)

Dear Mr. Eliason:

The Commission has issued the enclosed Amendment Nos. 200 and 184 to Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Nuclear Generating Station, Unit Nos. 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated April 25, 1997, as supplemented on June 6, 1997.

These amendments change TS 3.5.2, "ECCS Subsystems - $T_{ave} \geq 350°F$," to eliminate the flow path from the residual heat removal system to the reactor coolant system hot legs.

A copy of our safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,
/s/
Leonard N. Olshan, Senior Project Manager
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-272/311

Enclosures: 1. Amendment No. 200 to License No. DPR-70
2. Amendment No. 184 to License No. DPR-75
3. Safety Evaluation

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DOCUMENT NAME: SA98476.AMD

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 11, 1997

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Public Service Electric & Gas
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cc w/encls: See next page

Mr. Leon R. Eliason
Public Service Electric & Gas Company

Salem Nuclear Generating Station, Units 1 and 2

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PUBLIC SERVICE ELECTRIC & GAS COMPANY

PHILADELPHIA ELECTRIC COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-272

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 200
License No. DPR-70

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:

   A. The application for amendment filed by the Public Service Electric & Gas Company, Philadelphia Electric Company, Delmarva Power and Light Company and Atlantic City Electric Company (the licensees) dated April 25, 1997, as supplemented on June 6, 1997, 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 set forth in 10 CFR Chapter I;

   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. DPR-70 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 200 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 11, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 200

FACILITY OPERATING LICENSE NO. DPR-70

DOCKET NO. 50-272

Revise Appendix A as follows:

Remove Page	Insert Page
3/4 5-3	3/4 5-3

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - $T_{avg} \geq 350°F$

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of the following injection systems:

a. One OPERABLE centrifugal charging pump and associated flow path capable of taking suction from the refueling water storage tank and transferring suction to the residual heat removal pump discharge piping and;

   1. Discharging into each Reactor Coolant System (RCS) cold leg.

b. One OPERABLE safety injection pump and associated flow path capable of taking suction from the refueling water storage tank and transferring suction to the residual heat removal pump discharge piping and;

   1. Discharging into each RCS cold leg, and; upon manual initiation,

   2. Discharging into its two associated RCS hot legs.

c. One OPERABLE residual heat removal pump and associated residual heat removal heat exchanger and flow path capable of taking suction from the refueling water storage tank on a safety injection signal and transferring suction to the containment sump during the recirculation phase of operation and;

   1. Discharging into each RCS cold leg.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

c. With both ECCS subsystems inoperable for surveillance testing, restore at least one subsystem to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in at least HOT SHUTDOWN within the following 6 hours and at least COLD SHUTDOWN within the subsequent 24 hours.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

PUBLIC SERVICE ELECTRIC & GAS COMPANY

PHILADELPHIA ELECTRIC COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-311

SALEM NUCLEAR GENERATING STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.184
License No. DPR-75

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:

   A. The application for amendment filed by the Public Service Electric & Gas Company, Philadelphia Electric Company, Delmarva Power and Light Company and Atlantic City Electric Company (the licensees) dated April 25, 1997, as supplemented on June 6, 1997, 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 set forth in 10 CFR Chapter I;

   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. DPR-75 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 184 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

John F. Stolz, Director
Project Directorate I-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 11, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 184

FACILITY OPERATING LICENSE NO. DPR-75

DOCKET NO. 50-311

Revise Appendix A as follows:

Remove Page	Insert Page
3/4 5-3	3/4 5-3

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - $T_{avg} \geq 350°F$

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of the following injection systems:

a. One OPERABLE centrifugal charging pump and associated flow path capable of taking suction from the refueling water storage tank and transferring suction to the residual heat removal pump discharge piping and;

   1. Discharging into each Reactor Coolant System (RCS) cold leg.

b. One OPERABLE safety injection pump and associated flow path capable of taking suction from the refueling water storage tank and transferring suction to the residual heat removal pump discharge piping and;

   1. Discharging into each RCS cold leg, and; upon manual initiation,

   2. Discharging into its two associated RCS hot legs.

c. One OPERABLE residual heat removal pump and associated residual heat removal heat exchanger and flow path capable of taking suction from the refueling water storage tank on a safety injection signal and transferring suction to the containment sump during the recirculation phase of operation and;

   1. Discharging into each RCS cold leg.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 200 AND 184 TO FACILITY OPERATING

LICENSE NOS. DPR-70 AND DPR-75

PUBLIC SERVICE ELECTRIC & GAS COMPANY

PHILADELPHIA ELECTRIC COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-272 AND 50-311

1.0 INTRODUCTION

By letter dated April 25, 1997, as supplemented on June 6, 1997, the Public Service Electric & Gas Company (the licensee) submitted a request for changes to the Salem Nuclear Generating Station, Unit Nos. 1 and 2, Technical Specifications (TSs). These amendments change TS 3.5.2, "ECCS Subsystems - $T_{ave} \geq 350°F$," to eliminate the flow path from the residual heat removal system to the reactor coolant system hot legs. This flow path is being eliminated to prevent excessive flow through the residual heat removal system during all hot leg recirculation configurations assuming worst-case single failures that could result in increased flows following a loss-of-coolant accident (LOCA) during hot leg recirculation.

The licensee's supplemental letter provided additional information that clarified the information in the original submittal. The supplemental letter also corrected an error that was included in the original Federal Register notification (62 FR 26574). Specifically, the licensee referred to the enthalpy of saturated steam at 25 psig as 1160.1 British Thermal Units/Pound-mass (BTU/lbm) and the enthalpy of saturated liquid at 25 psig as 208.52 BTU/lbm. The correct values are 1169.61 BTU/lbm and 235.68 BTU/lbm, respectively. This error was insignificant and did not affect the staff's original proposed no significant hazards consideration determination.

2.0 BACKGROUND

In 1994, Westinghouse (the licensee's nuclear steam supply system vendor) informed the licensee that a high residual heat removal (RHR) pump flow condition can occur during the hot leg recirculation phase of a LOCA. Specifically, failure of one RHR pump would cause the operating pump to supply the suction flow to the intermediate and high head safety injection pumps and

also the flow to the low head hot leg injection flow path either directly or the result of a loop-around flow path. The licensee determined that the resultant flow may have resulted in the remaining RHR pump operating beyond its actual run-out limit which could have challenged the operation of the pump.

To eliminate this potential problem, in 1994 the licensee changed the emergency operating procedures (EOPs) to eliminate the procedure steps associated with opening the RHR hot leg injection path (via valve RH26). The elimination of this flow path reduced the amount of flow delivered by the RHR pumps during hot leg recirculation to ensure adequate margin for the RHR pumps during the hot leg recirculation phase of a LOCA.

However, TS 3.5.2.c. states that RHR will discharge into the two reactor coolant system hot legs during the recirculation phase. Since, the licensee no longer directly injects into the hot legs through the RHR system during hot leg recirculation, the licensee is proposing a TS change to remove the reference to RHR hot leg injection.

3.0 EVALUATION

The licensee's design basis for the emergency core cooling systems is contained in UFSAR Section 6.3.1. This section states, in part, that the system "is designed to tolerate a single active failure during the short-term immediately following an accident, or to tolerate a single active or passive failure during the long-term following an accident." This design basis requirement is consistent with the requirements of General Design Criterion 35, "Emergency Core Cooling," and Appendix K to 10 CFR Part 50 "ECCS Evaluation Models."

The RHR hot leg recirculation phase therefore is required to tolerate a single active or passive failure. As discovered by the licensee in 1994, the system was vulnerable to a single failure and thus did not meet the design basis requirement. The licensee changed its emergency operating procedures and Updated Final Safety Analysis Report to reflect a revised mode of operation that would prevent the possibility of excessive RHR flow assuming a single failure. Additionally, Post LOCA hot leg recirculation ensures that no boron precipitation occurs in the reactor vessel as a result of boiling and consequential boron concentration. The licensee verified that the high head and intermediate head safety injection flows provide adequate hot and cold leg flow after initiation of hot leg recirculation to prevent an increase of core boron concentration. The staff has reviewed the licensee's revised RHR hot leg recirculation and finds it acceptable since it restores compliance with the design basis single failure tolerance requirement.

The licensee is proposing to change the TS to delete reference to manually initiating discharge into the two reactor coolant system hot legs by the RHR pumps. The licensee is requesting this change to remove a statement that could be interpreted to require that the RHR pumps inject directly into the hot legs (due to the 1994 procedure changes the RHR pumps inject into the hot

legs indirectly by feeding the intermediate head safety injection pumps). The licensee's proposed TS revision clarifies the TS by removing a statement that is subject to interpretation. The capability of the RHR system to inject into the reactor coolant system hot legs through the safety injection pumps is adequately covered in TS 3.5.2.b which requires that the safety injection pumps be able to discharge into the associated reactor coolant system hot legs by using the RHR pump discharge piping. Therefore, the licensee's proposed TS change is acceptable.

The staff notes that the change presented above does not eliminate the requirement to maintain the flow path through RH26. The hot leg injection flow path through RH26 is still required for mitigating Mode 4 LOCAs.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve 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 the amendments involve no significant hazards consideration, and there has been no public comment on such finding (62 FR 26574). Accordingly, the amendments meet 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 the amendments.

6.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Dembek

Date: September 11, 1997