

May 2, 1989

Docket Nos. 50-272/311

Mr. Steven E. Miltenberger  
Vice President and Chief Nuclear  
Officer  
Public Service Electric & Gas Company  
Post Office Box 236  
Hancocks Bridge, New Jersey 08038

DISTRIBUTION w/enclosures:  
Docket File NRC PDR  
Local PDR PDI-2 Rdg  
WButler JStone/MThadani  
MO'Brien(2) OGC  
DHagan EJordan  
BGrimes TMeek(8)  
Wanda Jones EButcher  
WHodges ACRS(10)  
CMiles, GPA/PA RDiggs, ARM/LFMB  
Brent Clayton JCraig

Dear Mr. Miltenberger:

SUBJECT: CLARIFICATION OF ECCS FLOW PATHS (TAC NOS. 71405/71406)

RE: SALEM GENERATING STATION, UNIT NOS. 1 AND 2

The Commission has issued the enclosed Amendment Nos. 94 and 70 to Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Generating Station, Unit Nos. 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated July 23, 1987 and supplemented by letter dated March 16, 1989. The supplemental letter provided clarifying information only and did not change the original submittal.

These amendments revise the Emergency Core Cooling System Technical Specifications 3/4.5.2 and 3/4.5.3 including the limiting conditions for operation, surveillance requirements and their associated bases.

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/

James C. Stone, Project Manager  
Project Directorate I-2  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 94 to License No. DPR-70
2. Amendment No. 70 to License No. DPR-75
3. Safety Evaluation

cc w/enclosures:  
See next page

[MILTENBERGER3]

*[Handwritten initials]*  
PDI-2/PA  
MThadani  
4/12/89

*[Handwritten initials]*  
PDI-2/PM  
JStone:mr  
4/12/89

*OGC [Handwritten initials] reviewed  
4/14/89*  
PDI-2/D  
WButler  
5/2/89

*[Handwritten initials]*  
SRXB/mr  
WHodges  
4/13/89

*[Handwritten initials]*  
SPLB  
for JCraig  
4/13/89

8905050324 890502  
PDR ADOCK 05000272  
P PDC

*DFOL*  
*11*

*CP-1*  
*cc*



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

May 2, 1989

Docket Nos. 50-272/311

Mr. Steven E. Miltenberger  
Vice President and Chief Nuclear  
Officer  
Public Service Electric & Gas Company  
Post Office Box 236  
Hancocks Bridge, New Jersey 08038

Dear Mr. Miltenberger:

SUBJECT: CLARIFICATION OF ECCS FLOW PATHS (TAC NOS. 71405/71406)

RE: SALEM GENERATING STATION, UNIT NOS. 1 AND 2

The Commission has issued the enclosed Amendment Nos. 94 and 70 to Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Generating Station, Unit Nos. 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated July 23, 1987 and supplemented by letter dated March 16, 1989. The supplemental letter provided clarifying information only and did not change the original submittal.

These amendments revise the Emergency Core Cooling System Technical Specifications 3/4.5.2 and 3/4.5.3 including the limiting conditions for operation, surveillance requirements and their associated bases.

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

Sincerely,

A handwritten signature in cursive script that reads "James C. Stone".

James C. Stone, Project Manager  
Project Directorate I-2  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 94 to License No. DPR-70
2. Amendment No. 70 to License No. DPR-75
3. Safety Evaluation

cc w/enclosures:  
See next page

Mr. Steven E. Miltenberger  
Public Service Electric & Gas Company

Salem Nuclear Generating Station

cc:

Mark J. Wetterhahn, Esquire  
Conner and Wetterhahn  
Suite 1050  
1747 Pennsylvania Avenue, NW  
Washington, DC 20006

Richard B. McGlynn, Commission  
Department of Public Utilities  
State of New Jersey  
101 Commerce Street  
Newark, NJ 07102

Richard Fryling, Jr., Esquire  
Law Department - Tower 5E  
80 Park Place  
Newark, NJ 07101

Regional Administrator, Region I  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. L. K. Miller  
General Manager - Salem Operations  
Salem Generating Station  
P.O. Box 236  
Hancocks Bridge, NJ 08038

Lower Alloways Creek Township  
c/o Mary O. Henderson, Clerk  
Municipal Building, P.O. Box 157  
Hancocks Bridge, NJ 08038

Mr. S. LaBruna  
Vice President - Nuclear Operations  
Nuclear Department  
P.O. Box 236  
Hancocks Bridge, New Jersey 08038

Mr. Bruce A. Preston, Manager  
Licensing and Regulation  
Nuclear Department  
P.O. Box 236  
Hancocks Bridge, NJ 08038

Robert Traee, Mayor  
Lower Alloways Creek Township  
Municipal Hall  
Hancocks Bridge, NJ 08038

Mr. David Wersan  
Assistant Consumer Advocate  
Office of Consumer Advocate  
1425 Strawberry Square  
Harrisburg, PA 17120

Kathy Halvey Gibson, Resident Inspector  
Salem Nuclear Generating Station  
U.S. Nuclear Regulatory Commission  
Drawer I  
Hancocks Bridge, NJ 08038

Scott B. Ungerer  
MGR. - Joint Generation Projects  
Atlantic Electric  
P.O. Box 1500  
1199 Black Horse Pike  
Pleasantville, NJ 08232

Richard F. Engel  
Deputy Attorney General  
Department of Law and Public Safety  
CN-112  
State House Annex  
Trenton, NJ 08625

Delmarva Power & Light Company  
c/o Jack Urban  
General Manager, Fuel Supply  
800 King Street  
P.O. Box 231  
Wilmington, DE 19899

Mr. David M. Scott, Chief  
Bureau of Nuclear Engineering  
Department of Environmental Protection  
State of New Jersey  
CN 411  
Trenton, NJ 08625



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

PUBLIC SERVICE ELECTRIC & GAS COMPANY

PHILADELPHIA ELECTRIC COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-272

SALEM GENERATING STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 94  
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 July 23, 1987 as supplemented by letter dated March 16, 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 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:

8905050329 890502  
PDR ADOCK 05000272  
P PDC

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 94, 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.

FOR THE NUCLEAR REGULATORY COMMISSION

/S/

Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 2, 1989

PDI-2/BA  
WOBrien  
4/12/89

*John*  
PDI-2/PM  
JStone:mr  
4/12/89

OGC  
M. Young  
4/19/89

PDI-2/D  
WButler  
5/2/89 *WB*

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 94 , 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.

FOR THE NUCLEAR REGULATORY COMMISSION



Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 2, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 94

FACILITY OPERATING LICENSE NO. DPR-70

DOCKET NO. 50-272

Revise Appendix A as follows:

<u>Remove Pages</u>	<u>Insert Pages</u>
3/4 5-3	3/4 5-3
3/4 5-4	3/4 5-4
3/4 5-6	3/4 5-6
B 3/4 5-1	B 3/4 5-1
B 3/4 5-1a	B 3/4 5-1a

EMERGENCY COOLING SYSTEMS

ECCS SUBSYSTEMS - T<sub>avg</sub> ≥ 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, and; upon manual initiation,
  2. Discharging into two RCS hot legs.

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.

EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

a. At least once per 12 hours by:

1. Verifying that the following valves are in the indicated positions with power to the valve operators removed:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
a. 1 SJ 69	a. RHR pump suction	a. open
b. 1 SJ 30	b. SI pump suction	b. open
c. 11 SJ 40	c. SI discharge to hot legs	c. closed
d. 12 SJ 40	d. SI discharge to hot legs	d. closed
e. 1 RH 26	e. RHR discharge to hot legs	e. closed
f. 11 SJ 49	f. RHR discharge to cold legs	f. open
g. 12 SJ 49	g. RHR discharge to cold legs	g. open
h. 1 CS 14#	h. Spray additive tank discharge	h. open
i. 1 SJ 135	i. SI discharge to cold legs	i. open
j. 1 SJ 67	j. SI recirc. line isolation	j. open
k. 1 SJ 68	k. SI recirc. line isolation	k. open
l. 11 SJ 44	l. Containment sump isolation valve	l. closed
m. 12 SJ 44	m. Containment sump isolation valve	m. closed

2. Verifying that the following valves are in the indicated positions:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
a. 11 RH 19	a. RHR crosstie valve	a. open
b. 12 RH 19	b. RHR crosstie valve	b. open

b. At least once per 31 days by:

1. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

2. Verifying that the ECCS piping is full of water by venting the ECCS pump casings and accessible discharge piping high points.

# If inoperable, the applicable Technical Specification is 3.6.2.2.

## EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - T<sub>avg</sub> <350°F

### LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem# comprised of the following shall be OPERABLE:

- 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 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, and; upon manual initiation,
  2. Discharging into two RCS hot legs.

APPLICABILITY: MODE 4.

#### ACTION:

- a. With no ECCS subsystem OPERABLE because of the inoperability of either the centrifugal charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.
- b. Within no ECCS subsystem OPERABLE because of the inoperability of either the residual heat removal heat exchanger or residual heat removal pump, restore at least one ECCS subsystem to OPERABLE status or maintain the Reactor Coolant System T<sub>avg</sub> less than 350°F by use of alternate heat removal methods.
- c. ~~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.~~

#A maximum of one safety injection pump or one centrifugal charging pump shall be OPERABLE whenever the temperature of one or more of the RCS cold legs is less than or equal to 312°F. NOTE: This particular restriction also applies in MODE 5 and 6.

## 3/4.5 EMERGENCY CORE COOLING SYSTEMS

### BASES

---

#### 3/4.5.1 ACCUMULATORS

The OPERABILITY of each RCS accumulator ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the accumulators. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on accumulator volume, boron concentration and pressure ensure that the assumptions used for accumulator injection in the safety analysis are met.

The accumulator power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these accumulator isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with an accumulator inoperable for any reason except an isolation valve closed minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional accumulator which may result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be immediately opened, the full capability of one accumulator is not available and prompt action is required to place the reactor in a mode where this capability is not required.

#### 3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the accumulators is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

The limitation for a maximum of one safety injection pump or centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all safety injection pumps except the allowed OPERABLE pump to be inoperable below 312°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single POPs relief valve.

## EMERGENCY CORE COOLING SYSTEMS

### BASES

---

#### ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. Each ECCS subsystem supplies all four cold legs to satisfy minimum flow requirements.



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

PUBLIC SERVICE ELECTRIC & GAS COMPANY

PHILADELPHIA ELECTRIC COMPANY

DELMARVA POWER AND LIGHT COMPANY

ATLANTIC CITY ELECTRIC COMPANY

DOCKET NO. 50-311

SALEM GENERATING STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 70  
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 July 23, 1987 as supplemented by letter dated March 16, 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 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. 70, 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.

FOR THE NUCLEAR REGULATORY COMMISSION

/S/

Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 2, 1989

*Handwritten:* PDI-2/D  
M. Young  
4/12/89

*Handwritten:* PDI-2/PM  
JStone:mr  
4/12/89

*Handwritten:* OGC  
M. Young  
4/19/89

*Handwritten:* PDI-2/D  
WButler  
5/2/89

*Handwritten:* WB

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 70 , 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.

FOR THE NUCLEAR REGULATORY COMMISSION



Walter R. Butler, Director  
Project Directorate I-2  
Division of Reactor Projects I/II

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 2, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 70

FACILITY OPERATING LICENSE NO. DPR-75

DOCKET NO. 50-311

Revise Appendix A as follows:

<u>Remove Pages</u>	<u>Insert Pages</u>
3/4 5-3	3/4 5-3
-	3/4 5-3a
3/4 5-4	3/4 5-4
3/4 5-7	3/4 5-7
B 3/4 5-2	B 3/4 5-2

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS -  $T_{avg} \geq 350^{\circ}\text{F}$

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, and; upon manual initiation,
  2. Discharging into two RCS hot legs.

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.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - T<sub>avg</sub> ≥ 350°F

ACTION (Continued):

- 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.

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

- a. At least once per 12 hours by:
1. Verifying that the following valves are in the indicated positions with power to the valve operators removed:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
a. 2 SJ 69	a. RHR pump suction	a. open
b. 2 SJ 30	b. SI pump suction	b. open
c. 21 SJ 40	c. SI discharge to hot legs	c. closed
d. 22 SJ 40	d. SI discharge to hot legs	d. closed
e. 2 RH 26	e. RHR discharge to hot legs	e. closed
f. 21 SJ 49	f. RHR discharge to cold legs	f. open
g. 22 SJ 49	g. RHR discharge to cold legs	g. open
h. 2 CS 14#	h. Spray additive tank discharge	h. open
i. 2 SJ 135	i. SI discharge to cold legs	i. open
j. 2 SJ 67	j. SI recirc. line isolation	j. open
k. 2 SJ 68	k. SI recirc. line isolation	k. open
l. 21 SJ 44	l. Containment sump isolation valve	l. closed
m. 22 SJ 44	m. Containment sump isolation valve	m. closed

2. Verifying that the following valves are in the indicated positions:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
a. 21 RH 19	a. RHR crosstie valve	a. Open
b. 22 RH 19	b. RHR crosstie valve	b. Open

- b. At least once per 31 days by:
1. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
  2. Verifying that the ECCS piping is full of water by venting the ECCS pump casings and accessible discharge piping high points.

#If inoperable, the applicable Technical Specification is 3.6.2.2.

EMERGENCY COOLING SYSTEMS

ECCS SUBSYSTEMS -  $T_{avg} < 350^{\circ}\text{F}$

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem# comprised of the following shall be OPERABLE:

- 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 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, and; upon manual initiation,
  2. Discharging into two RCS hot legs.

APPLICABILITY: MODE 4.

ACTION:

- a. With no ECCS subsystem OPERABLE because of the inoperability of either the centrifugal charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.
- b. With no ECCS subsystem OPERABLE because of the inoperability of either the residual heat removal heat exchanger or residual heat removal pump, restore at least one ECCS subsystem to OPERABLE status or maintain the Reactor Coolant System  $T_{avg}$  less than  $350^{\circ}\text{F}$  by use of alternate heat removal methods.
- c. 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.

#A maximum of one safety injection pump or one centrifugal charging pump shall be OPERABLE whenever the temperature of one or more of the RCS cold legs is less than or equal to  $312^{\circ}\text{F}$ . NOTE: This particular restriction also applies in MODES 5 and 6.

BASES

ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, an OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The limitation for a maximum of one safety injection pump or one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all safety injection pumps except the allowed OPERABLE safety injection pump to be inoperable below 312°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single POPS relief valve.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. Each ECCS subsystem supplies all four cold legs to satisfy minimum flow requirements.

3/4.5.4 REFUELING WATER STORAGE TANK

The OPERABILITY of the RWST as a part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA.

The limits on RWST minimum volume and boron concentrations ensure that: (1) sufficient water is available within containment to permit recirculation cooling flow to the core, (2) the reactor will remain subcritical in the cold condition following a small LOCA assuming complete mixing of the RWST, RCS, and ECCS water volumes with all control rods inserted except the most reactive control assembly (ARI-1), and (3) the reactor will remain subcritical in the cold condition following a large break LOCA (break flow area > 3.0 sq. ft.) assuming complete mixing of the RWST, RCS, and ECCS water and other sources of water that may eventually reside in the sump following a LOCA with all control rods assumed to be out (ARO). The limits on contained water volume and boron concentration also ensure a pH value of between 8.5 and 11.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NOS. 94 AND 70 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 GENERATING STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-272 AND 50-311

1.0 INTRODUCTION

By letter dated July 23, 1987, as supplemented by letter dated March 16, 1989, Public Service Electric & Gas Company requested an amendment to Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Generating Station, Unit Nos. 1 and 2. The supplemental letter provided clarifying information only and did not change the original submittal. The proposed amendments would revise the emergency core cooling system (ECCS) limiting conditions for operation, surveillance requirements and associated basis to clearly define the emergency core cooling subsystem alignment and component availability requirements in various modes. Changes are also proposed to eliminate the requirement to issue a report when an action statement is entered as a result of inservice testing and to make the Salem 1 and Salem 2 ECCS technical specifications (TS) consistent. The supplemental information provided by letter dated March 16, 1989 revised the actual TS pages and did not change the technical considerations. In addition, the licensee agreed to administrative changes (i.e., typographical errors, page numbers, etc.) the staff made to the revised technical specification pages which are also noted by vertical bars in the right margin. None of the clarifications altered the action noticed or affected the staff's initial determination.

2.0 EVALUATION

A. Technical Specification 3.5.2

The current TS for Modes 1, 2 and 3 requires:

Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

- a. One OPERABLE centrifugal charging pump,
- b. One OPERABLE safety injection pump,

- c. One OPERABLE residual heat removal heat exchanger,
- d. One OPERABLE residual heat removal pump, and
- e. An OPERABLE 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.

The revised TS for Modes 1, 2 and 3 would require:

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, and; upon manual initiation,
  - 2. Discharging into two RCS hot legs.

These changes explicitly identify the flow paths into the reactor coolant system (RCS) which are required to be operational in Modes 1, 2 and 3. They do not modify the ECCS injection or recirculation flow paths but will ensure the ECCS subsystems are aligned as assumed in the design basis for the ECCS-LOCA. By making these changes the

concern expressed in Information Notice 87-01, "RHR Valve Misalignment Causes Degradation of ECCS in PWRs," would be alleviated.

An Action Statement is being added as follows:

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

Certain valves identified in Technical Specification Surveillance 4.5.2 as being maintained open are also part of the Inservice Testing (IST) Program and must be periodically stroke tested. Some of the valves are tested quarterly which means some stroke testing occurs while the units are at full power. Shutting the valves causes both ECCS subsystems to be inoperable. Currently, the IST for these valves is accomplished by entering Action Statement 3.0.3 which allows the LCO to be exceeded for up to one hour. Shutdown must commence if this time limit is exceeded. However, a License Event Report (LER) is required pursuant to 10 CFR 50.73(a)(2)(i)(b) each time Action Statement 3.0.3 is entered. This change will negate the reporting requirement of 10 CFR 50.73 while maintaining the time limits of Action Statement 3.0.3.

The staff finds the proposed changes to Technical Specification 3.5.2 to be acceptable.

B. Technical Specification 4.5.2 (Surveillance Requirements)

The first change adds to the surveillance requirements to verify that the RHR crosstie valves (RH 19) are open every 12-hours. In order for any RHR pump to discharge into all four RCS cold legs the crosstie valves must be open. By adding these valves to the Surveillance Requirements it will ensure the ECCS subsystems are aligned as assumed in the design basis for the ECCS-LOCA.

The second change adds a requirement to the Unit 1 TSs to verify that the ECCS piping is full of water by venting the high points and pump casing every 31 days. Unit 2 already has this incorporated into the Surveillance Requirements. This surveillance test will provide greater assurance that the ECCS system is being maintained full of water.

The third change clarifies that with the CS 14 valve inoperable, the affected system is the Containment Spray System (Spray Additive tank). This is accomplished by adding a footnote that directs the operator to Technical Specification 3.6.2.2. (Spray Additive Tank) if the valve is found inoperable. CS 14 is in the discharge line of the

spray additive tank and is maintained open. Consequently, when the valve is found inoperable, the Action Requirements of TS 3.6.2.2 should be followed. The licensee is currently following TS 3.0.3 when the CS 14 valve is inoperable because it disables the spray additive tank for both ECCS trains. The Action Requirements of TS 3.6.2.2 allows up to 72 hours to restore the system to OPERABLE, vice 1 hour allowed in TS 3.0.3. The staff finds this change to be acceptable and in agreement with the limits placed on the Spray Additive Tank. The licensee had proposed to administratively restrict the time the Spray Additive Tank is inoperable to one hour. The staff concludes this is not necessary because the 72 hours provision in TS 3.6.2.2 provides adequate safety.

The staff finds the proposed changes to Technical Specification 4.5.2 to be acceptable.

C. Technical Specification 3.5.3

The current TS for Mode 4 requires:

As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

- a. One OPERABLE centrifugal charging pump,
- b. One OPERABLE residual heat removal heat exchanger,
- c. One OPERABLE residual heat removal pump, and
- d. An OPERABLE flow path capable of taking suction from the refueling water storage tank upon being manually realigned and transferring suction to the containment sump during the recirculation phase of operation.

The revised TS for Mode 4 would require:

As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

- 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 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, and; upon manual initiation
  - 2. Discharging into two RCS hot legs.

These changes clearly reflect the design bases flow paths for the ECCS-LOCA in the TSs. They will ensure the required Mode 4 ECCS flow paths are maintained operable and thus will preclude an ECCS misalignment from occurring in Mode 4. The changes do not modify the ECCS injection of recirculation flow paths in any way.

The second change is for clarification only. The Safety Injection (SI) pumps are de-energized whenever the RCS temperature is below 312°F except when a special surveillance test is being conducted and then only one SI pump is energized. This restriction allows the Pressurizer Overpressure Protection System (POPS) to maintain the RCS pressure below the 10 CFR 50, Appendix G limit in case of inadvertent mass addition from the single SI pump. The current footnote incorporates this requirement by stating that only one SI pump shall be OPERABLE when the RCS temperature is less than or equal to 312°F. Implicit in this statement is the requirement that the centrifugal charging pump be disabled and therefore not OPERABLE. This change makes this requirement explicitly clear by stating that one SI or one centrifugal charging pump, not one SI pump in addition to one centrifugal charging pump, shall be OPERABLE when the RCS temperature is less than or equal to 312°F.

In Unit 1 TS, the statement, "NOTE: This particular restriction also applies to Modes 5 and 6," is being added to the # footnote. This statement already appears in the Unit 2 TS. This will clarify that in Modes 5 and 6 one safety injection pump or one centrifugal charging pump is to be maintained operational.

The staff finds the proposed changes to Technical Specification 3.5.3 to be acceptable.

D. Technical Specification Bases Section 3/4.5.2 and 3/4.5.3

These two bases section have been updated to reflect the fact that each ECCS subsystem supplies all four cold legs in order to satisfy minimum flow requirements. Also, the limitation of one safety injection pump or one centrifugal charging pump may be operational when the temperature of the RCS cold leg is 312°F or less when in Mode 4, 5 or 6.

The staff finds the proposed changes to Technical Specification Bases Section 3/4.5.2 and 3/4.5.3 to be acceptable.

### 3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The 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. 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.

### 4.0 CONCLUSION

The Commission made a proposed determination that the amendments involve no significant hazards consideration which was published in the Federal Register (54 FR 9928) on March 8, 1989 and consulted with the State of New Jersey. No public comments were received and the State of New Jersey 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 the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

Principal Contributor: J. Stone

Dated: May 2, 1989