PSEG Nuclear LLC
P.O. Box 236, Hancocks Bridge, New Jersey 08038-0236

AUG 1 7 2001
LRN-01-0103
LCR S01-04

PSEG
Nuclear LLC

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

**REQUEST FOR CHANGE TO
TECHNICAL SPECIFICATION 3.6.2.3
CONTAINMENT COOLING SYSTEM
SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311**

In accordance with the requirements of 10CFR50.90, PSEG Nuclear LLC (PSEG) hereby transmits a request for revision of the Technical Specifications (TS) for Salem Generating Station Unit Nos. 1 and 2 respectively. Pursuant to the requirements of 10CFR50.91(b)(1), a copy of this request for amendment has been sent to the State of New Jersey.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and it has been determined that this request involves no significant hazards considerations.

The proposed Technical Specification change will (1) modify Salem Technical Specification (TS) surveillance requirement 4.6.2.3, and (2) revise the TS Basis. Specifically, the proposed change will modify the current acceptance criterion for the service water flow rate through the Containment Fan Coil Units (CFCUs) from ≥ 2550 gallons per minute (gpm) to ≥ 2300 gpm.

PSEG has reviewed the proposed License Amendment Request (LCR) against the criteria of 10CFR51.22 for environmental considerations. The proposed changes do not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, PSEG concludes that the proposed change meets the criteria delineated in 10CFR51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement.

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A description of the requested amendment, the reason for the changes, and the justification for the changes are provided in Attachment 1. The basis for no significant hazards consideration determination is provided in Attachment 2. The marked up Technical Specification pages, including Basis pages are provided in Attachment 3. Attachment 4 contains the insert for the Technical Specification Basis.

Upon NRC approval of the proposed change, PSEG requests that the amendment be made effective upon issuance, but allow implementation period of sixty (60) days to provide sufficient time for associated administrative activities.

Should you have any questions regarding this request, please contact E. Villar at (856) 339-5456.

Sincerely,

D. F. Garchow

D. F. Garchow
Vice President – Operations

Affidavit
Attachments (4)

C Mr. H. Miller, Administrator - Region I
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LRN-01-0103
LCR S01 - 04

STATE OF NEW JERSEY)
) SS.
COUNTY OF SALEM)

D. F. Garchow, being duly sworn according to law deposes and says:

I am Vice President - Operations of PSEG Nuclear LLC, and as such, I find the matters set forth in the above referenced letter, concerning Salem Generating Station, Units 1 and 2, are true to the best of my knowledge, information and belief.

David F. Garchow

Subscribed and Sworn to before me

this 17th day of Aug., 2001

Jennifer M. Turner
Notary Public of New Jersey

JENNIFER M. TURNER
NOTARY PUBLIC OF NEW JERSEY
My Commission expires on My Commission Expires July 25, 2005

SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS

DESCRIPTION OF THE PROPOSED CHANGE

The proposed Technical Specification change will (1) modify Salem Technical Specification (TS) surveillance requirement 4.6.2.3 b.3 and c.2, and (2) revise the TS Basis. Specifically, the proposed change will modify the current acceptance criterion for the service water flow rate through the Containment Fan Coil Units (CFCUs) from ≥ 2550 gallons per minute (gpm) to ≥ 2300 gpm.

Attachment 4 contains the proposed TS Basis revision. The TS Basis is revised to clarify that instrument uncertainty is accounted for in the CFCU test procedure acceptance criterion.

PURPOSE OF THE PROPOSED CHANGES

The purpose of the proposed change is to provide flexibility during the testing of the CFCUs in the accident mode once every 31 days as required by TS surveillance 4.6.2.3.b.3. The proposed change will eliminate unnecessary entries into the TS action statement for exceeding the administratively imposed band on the acceptable service water flow.

The present TS surveillance test acceptance criterion is ≥ 2550 gpm. The current TS surveillance test procedure acceptance criterion limits the flow to a value greater than 2646 gpm indicated but less than 2850 gpm indicated. This band assures that (1) The service water flow will not be below the 2550 gpm required by the TS, (2) Prevents too much flow through the CFCU path causing reduced flow to other service water cooled components, and (3) maintains CFCU outlet service water temperature less than the maximum piping design temperature and below saturation conditions.

While the proposed amendment reduces the minimum required service water flow, a maximum CFCU flow setpoint limit has also been established. This limit was conservatively established and is being controlled administratively.

PSEG is continuing to assess other methods of determination of this maximum upper flow limit, which was developed based on the requirement to maintain outlet conditions below saturation during a worst case Service Water single failure. Other methods under consideration include the use of an alternate containment analysis consistent with the Service Water system recirculation phase failure assumption. These actions are expected to be completed by the Salem Unit 1 15th refueling outage in the Fall of 2002. If determined to be necessary at that time, a high flow setpoint limit will be submitted for addition to the subject CFCU technical specification. This action is consistent with the guidance provided in NRC Administrative Letter 98-10 "Dispositioning Of Technical Specifications That Are Insufficient To Assure Plant Safety."

Flow through each CFCU is maintained by a complex series of controls, which include an air operated, modulating outlet flow control valve (SW223). There are other active valves (SW57 and SW65) in this path, however, these valves are designed to provide for normal operation at low CFCU flow and move full open on an accident signal, leaving the SW223 to maintain flow within the Technical Specification requirements. Maintaining this administratively imposed band (approximately 204 gpm) is difficult and causes unnecessary entries in the TS limiting condition for operation.

Therefore, by reducing the required flow to ≥2300 gpm, the administratively controlled band can be expanded to reduce the burden placed on PSEG personnel by the unnecessary entries into TS 3/4.6.2.3, as well as reducing the performance requirements of the modulating flow control valve. Reduction of the flow requirements will also support a simplified flow control design presently being considered by PSEG.

The TS Basis is revised to clarify that the appropriate instrument uncertainties are accounted for in the test procedure acceptance criterion.

JUSTIFICATION FOR THE PROPOSED CHANGES

Background

The Containment Ventilation System, which includes five CFCUs, is designed to (1) remove the normal heat loss from equipment and piping in the reactor containment during plant operation, and (2) remove sufficient heat from the reactor containment during design basis accidents to keep the containment pressure and temperature from exceeding their design limits. Specifically, the CFCUs are designed to recirculate and cool the containment atmosphere in the event of a Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB) thereby ensuring that the containment pressure will not exceed its design value of 47 psig at 271 °F (100-percent relative humidity).

The CFCU System, as described in The Salem Updated Final Safety Analysis Report (UFSAR) section 6.2.2.2, consists of five air handling units, each including motor, fan, motor heat exchanger, cooling coils, roughing filters, dampers, duct distribution system, instrumentation, and controls. The units are located on the 130 Ft. elevation of containment on the operating floor, between the containment wall and the polar crane wall.

SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS

Each fan is designed to supply a nominal 110,000 cfm during normal operation and 40,000 cfm during accident operation. The fans are direct driven, centrifugal type, and the coils are plate fin tube type. Under accident conditions each CFCU is capable of removing at least 64,970,000 Btu/hr from the containment atmosphere with a service water flow rate of 2500 gpm with a maximum design basis service water temperature of 90 °F, and a maximum fouling factor of 0.00320 $hr \cdot °F \cdot ft^2$ / Btu. Only three of the five CFCUs are needed to remove 194,907,600 Btu/hr from the containment.

Justification

The proposed change to the Salem TS reduces the service water flow rate from ≥2550 gpm to ≥2300 gpm. This proposed service water flow reduction does not change any of the assumptions/inputs into the presently approved licensing basis analyses as described in the approved Salem UFSAR. Therefore, the proposed changes do not result in any changes to the Salem UFSAR analyses.

To maintain the current design basis assumptions of pressure of 47 psig and a saturation temperature of 271°F in containment during a design basis accident, the average heat transfer rate of each CFCU must be ≥ 64,970,000 Btu/hr (18,047 Btu/s) or 194,907,600 Btu/hr total for three CFCUs. Heat transfer rate is a function of fouling factor, service water flow rate, and service water temperature. Since reducing flow increases the outlet temperature, flow must be maintained sufficiently high to maintain outlet piping temperature ≤ 195 °F. This assures the validity of the service water pipe stress calculations, and also supports maintaining fluid conditions below saturation.

Because the CFCUs function as condensing heat exchangers in the accident environment, the thermal fouling has a significant effect on heat transfer. Therefore to reduce the service water flow rate from ≥2550 gpm to ≥2300 gpm, the maximum acceptable fouling factor will be reduced by a small amount. Limiting the maximum fouling to a slightly lower value than presently used and allowing the service water outlet temperature to increase slightly will offset the proposed flow reduction without affecting the inputs to the presently approved analysis.

The results of the calculations performed by PSEG show that the proposed 2300 gpm service water flow rate results in a small decrease in the maximum thermal fouling of approximately 11%, while removing heat at the required rate and maintaining outlet temperature below the limit of 195 °F consistent with service water pipe stress calculations.

SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS

Internal fouling and service water outlet temperature determination

To determine the appropriate thermal fouling value, PSEG reviewed approximately thirty (30) tests (two years of CFCU thermal performance tests) performed in accordance with the requirements of Generic Letter 89-13 "Service Water System Problems Affecting Safety-Related Equipment" to determine (1) the actual internal tube fouling of the cooling coils, and (2) the actual heat transfer rate across the CFCUs. Fouling and heat transfer rate values calculated in accordance with Generic Letter 89-13 include a 1% model uncertainty.

Review of actual test data indicated that 1) the heat transfer rate has been greater than the required heat rate assumed in the accident analysis, and 2) the fouling has been less than the current limit utilized in the analysis. A fouling value of 0.00242 hr·°F ft^2 / Btu, which is typical of the observed fouling and approximately 22% lower than the present fouling limit, was used to calculate the corresponding service water flow during accident conditions required to remove approximately 64,970,000 Btu/hr. The calculation yielded a service water flow rate of approximately 1890 gpm during accident conditions. However, the resulting service water outlet temperature at a flow rate of 1890 gpm was greater than the 195 °F limit.

To bound the minimum acceptable service water flow, PSEG calculated the service water flow rate that would yield an outlet temperature equal to 195 °F assuming zero fouling of the CFCU's cooling coils and removing greater than 64,970,000 Btu/hr. This calculation yielded a service water flow rate of approximately 2060 gpm, which indicates that the service water flow rate through the CFCU's cooling coil should be greater than 2060 gpm to ensure a service water outlet temperature of less than 195 °F.

Therefore, to provide adequate margin for future thermal performance testing and margin to the service water outlet temperature limit, a service water flow rate of 2300 gpm was selected. This proposed service water flow rate value yields an internal fouling of 0.00285 hr·°F·ft^2 / Btu and a service water outlet temperature of approximately 192 °F. The fouling value is approximately 18% higher than the typical observed fouling identified by testing through Generic Letter 89-13, and yields a service water outlet temperature of approximately 192 °F, which provides a margin of approximately 3 °F to the maximum service water outlet temperature).

Therefore, the proposed 2300 gpm value provides adequate margin from the observed fouling of the CFCUs to accommodate sufficient margin for future thermal testing, while maintaining the current maximum service water outlet ensure that excessive CFCU flow will not adversely affect flow to other components and that outlet fluid conditions remain below saturation under worst-case scenarios.

CONCLUSIONS

The proposed change to reduce the required service water flow from ≥2550 gpm to ≥2300 gpm results in (1) no changes to the UFSAR Chapter 15 analyses, (2) allows an increase in the allowable band contained in the surveillance test procedure, thus providing operational flexibility and reducing the burden of plant personnel associated with the unnecessary entry into Technical Specification 3/4.6.2.3, while still protecting the health and safety of the public and station personnel.

SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION - 10CFR50.92 EVALUATION

Pursuant to 10CFR50.92, PSEG reviewed the proposed revision to determine whether the request involves a significant hazards consideration. PSEG has determined that operation of Salem Generating Station, Unit Nos. 1 and 2, in accordance with the proposed changes does not involve a significant hazards consideration.

REQUESTED CHANGE

The proposed Technical Specification change will (1) modify Salem Technical Specification (TS) surveillance requirement 4.6.2.3 b.3 and c.2, and (2) revise the TS Basis. Specifically, the proposed change will modify the current acceptance criterion for the service water flow rate through the Containment Fan Coil Units (CFCUs) from ≥ 2550 gallons per minute (gpm) to ≥ 2300 gpm.

The TS Basis is revised to clarify that instrument uncertainty is accounted for in the test procedure acceptance criterion.

BASIS

1. ***Will not involve a significant increase in the probability or consequences of an accident previously evaluated.***

The containment ventilation system, including the containment fan coil units is not an accident initiator.

The proposed Technical Specification change to modify the Salem Technical Specification (TS) surveillance requirement 4.6.2.3 to the service water-cooling water flow through the fan coil units is bounded by the present licensing and design bases analyses. The new proposed flow rate does not result in the reanalysis of any of the Salem Updated Final Safety Analysis Report (UFSAR) chapter 15 analyses. Therefore, the proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. ***Does not create the possibility of a new or different kind of accident from any accident previously analyzed.***

The proposed Technical Specification change to modify the Salem Technical Specification (TS) surveillance requirement 4.6.2.3 to the service water-cooling water flow through the fan coil units is bounded by the present licensing and design bases analyses. The manner and frequency at which the surveillance test is conducted remains unchanged. The physical facility remains unchanged.

Therefore, the new proposed flow rate does not create the possibility of a new or different kind of accident from any accident previously analyzed.

3. ***Does not involve a significant reduction in a margin of safety.***

The proposed Technical Specification change to modify the Salem Technical Specification (TS) surveillance requirement 4.6.2.3 to the service water-cooling water flow through the fan coil units is bounded by the present licensing and design basis analyses. The new proposed flow rate does not result in the re-analysis of any of the Salem Updated Final Safety Analysis Report (UFSAR) chapter 15 analyses. Consequently, the existing margin of safety with respect to the current design basis assumptions of pressure of 47 psig and a saturation temperature of 271°F in containment during a design basis accident is maintained.

The proposed new flow rate maintains adequate margins (18% margin to the maximum observed thermal fouling during GL89-13 performance tests, 11% margin to the present maximum thermal fouling in the analysis, and approximately 3 °F to the maximum design service water outlet temperature).

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

CONCLUSION

Based on the preceding discussion, PSEG has concluded that the proposed changes to the Technical Specifications do not involve a significant hazards consideration.

**SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS**

TECHNICAL SPECIFICATION PAGES WITH PROPOSED CHANGES

The following Technical Specifications for Facility Operating License DPR-70 are affected by this change request:

Technical Specification	Page
3.6.2.3	3/4 6-11a
3/4 6.2.3	B 3/4 6-3

The following Technical Specifications for Facility Operating License DPR-75 are affected by this change request:

Technical Specification	Page
3.6.2.3	3/4 6-13
3/4 6.2.3	B 3/4 6-3

SURVEILLANCE REQUIREMENTS (Continued)

a. At least once per 12 hours by:

   1. Verifying the water level in each service water accumulator vessel is greater than or equal to 226 inches and less than or equal to 252 inches.

   2. Verifying the temperature in each service water accumulator vessel is greater than or equal to 55°F and less than or equal to 95°F.

   3. Verifying the nitrogen cover pressure in each service water accumulator vessel is greater than or equal to 135 psig and less than or equal to 160 psig.

b. At least once per 31 days by:

   1. Starting (unless already operating) each fan from the control room in low speed.

   2. Verifying that each fan operates for at least 15 minutes in low speed.

   3. Verifying a cooling water flow rate of greater than or equal to ~~2550~~ 2300 gpm to each cooler.

c. At least once per 18 months by verifying that on a safety injection test signal:

   1. Each fan starts automatically in low speed.

   2. The automatic valves and dampers actuate to their correct positions and that the cooling water flow rate to each cooler is greater than or equal to ~~2550~~ 2300 gpm.

d. At least once per 18 months by verifying that on a loss of offsite power test signal, each service water accumulator vessel discharge valve response time is within limits.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY SYSTEM

The OPERABILITY of the containment spray system ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

3/4.6.2.2 SPRAY ADDITIVE SYSTEM

The OPERABILITY of the spray additive system ensures that sufficient NaOH is added to the containment spray in the event of a LOCA. The limits on NaOH minimum volume and concentration, ensure that 1) the iodine removal efficiency of the spray water is maintained because of the increase in pH value, and 2) corrosion effects on components within containment are minimized. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics. These assumptions are consistent with the iodine removal efficiency assumed in the accident analyses.

3/4.6.2.3 CONTAINMENT COOLING SYSTEM

The OPERABILITY of the containment cooling system ensures that adequate heat removal capacity is available when operated in conjunction with the containment spray systems during post-LOCA conditions.

The surveillance requirements for the service water accumulator vessels ensure each tank contains sufficient water and nitrogen to maintain water filled, subcooled fluid conditions in three containment fan coil unit (CFCU) cooling loops in response to a loss of offsite power, without injecting nitrogen covergas into the containment fan coil unit loops assuming the most limiting single failure. The surveillance requirement for the discharge valve response time test ensures that on a loss of offsite power, each discharge valve actuates to the open position in accordance with the design to allow sufficient tank discharge into CFCU piping to maintain water filled, subcooled fluid conditions in three CFCU cooling loops, assuming the most limiting single failure. ← INSERT A

3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment. Containment isolation within the time limits specified ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA.

The opening of locked or sealed closed containment isolation valves (penetration flow paths)on an intermittent basis under administrative control includes the following considerations: (1) stationing a dedicated individual, who is in constant communication with the control room, at the valve controls, (2) instructing this individual to close these valves in an accident situation, and (3) assuring that environmental conditions will not preclude access to close the valves and that this action will prevent the release of radioactivity outside the containment.

SURVEILLANCE REQUIREMENTS (Continued)

a. At least once per 12 hours by:

1. Verifying the water level in each service water accumulator vessel is greater than or equal to 226 inches and less than or equal to 252 inches.

2. Verifying the temperature in each service water accumulator vessel is greater than or equal to 55°F and less than or equal to 95°F.

3. Verifying the nitrogen cover pressure in each service water accumulator vessel is greater than or equal to 135 psig and less than or equal to 160 psig.

b. At least once per 31 days by:

1. Starting (unless already operating) each fan from the control room in low speed.

2. Verifying that each fan operates for at least 15 minutes in low speed.

3. Verifying a cooling water flow rate of greater than or equal to ~~2550~~ 2300 gpm to each cooler.

c. At least once per 18 months by verifying that on a safety injection test signal:

1. Each fan starts automatically in low speed.

2. The automatic valves and dampers actuate to their correct positions and that the cooling water flow rate to each cooler is greater than or equal to ~~2550~~ 2300 gpm.

d. At least once per 18 months by verifying that on a loss of offsite power test signal, each service water accumulator vessel discharge valve response time is within limits.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 CONTAINMENT SPRAY SYSTEM

The OPERABILITY of the containment spray system ensures that containment depressurization and cooling capability will be available in the event of a LOCA. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

The containment spray system and the containment cooling system are redundant to each other in providing post accident cooling of the containment atmosphere. However, the containment spray system also provides a mechanism for removing iodine from the containment atmosphere and therefore the time requirements for restoring an inoperable spray system to OPERABLE status have been maintained consistent with that assigned other inoperable ESF equipment.

3/4.6.2.2 SPRAY ADDITIVE SYSTEM

The OPERABILITY of the spray additive system ensures that sufficient NaOH is added to the containment spray in the event of a LOCA. The limits on NaOH volume and concentration, ensure that 1) the iodine removal efficiency of the spray water is maintained because of the increase in pH value, and 2) corrosion effects on components within containment are minimized. The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics. These assumptions are consistent with the iodine removal efficiency assumed in the accident analyses.

3/4.6.2.3 CONTAINMENT COOLING SYSTEM

The OPERABILITY of the containment cooling system ensures that adequate heat removal capacity is available when operated in conjunction with the containment spray systems during post-LOCA conditions.

The containment cooling system and the containment spray system are redundant to each other in providing post accident cooling of the containment atmosphere. As a result of this redundancy in cooling capability, the allowable out of service time requirements for the containment cooling system have been appropriately adjusted. However, the allowable out of service time requirements for the containment spray system have been maintained consistent with that assigned other inoperable ESF equipment since the containment spray system also provides a mechanism for removing iodine from the containment atmosphere.

The surveillance requirements for the service water accumulator vessels ensure each tank contains sufficient water and nitrogen to maintain water filled, subcooled fluid conditions in three containment fan coil unit (CFCU) cooling loops in response to a loss of offsite power, without injecting nitrogen covergas into the containment fan coil unit loops assuming the most limiting single failure. The surveillance requirement for the discharge valve response time test ensures that on a loss of offsite power, each discharge valve actuates to the open position in accordance with the design to allow sufficient tank discharge into CFCU piping to maintain water filled, subcooled fluid conditions in three CFCU cooling loops, assuming the most limiting single failure.

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SALEM GENERATING STATION
UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311
CHANGE TO TECHNICAL SPECIFICATIONS

INSERT A

The acceptance criterion of surveillance requirements 4.6.3.2 b 3 and c.2 includes approximately 60 gpm of service water flow through the motor cooler of the containment fan coil units, however, this amount is not credited in the heat transfer removal of the fan coil units in the design basis calculation.

Furthermore, the acceptance criterion of surveillance 4.6.3.2.b.3 and c.2 represents the analytical value used in the design basis calculation, and although conservatisms are included in the determination of this value, it does not include instrument uncertainty. Instrument uncertainties are included in the administratively controlled acceptance values included in the surveillance test procedure.