

Public Service  
Electric and Gas  
Company

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LR-N970779

LCR S97-33

United States Nuclear Regulatory Commission  
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Washington, DC 20555

**REQUEST FOR CHANGE TO TECHNICAL SPECIFICATIONS  
ONE-TIME EXEMPTION TO ALLOW CONTAINMENT PURGING IN MODES 3 AND 4  
SALEM GENERATING STATION UNIT NO. 1  
FACILITY OPERATING LICENSE DPR-70  
DOCKET NO. 50-272**

Gentlemen:

In accordance with 10CFR50.90, Public Service Electric & Gas (PSE&G) Company requests a revision to the Technical Specifications (TS) for Salem Generating Station Unit No. 1. In accordance with 10CFR50.91(b)(1), a copy of this submittal has been sent to the State of New Jersey.

The proposed TS change contained herein represents a one-time exemption to the Technical Specifications during return to power from the current outage (1R13). The exemption would allow purging of the containment during Modes 3 (Hot Standby) and 4 (Hot Shutdown).

Significant work, including most notably replacement of the steam generators, was completed during the current outage. This work included installation of a large amount of new insulation. The insulation associated with the steam generator replacement was pre-baked to minimize off-gassing. However, because of the amount of insulation installed, we are not positive that the pre-baking will be completely successful. Previous Salem and other industry experience indicates that there could be significant off-gassing from the insulation during the plant heat up resulting in an uninhabitable containment atmosphere. The ability to purge the containment during Modes 3 and 4 will provide the most safe, efficient means of removing the off-gases from the insulation. Unit 1 has been shut down for over two and one half years. The decay heat of the reactor core and the source term is significantly below that which would exist for return from a normal refueling outage. Therefore, in the event of a loss of coolant accident (LOCA), the chances of fuel

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overheating and cladding failure are remote, and introduction of fission products into the reactor coolant are low. If a LOCA did occur, the overall activity concentrations of any released containment atmosphere would be very low relative to previous accident analysis conditions due to the extended outage (2 1/2 years of decay time). In addition the actual time of purging will be minimized, further reducing the chance that the worst case of a LOCA while purging could occur.

The Technical Specifications as currently written preclude purging of the containment in Modes 3 and 4. Therefore, to restore a non-hazardous containment atmosphere, the unit would have to be cycled from Modes 3 and 4, where off-gassing will occur, back to Mode 5 where purging is allowed. This cycling may have to be repeated several times.

PSE&G requests this one-time change to provide operational flexibility, to allow the orderly resumption of startup and preclude an unnecessary cycling of the plant into Mode 5.

Similar technical specification changes were issued as License Amendment 150 for Catawba Unit 1 on July 30, 1996 and Amendments 174 and 156 for McGuire Nuclear Station Units 1 and 2, respectively, on April 24, 1997.

The proposed changes have been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and PSE&G has concluded that this request involves no significant hazards considerations.

The basis for the requested change is provided in Attachment 1. A 10CFR50.92 evaluation with a determination of no significant hazards consideration is provided in Attachment 2. The marked up TS pages affected by the proposed changes are provided in Attachment 3.

Upon NRC approval of this proposed change, PSE&G requests that the amendment be made effective on the date of issuance, and fully implemented within 7 days.



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Should you have any questions regarding this request, we will be pleased to discuss them with you.

Sincerely,



Affidavit  
Attachments (3)

C Mr. H. J. Miller, Administrator - Region I  
U. S. Nuclear Regulatory Commission  
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Mr. P. Milano, Licensing Project Manager - Salem  
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Ms. M. Evans (X24)  
USNRC Senior Resident Inspector - Salem

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Bureau of Nuclear Engineering  
PO Box 415  
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STATE OF NEW JERSEY )  
                      ) SS.  
COUNTY OF SALEM    )

E. C. Simpson, being duly sworn according to law deposes and says:

I am Senior Vice President - Nuclear Engineering of Public Service Electric and Gas Company, and as such, I find the matters set forth in the above referenced letter, concerning Salem Generating Station, Unit 1, are true to the best of my knowledge, information and belief.



Subscribed and Sworn to before me  
this 11 day of December, 1997

  
\_\_\_\_\_  
Notary Public of New Jersey

ELIZABETH J. KIDD  
NOTARY PUBLIC OF NEW JERSEY  
My Commission Expires April 25, 2000

My Commission expires on \_\_\_\_\_

## I. REQUESTED CHANGE AND PURPOSE

The proposed Technical Specification (TS) contained herein represents a one time change to Specifications 3.6.1.1 "Primary Containment Integrity", 3.6.1.2 "Containment Leakage" and 3.6.1.7 "Containment Ventilation System". The change involves adding the following footnote to the above listed specifications.

"\* \* A one-time change is granted to have the containment purge supply and/or exhaust isolation valves open in Modes 3 and 4 following the steam generator replacement outage (1R13). The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. Each valve will be immobilized in the shut position prior to initial entry into Mode 2. The one-time exemption expires with initial entry into Mode 2 following 1R13."

In response to a TMI action item, Technical Specification 3.6.1.7 "Containment Ventilation System" was included in the Technical Specifications because it could not be conclusively shown that the purge valves would close within the appropriate time in response to a design basis accident.

The purpose of the proposed change is to provide the flexibility to purge the containment during Modes 3 and 4 allowing for the safe, efficient removal of off-gases from newly installed insulation, while precluding unnecessary cycling of the plant to Mode 5. Subsequent to purging, each containment purge valve will be tested pursuant to Surveillance Requirement 4.6.3.1.5. The proposed change would also allow for potential repair to the supply and exhaust purge valves if testing results were unsatisfactory.

There was considerable work performed in the Unit 1 containment during the current outage. This work included the replacement of the steam generators. This replacement and other work involved the installation of a large amount of new insulation. The insulation associated with the steam generator replacement was pre-baked to minimize off-gassing. However, because of the amount of insulation installed, and previous experience with the Unit 2 pressurizer, we can not be fully assured that the pre-baking will be completely successful. Salem and other industry experience indicates that considerable off-gassing from this insulation could occur during the heat up on return to power from this outage. This will result in a potentially uninhabitable atmosphere. Technical Specification 3.6.1.7 prevents opening of the purge supply and exhaust valves during Modes 1, 2, 3 and 4. Therefore the plant would have to be cycled between Modes 3 and 4, and Mode 5 (possibly several times) until the off-gassing is

complete and the containment atmosphere is returned to a non-hazardous condition. A one-time exemption during return to power will allow efficient off-gassing and purging to occur while precluding the need to cycle to Mode 5.

Similar technical specification changes were issued as License Amendment 150 for Catawba Unit 1 on July 30, 1996 and Amendments 174 and 156 for McGuire Nuclear Station Units 1 and 2, respectively, on April 24, 1997.

## II. JUSTIFICATION OF REQUESTED CHANGES

Unit 1 has been shut down for over two and one half years. The decay heat of the reactor core is very low. Therefore the chances of overheating of the fuel, fuel failure, and introduction of fission products into the reactor coolant are also low. If a LOCA did occur, the overall activity concentrations of any released containment atmosphere would be very low relative to previous accident analysis conditions due to the decay of nearly all the Iodines and noble gases (with the exception of Kr-85). Also the actual time of purging will be minimized, further reducing the chance that the worst case of a LOCA while purging could occur.

The accidents analyzed in Chapter 15 of the USFAR were reviewed and it was determined that the LOCA was the limiting accident for the condition being addressed by this request.

A conservative engineering analysis was performed to provide an upper bound for the dose consequences of a postulated LOCA occurring during Modes 3 or 4 prior to Unit 1 Cycle 13 power operation. The evaluation considered the current decay time of more than 2 and 1/2 years. Computations were developed for whole body gamma dose, beta skin dose and thyroid dose at the Unit 1 control room air intakes which are bounding for the control room operators. Additionally, computations were developed for whole body gamma dose and thyroid dose at the exclusion area boundary (EAB).

The computations evaluate a postulated release of the entire core inventory of available iodine and noble gases. The release is modeled as a "puff" release of core activity that is transported directly to the environment via the plant vent, taking no credit for containment isolation. The release is modeled as being instantaneous. This is conservative because the highest atmospheric dispersion factors are associated with the initial release period (0 to 2 hours). The Cycle 13 core reload includes 64 new fuel assemblies. Therefore, the active portion of the core was modeled as consisting of 129 assemblies (193-64). Twenty-five percent of the core radioactive iodine and one

hundred percent of the core noble gas inventories were assumed to be immediately available for release from the containment in accordance with Regulatory Guide 1.4.

The results of the computations are shown below compared to General Design Criteria 19 and Standard Review Plan (SRP) 6.4 for control room occupancy, and 10 CFR Part 100 for off site dose consequences.

	Computation Results	Guideline Values
Whole Body Dose	Control Room 0.6 rem	General design Criteria 19, SRP 6.4 5 rem
Skin Dose	63.1 rem	30 rem 75 rem (with protective eyewear)
Thyroid dose	< 1 mrem	30 rem
	Exclusion Area Boundary (EAB) 0.045 rem	10 CFR 100 25 rem
Whole Body Dose	< 1 mrem	300 rem

The above computational results show that the whole body dose and the thyroid dose at the EAB are negligible compared to the 10 CFR 100 limits of 25 rem whole body and 300 rem thyroid, respectively and that the doses are less than the corresponding doses calculated for the design basis LOCA.

The results also indicate that the calculated thyroid dose at the control room air intakes is negligible when compared to the respective GDC 19 limit of 30 rem. Additionally the calculated whole body dose is well within the respective limit of 5 rem. The computed thyroid and whole body doses are less than the corresponding doses calculated for the design basis LOCA.

The computations indicate that the control room calculated beta skin dose exceeds the 30 rem limit, but is within the 75 rem limit for protective eyewear use. In consideration of the possibility of a LOCA, however low, protective eyewear will be provided to control room personnel during the purging process.

Even though no credit is taken for containment isolation in the dose assessment, it should be noted that the valves are expected to close when requested to do so. The containment supply and exhaust valves are tested within the surveillance program to check valve stroke times. Additionally, they are designed to close in response to Containment Ventilation Isolation and Phase A Isolation signals. This response is also tested periodically. Each purge penetration is protected by two automatic isolation valves which are safety related and leak tested. Therefore, although no credit has been taken for isolation of the purge supply and exhaust penetrations, the valve closure will probably occur in the event of a design basis accident in Modes 3 or 4.

#### **CONCLUSIONS**

Based on the above, PSE&G has determined that the proposed change does not involve a significant hazards consideration.

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10CFR50.92 EVALUATION

Public Service Electric & Gas (PSE&G) has concluded that the proposed changes to the Salem Generating Station Unit No. 1 Technical Specifications (TS) do not involve a significant hazards consideration. In support of this determination, an evaluation of each of the three standards set forth in 10CFR50.92 is provided below.

**REQUESTED CHANGE**

The proposed Technical Specification (TS) contained herein represents a one-time change to Specifications 3.6.1.1 "Primary Containment Integrity", 3.6.1.2 "Containment Leakage" and 3.6.1.7 "Containment Ventilation System". The change involves adding the following footnote to the above listed specifications.

"\* \* A one-time change is granted to have the containment purge supply and/or exhaust isolation valves open in Modes 3 and 4 following the steam generator replacement outage (1R13). The cumulative time for having the valves open in Modes 3 and 4 is limited to fourteen (14) days. Each valve will be sealed closed prior to initial entry into Mode 2. The one-time exemption expires with initial entry into Mode 2 following 1R13."

**BASIS**

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

Performance of containment purging as proposed in this license change request does not modify any primary system, secondary system, or power supply system. The purging equipment will be operated as it was designed to be operated. In summary, no "accident initiator" will be affected by the proposed containment purging in Modes 3 and 4. For this reason, the activity does not involve an increase in the probability of an accident previously evaluated.

A conservative engineering evaluation was performed to calculate an upper bound for the dose consequences of a postulated LOCA during Modes 3 or 4 prior to Unit 1 Cycle 13 power operation. The computations performed evaluate a postulated release of the entire core inventory. The release is modeled as a "puff" release of core activity that is transported directly to the environment via the plant vent, taking no credit for containment isolation. The release is modeled as being instantaneous. This is conservative because the highest atmospheric dispersion factors are associated with the initial release period (0 to 2 hours). Twenty-five percent of the core radioactive iodine and one hundred percent of the core noble gas inventories were assumed to be immediately available for release from the containment in accordance with Regulatory Guide 1.4. Computations were developed for whole body gamma dose, beta skin dose and thyroid dose at the Unit 1 control room air intakes, and whole body gamma dose and thyroid dose at the exclusion area boundary (EAB).

The evaluation results show that the whole body dose and the thyroid dose at the EAB are negligible compared to the 10 CFR 100 limits and that the doses are less than the corresponding doses calculated for the design basis LOCA.

The results also indicate that the thyroid dose at the control room air intakes is negligible when compared to the GDC 19 and SRP 6.4 criteria and that the calculated whole body dose is well within its limit. The computed thyroid and whole body control room doses are less than the corresponding doses calculated for the design basis LOCA.

The computations indicate that the calculated control room beta skin dose is within the 75 rem limit for protective eyewear use. In consideration of the possibility of a LOCA, however low, protective eyewear will be provided to control room personnel during the purging process.

Even though no credit is taken for containment isolation in the dose assessment, it should be noted that the valves are expected to close when requested to do so. The containment supply and exhaust valves are tested within the surveillance program to check valve stroke times. Additionally, they are designed to close in response to Containment Ventilation Isolation and Phase A Isolation signals. This response is also tested periodically. Each purge penetration is protected by two automatic isolation valves which are safety related and leak tested. Therefore, although no credit has been taken for isolation of the purge supply and exhaust penetrations, the valve closure will probably occur in the event of a design basis accident in Modes 3 or 4.

Additionally, the actual time of purging will be minimized, significantly reducing the chance that the worst case of a LOCA while purging could occur.

Plant effluent monitors provide the same monitoring capability in Modes 3 and 4 as they do in Modes 5 and 6 and the guidance necessary to assess the radiological consequences of any purge in Modes 3 and 4 is contained, and will be followed, in existing plant procedures.

For the above reasons, it is concluded that purging of the containment in Modes 3 and 4 during return from 1R13 does not involve a significant increase in either the probability or the consequences of an accident previously evaluated.

**2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

As is noted above, no "accident initiators" are affected by the proposed activity. The safety function of the purge valves is containment isolation. Performance of containment purging as proposed in this license change request does not modify any primary system, secondary system, or power supply system.

Purging proposed in Modes 3 and 4 will be conducted and monitored in the same manner as it is routinely carried out in the shutdown modes. Therefore no new "accident initiators" are created by this activity. One difference is considered in the dose analysis. Although it is believed that containment isolation would occur, the conservative dose analysis, which takes no credit for containment isolation, calculates the doses for a LOCA during purging, to be within regulatory guidance. For these reasons, the activity will not create the possibility of a new or different type of accident from any previously evaluated.

**3. The proposed change does not involve a significant reduction in a margin of safety.**

Margin of safety is associated with the confidence in the ability of the fission product barriers (the fuel and fuel cladding, the Reactor Coolant System pressure boundary, and the containment) to limit the level of radiation doses to the public. The proposed purging of the containment will occur at the end of an extended outage of over 2 1/2 years in length. The level of decay heat and activity in the reactor is very low compared to the levels associated with full power operations. For this reason, the likelihood of fuel damage following a LOCA occurring during the

purgung process is significantly reduced. Additionally the length of time that the purging will occur has been limited. This reduces the likelihood of the LOCA occurring during the purging process.

Conservative dose assessment performed to provide an upper bound shows that whole body and thyroid dose to the public is virtually non existent, and whole body and thyroid dose to the control room personnel is well within regulatory guidance and lower than design basis accident analysis.

The dose computations indicate that the calculated control room beta skin dose is within the 75 rem limit for protective eyewear use. In consideration of the possibility of a LOCA, however low, protective eyewear will be provided to control room personnel during the purging process.

For these reasons, the activity does not involve a significant reduction in the margin of safety.

#### **CONCLUSION**

Based on the above, PSE&G has determined that the proposed changes do not involve a significant hazards consideration.