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Nuclear Business Unit

JUN 4 1999

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United States Nuclear Regulatory Commission
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**REQUEST FOR ENFORCEMENT DISCRETION
TECHNICAL SPECIFICATION 3/4.6.2.3
CONTAINMENT COOLING SYSTEM
SALEM GENERATING STATION NO. 1
FACILITY OPERATING LICENSE DPR-70
DOCKET NO. 50-272**

Gentlemen:

Public Service Electric and Gas Company (PSE&G) hereby requests Enforcement Discretion from the provisions of Technical Specification (TS) 3.6.2.3, "Containment Cooling System." This request is a revision to the request submitted in the afternoon of June 4, 1999 providing clarification of several issues.

As discussed in Attachment 1 to this letter, PSE&G concludes that granting this request would not be a potential detriment to the public health and safety and would involve neither a significant hazards consideration nor any adverse environmental consequences.

PSE&G is requesting enforcement discretion for Salem Generating Station Unit 1. This enforcement discretion is for an extension to the allowed outage time (AOT) for one Containment Cooling Fan (Containment Fan Coil Unit) inoperable specified in TS 3.6.2.3. In view of the current circumstances, PSE&G has concluded that consideration of safety significance and potential consequences of completing the repair of 11 CFCU during an extended AOT is appropriate rather than shutting down Salem Unit 1 in accordance with Technical Specification 3.6.2.3. Granting this enforcement discretion would allow for the completion of restoration of the Containment Fan Coil Unit and would not jeopardize public health and safety.

The requested duration of this enforcement discretion is 5 days, or when the Containment Fan Coil Unit is returned to operable status, whichever occurs first.

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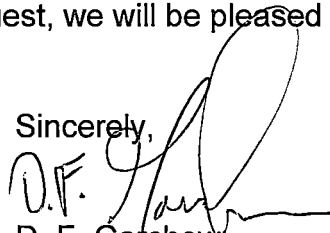
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Absent the exercise of enforcement discretion, TS 3.6.2.3 requires Salem Unit 1 to be in HOT STANDBY by 0724 on June 5, 1999.

PSE&G understands that, if granted, the requested enforcement discretion is for the conditions described in this request. For any other conditions that would cause the Containment Cooling System to become inoperable, the appropriate Technical Specification action statement would apply.

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

Sincerely,



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This request for enforcement discretion includes the following pursuant to NRC Inspection Manual Part 9900: Operations – Notices of Enforcement Discretion

1. The TS or other license conditions that will be violated.

Technical Specification (TS) 3.6.2.3 for Salem Unit will be violated during the period of requested enforcement discretion.

TS 3.6.2.3 Action a. states:

“With one or two of the above required containment cooling fans inoperable, restore the inoperable cooling fan(s) to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.”

2. The circumstances surrounding the situation, including apparent root causes, the need for prompt action and identification of any relevant historical events.

On 5/18/99 a scheduled surveillance test was performed on 11 CFCU. This surveillance requires stroke timing closed of the CFCU inlet and outlet containment valves (11SW58 and 11SW72 respectively). During performance of the test the 11SW72 was closed, then the 11SW58 was closed, then the 11SW72 was opened and finally the 11SW58 was opened. Shortly thereafter Operations received OHA C-38 (CONTAINMENT FAN COIL UNIT 11 LEAK DETECTOR HIGH). It was determined that when the 11SW58 was opened, a pressure transient was experienced. This resulted in gasket leaks from three of the twelve coolers on the 11CFCU. Each CFCU has 12 coolers. The coolers are arranged in two vertical rows of six. The two coolers in the top row developed gasket leaks along with one in the fourth row down.

The apparent cause at that time was attributed to the sequence in which the valves were stroked. Procedure steps were not exact and allowed the operator to interpret them to allow using an improper sequence. At the start of the test (prior to any valves being stroked) both the 11SW58 and the 11SW72 were open and the 11SW223 (a ball valve downstream of the 11SW72) was closed. The piping is pressurized with full service water header pressure to 11SW223. Proper sequencing of the valves is: first close the 11SW72, second close then reopen the 11SW58; and finally reopen the 11SW72. Utilizing this sequence keeps the piping up to the 11SW72 pressurized during the entire test. The sequence utilized on 5/18/99 allowed the piping between 11SW58 and 11SW72 to become depressurized since the 11SW58 was closed with the 11SW72 opened. It

was postulated that water drained out of the piping via a thermal bypass around the 11SW223 valve. The pressure transient occurred when voids in the piping formed when the 11SW72 valve was opened were collapsed when 11SW58 was reopened.

During the evaluation of the 5/18/99 event, consideration was given to the possibility that both the 11SW72 and the 11SW223 valve were leaking through. It was noted that the test had been successfully performed on 2/20/99. Also the probability that both valves were leaking through was deemed to be low. There was no external evidence that the valves were leaking through. Valve disassembly would have been required to determine if the valves were leaking through. Based on these considerations and the fact that the improper sequence had been used, the apparent cause was attributed to the faulty sequence.

The gasket leaks were repaired, operability testing was successfully performed and 11CFCU was returned to service on 5/22/99 within the 7 day LCO allowable outage time (AOT)

S1.OP-ST.SW-0010 ["Inservice Testing Containment Fan Coil Units (CFCU) Service Water and Control Air Valves"] tests various service water valves for all CFCUs. Since the surveillances for the other CFCU valves were becoming due, the 11 CFCU surveillance was again performed to reset the sequence of testing. In order to ensure the valves were stroked in the proper manner, the procedure was revised providing very specific direction on the sequencing of the valves. At 0124 on 5/29/99 after the performance of stroke timing surveillance test procedure, OHA C-38 (CONTAINMENT FAN COIL UNIT 11 LEAK DETECTOR HIGH) was once again received by Operations. This alarm indicated that there was another leak in Containment emanating from 11 CFCU. The 11 CFCU was isolated and Technical Specification 3.6.2.3 was once again entered. An entry into Unit 1 Containment revealed Service Water leakage at 3 of the top 4 CFCU cover plate gaskets.

The CFCU was declared inoperable and the action statement entered at 0124 on 5/29/99.

The apparent cause of the second Service Water leakage event was again a pressure transient. Since the proper valve sequencing was utilized during the 5/29/99 test, in hindsight it became apparent that the sequence alone may not have caused the 5/18/99 event. As mentioned previously, the 11 CFCU was isolated to stop the leak and Technical Specification 3.6.2.3 was entered for one inoperable CFCU. Leak repairs were commenced on the leaking CFCU cover plates and an apparent cause was determined. As a result of these events and the apparent cause determination, it was noticed that the 11SW72 rubber liner was

degraded. The 11SW223 V-ball was also degraded thus allowing more than design flow through seat. As a result of these findings, it has been concluded that both the 11SW72 and 11SW223 were leaking through. The following repair actions were undertaken: 1) the 11SW72 (11 CFCU SW OUTLET AOV) was replaced with a new valve, and 2) the 11SW223 (11 CFCU SW OUTLET CONTROL AOV) was replaced with a new ball and shims. On June 4, 1999, following the repairs listed above, during valve testing, additional cooler leaks developed on the top two coolers. Testing following repairs will ensure proper operation of the CFCU, the CFCU valves, and leak tightness of the SW system.

Repairing the outlet valves ensured that draining the CFCU coolers will not occur during testing evolutions associated with stroking the CFCU inlet valves. Modifying the S1.OP-ST.SW-0010, reduces the likelihood of draining the CFCU during testing was further reduced by closing a third valve in series with 11SW72 and 11SW223 thus improving system reliability during testing. These two corrective actions address the system issues associated with the unit one CFCU.

The only remaining system test issues that are required to ensure system operability are the dynamic 11SW57 pressure control valve verification and the time stroking of the 11SW223 valve.

An additional item of note is that gaskets utilized between the cooler flanges is 1/16 inch thick material called Ethylene Propylene Di Methyl (EPDM). The gasket edges are scalloped and this design feature has caused problems during installation while sealing areas around bolt holes. Interviews with mechanical maintenance personnel have indicated that this thin gasket and procedurally directed adhesive material has been challenging to install with precision.

The Salem Unit 2 CFCU gaskets appear to be a higher quality design. The Unit 2 gaskets are made of the same material but 1/8 inch thick. The gaskets are not scalloped and have square edges. The square edges are not as susceptible to problems during installation. The Unit 2 gaskets are also installed with a more durable adhesive. All of these design features of the Unit 2 gaskets appear to lead to a more successful installation.

- 3. The safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed course of action. This evaluation should include at least a qualitative risk assessment derived from the licensee's PRA.**

This NOED requests that the allowable outage time (AOT) for an inoperable CFCU be extended by 5 days. A PRA based assessment of the risk impact of operating with 4 vice 5 CFCUs shows that change in

core damage frequency (CDF) is very small, $3.6E-6$ /year. The baseline CDF is $4.84E-5$ /year. Additionally, a PRA based assessment of the risk impact to large early release frequency (LERF) is $1.7E-7$ /year, with the baseline LERF being $6.47E-6$ /year.

The above assessment shows insignificant impact on the CDF and LERF and therefore no impact to the health and safety of the public.

The Safety Analyses for Salem shows that 3 CFCUs in concert with one containment spray pump will provide sufficient heat removal capability to mitigate the consequences of relevant accidents. Note two containment spray pumps by themselves will provide sufficient heat removal capability. Currently, of the 5 CFCU, 4 are operable and the fifth (11 CFCU) is in a 7 day LCO. Both containment spray pumps are operable. Action a. of TS 3.6.2.3 allows one or two CFCUs to be inoperable for up to 7 days, then unit shutdown is required. In the current configuration sufficient operable CFCUs and or containment spray pumps would be available during an accident except for a specific single failure. The specific failure would be the loss of the bus that provides the power supply to two CFCUs and a containment spray pump (C Vital Bus). Absent the occurrence of the above specific bus failure, there is no impact to the ability of the CFCUs or containment spray pumps to provide accident heat removal capability.

3 CFCUs in concert with one containment spray pump are required to mitigate the large break LOCAs and main steam line breaks (MSLB). In addition to the failure of a containment safeguards train, the MSLB analysis also considers limiting single failures of a feedwater regulating valve (FRV), main steam isolation valve (MSIV), and auxiliary feedwater runout protection. The failures of the FRV and MSIV result in the limiting containment pressure and temperature responses respectively. For these cases the analysis assumes heat removal from all five CFCUs and two containment sprays. Based on the analysis results, having four CFCUs available should have only a small impact not exceeding the allowable design limits. 2 CFCUs provide sufficient heat removal for certain smaller LOCAs and main steam line breaks. The larger breaks are much less likely to occur.

Additionally, the CFCU heat transfer rates for the accident analyses were based on a service water inlet temperature of 95 degrees F. These values are conservative since the present service water design basis maximum temperature is 90 degrees and therefore provide additional engineering margin. Current service water temperature is in the low 70 degrees F range. There is additional conservatism in the accident analyses [e.g. that the containment temperature is at its upper TS limit and that the Refueling water Storage Tank (RWST) temperature is at its maximum allowable (100 degrees F)]. More realistic conditions may support 2 CFCUs being

able to provide adequate heat removal capability at least for a large spectrum of LOCAs and MSLBs.

Compliance with the AOT may result in a plant shutdown with associated equipment cycling. Transient risk during such a shutdown is always increased.

Based on the above discussion we conclude that the safety significance and potential consequences of extending the AOT by 5 days are minimal.

4. **The basis for the licensee's conclusion that the noncompliance will not be of potential detriment to the public health and that no significant hazard consideration is involved.**

Determination of No Significant Hazards Consideration

This proposed enforcement discretion:

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

The extension of the AOT by 5 days does not involve any modification of plant equipment or impact the operation of the plant in any way that would increase the probability of an accident

The change in core damage frequency associated with operation of 4 CFCUs ($3.6E-6$ /year) is not significant. The change in large early release frequency is $1.7E-7$ /year. Given the low probability of the specific failure and the conservatism in the accident analyses, it is likely that sufficient heat removal capability would be available if an accident occurred during the 5 day extension period, resulting in no significant impact to the response to an accident.

The extension of the AOT avoids the risks associated with the cycling of equipment during a plant shutdown and subsequent restart.

Therefore the extension of the AOT by 5 days does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Extension of the AOT does not involve any modification of plant equipment or impact the operation of the plant in any way that would

introduce a new or different kind of accident from any accident previously evaluated.

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

The change in core damage frequency associated with operation of 4 CFCUs ($3.6E-6$ /year) is not significant. The change in large early release frequency is $1.7E-7$ /year. Given the low probability of a specific failure and the conservatism in the accident analyses, it is likely that sufficient heat removal capability will be available during the 5 day extension period, resulting in no impact to the response to an accident.

The extension of the AOT avoids the risks associated with the cycling of equipment during a plant shutdown and subsequent restart.

Therefore, the extension of the AOT to 5 days does not involve a significant reduction in a margin of safety.

5. The basis for the licensee's conclusion that the noncompliance will not involve adverse consequences to the environment.

The requested enforcement discretion does not cause any increase in effluents that may be released offsite, does not involve an increase in radiation exposure to the public, and does not involve a Significant Hazards Consideration. Therefore, the request does not involve any environmental consequences.

6. Any proposed compensatory measure(s).

In the current configuration sufficient operable CFCUs and containment spray pumps would be available with the exception of a specific single failure. The specific failure would be the loss of C Vital Bus. In order to further minimize the chances of this specific failure from occurring, activities associated with C Vital Bus will be closely controlled during the 5 day extension and limited to those required by the Operating License (e.g. required TS surveillances). In the event a containment spray pump or an additional CFCU becomes inoperable, the plant will be shut down in accordance with Technical Specifications.

7. The justification for the duration of the noncompliance.

The time necessary to restore 11 CFCU to an operable status will extend past the 7 day AOT. The repairs involve 1) replacing the 11SW72 valve (already completed), 2) replacing the 11SW223 v-ball and seat (already completed), 3) Repairing leaking cooler heads which includes installation

of gasket material that was recently utilized in the Unit 2 CFCUs refueling outage maintenance. This design utilizes a thicker gasket with square edges that is installed with a more durable adhesive. Salem has recent success in utilizing this design during the Unit 2 refueling outage. The positive results of the installation led to all the Unit 2 CFCUs being upgraded with the thicker design. Plans were being developed to upgrade the Unit 1 CFCUs during the upcoming refueling outage this Fall.

Subsequent to these repairs: 1) the associated cooler head piping must be re-installed and pressure tested, 2) the 11 CFCU piping, and valves must be filled & vented, 3) the CFCU tested for operability, and 4) Applicable CFCU isolation valves must be stroke time tested. In addition, as a contingency, an alternate repair plan will be developed. Extension of the AOT by 5 days will allow sufficient time for these activities to be successful without incurring the risks associated with the cycling of equipment during a plant shutdown.

- 8. A statement that the request has been approved by the facility organization that normally reviews safety issues (Plant Onsite Review Committee, or its equivalent)**

This request was revised and approved by the Salem Station Operations Review Committee.

- 9. The request must specifically address how one of the NOED criteria for appropriate plant conditions specified in Section B is satisfied.**

Criteria 1 of Section B-2 of Part 9900 Technical Guidance, "Operations – Notices of Enforcement Discretion," applies for Salem Unit 1. The shutdown of Salem Unit 1 merely to comply with the requirements of TS 3.6.2.3 would require a shutdown and subsequent restart evolution. As discussed above, although the AOT of 3.6.2.3 Action a. could not be met, the associated potential consequences are acceptable.

- 10. If a follow-up license amendment is required, the NOED request must include marked-up TS pages showing the proposed TS changes and a commitment to submit the actual license amendment request within 48 hours.**

Since this NOED is only requesting a one-time extension for the allowed outage time (AOT) associated with the containment fan coil unit, a request for amendment to the technical specifications will not be submitted.