

Public Service  
Electric and Gas  
Company

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United States Nuclear Regulatory Commission  
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Washington, DC 20555

Gentlemen:

**REQUEST FOR ENFORCEMENT DISCRETION  
REACTOR TRIP SYSTEM INSTRUMENTATION  
ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION  
FACILITY OPERATING LICENSE DPR-70 and DPR-75  
SALEM GENERATING STATION  
UNIT NO. 1 DOCKET NO. 50-272  
UNIT NO. 2 DOCKET NO. 50-311**

Public Service Electric and Gas Company (PSE&G) hereby requests Enforcement Discretion from the provisions Salem Units 1 and 2 Technical Specifications 3/4.3.1 action 10 and 3/4.3.2 Table 3.3-3 action 13, and 3/4.3.1, Table 3.3-1 action 1, relative to the Solid State Protection System (SSPS). As discussed in Attachment 1, PSE&G has concluded that granting this request would involve neither a significant hazards consideration nor any irreversible environmental consequences.

This request for enforcement discretion is being submitted in order to allow implementation of a design modification to eliminate the potential for a fault in the power feeds to the turbine stop valve limit switches, the auto stop oil pressure switches and the reactor coolant pump breaker from resulting in loss of the SSPS function.

This request was verbally discussed with NRC personnel on February 2, 1995, and NRC granted verbal relief pending the submittal of our written request. At 0230 hours, NRC granted Enforcement Discretion from the single failure consideration which allowed PSE&G to exit Technical Specification 3.0.3 and proceed with the implementation of a design change package to permanently correct the identified deficiency.

The requested duration of the discretion of enforcement is from 0230 hours on February 2, 1995 until 0230 hours on February 6, 1995, or the completion of the modification whichever is first.

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Additionally, to perform the required modifications the reactor trip bypass breakers should be temporarily placed in service. This reduces the risk of a reactor trip during the performance of the modifications. Technical Specification allows the reactor trip bypass breakers to be closed (bypass) for up to two hours. However, each reactor trip bypass breaker will be required to be closed for six hour periods to perform the required modification. Therefore, a four hour extension to this Technical Specification is being sought.

This request has been reviewed and recommended for approval by the Salem Generating Station - Station Operations Review Committee.

On February 3, 1995, prior to the submittal of this request, the NRC rescinded its Notice of Enforcement Discretion. Both Salem Units entered Technical Specification 3.0.3 and are presently complying with the requirements of Technical Specification.

Sincerely



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ATTACHMENT A

Licensee requests for Enforcement Discretion require responses to specific questions. PSE&G provides it's responses below:

**1. The Technical Specification (TS) or other license conditions that will be violated, and the duration of the request.**

Salem Units 1 and 2 TS 3/4.3.1, Table 3.3-1, Reactor Trip System Instrumentation, Functional Unit 19, Safety Injection Input from ESF - provides reactor trip signal through Solid State Protection System (SSPS) when SI is initiated. TS requires two channels OPERABLE in MODES 1 and 2. With one channel inoperable, Action 10 requires restoration to OPERABILITY within 6 hours or be in HOT STANDBY within the next 6 hours.

Salem Units 1 and 2 TS 3/4.3.2, Table 3.3-3, ESF Actuation System Instrumentation, Automatic Isolation Logic for the various ESF functions, requires two channels OPERABLE in MODES 1,2,3,4. With one channel inoperable, Actions 13 and 20 require restoration to OPERABILITY within 6 hours, or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Salem Units 1 and 2 TS 3.0.3. requires that when a limiting condition for operation cannot be met within one hour, action be initiated to place the unit in a mode in which the LCO is not applicable or be in at least HOT STANDBY within the next 6 hours, at least HOT SHUTDOWN within the following 6, and COLD SHUTDOWN within the subsequent 24 hours.

Salem Units 1 and 2 TS 3/4.3.1, Table 3.3-1, Reactor Trip System Instrumentation, Functional Unit 21, Reactor Trip Breaker, requires 2 OPERABLE channels in MODES 1 and 2. Action 1 allows for the bypassing one train for up to 2 hours for surveillance testing.

PSE&G requests that upon granting the enforcement discretion from single failure consideration, PSE&G will be allowed to declare one train of solid state protection (SSPS) operable, and to exit TS 3.0.3. Upon termination of TS 3.0.3, a 96 hours extension of TS 3/4.3.1 action 10 and 3/4.3.2 action 13 and 20 is requested.

Additionally, to perform the required modifications the reactor trip bypass breakers should be temporarily placed in service. This reduces the risk of a reactor trip during the performance of the modifications. Technical Specification allows the reactor trip bypass breakers to be closed (bypass) for up to two hours. However, each reactor trip bypass breaker will be required to be closed for six hour periods to perform the required modification. Therefore, a four hour extension to this Technical Specification is being sought.

The requested duration of this notice of enforcement discretion is from 0230 hours on February 2, 1995 until 0230 hours on February 6, 1995, or the completion of the modification whichever is first.

**2. The circumstances surrounding the situation, including the need for prompt action.**

**BACKGROUND**

The following is a brief description of a typical Westinghouse SSPS system.

The SSPS receives input signal from plant sensors. For the most part these sensors are divided into 4 channels (I, II, III, and IV). Each channel is input to the SSPS through a separate input bay. In addition, each channel is powered from one of four vital instrument A.C. busses. The input from plant sensors is then processed through the logic circuitry of the SSPS to determine required equipment actuation to mitigate the consequences of an accident. The logic circuitry for the SSPS is powered from redundant power supplies powered from two of the four instrument channels (Channels I and IV [VIB A & D] for train A; Channels II and III [VIB B & C] for train B). After the logic circuitry has processed the input signals, the appropriate signals are then sent to the output bay of the SSPS, where output relays control the appropriate plant equipment.

**Current situation**

A power plant of similar design identified a condition in which a fault in the circuitry for the turbine stop valve limit switches, autostop oil pressure switches or reactor coolant pump breaker position could render a solid state protection system (SSPS) train inoperable. PSE&G reviewed the condition for applicability to Salem and concluded that a single initiating event (e.g., Main Steam Line Break or seismic event), could render one or two trains of SSPS inoperable.

Electrical terminal boxes contain two SSPS instrument channels for turbine stop valve position indication while another terminal box contains the auto stop oil input to SSPS. These channels are non-safety related (non 1E) inputs to SSPS and are not electrically isolated from the safety related (1E) portion of the SSPS. If the steam jet from the faulted main steam line was to strike one of the electrical terminal boxes or a seismic event affected the terminal boxes, the force could potentially cause shorts in the non 1E inputs to the SSPS. Since the non 1E channels are not electrically isolated from the SSPS, the short would cause the fuses for the associated 1E channels to fail. The failure of the fuses for the 1E channels would result in the failure of the power supplies for the logic circuitry of one or both trains of SSPS.

Assuming the credible failure of a short to ground, the SSPS 15 and 48 VDC power supplies would fail from the short circuit. Therefore, PSE&G conservatively declared both SSPS trains inoperable at 2235 hours on February 1, 1995.

At 0230 EST on February 2, 1995, the NRC granted verbal enforcement discretion. PSE&G committed to submit a formal written request on February 3, 1995. This allowed PSE&G to restore one train of SSPS to operable status and exit TS 3.0.3. The requested duration for the discretion of enforcement is from 0230 hours on February 2, 1995 until 0230 hours on February 6, 1995, or the completion of the modification whichever is first.

A modification has been developed to rewire the SSPS power supply leads so that they will be directly fed from the VIB breaker (before the input bay fuses) instead of being fed after the fuses. Note: Power supplies are fused separately. In order to perform this modification, PSE&G requests enforcement discretion to allow an action time of 96 hours to restore all trains of SSPS (two per unit) to operable.

PSE&G has proactively acted on the newly acquired information. However, during our search of our operating history, PSE&G found Information Notice No. 91-11, Inadequate Physical Separation and Electrical Isolation of Non-Safety Related Circuits from Reactor Protection System Circuits, issued on February 20, 1991. PSE&G has determined that the disposition of the IE notice was accomplished in a timely manner within the procedural requirements and addressed the specific concerns of the Information Notice. However, PSE&G recognizes that a stronger questioning attitude may have identified this concern.

In addition, PSE&G has contacted the Westinghouse Owners Group Regulatory Response Group to inform them of this potential concern and its generic implications.

3. **The safety basis for the request that Enforcement Discretion be exercised, including an evaluation of the safety significance and potential consequences of the proposed course of action.**

NUREG-0800, "Standard Review Plan," Sections 3.6.1 and 3.6.2, require that evaluations be performed to verify that High Energy Line Breaks (HELB) will not render safety-related equipment inoperable and prevent the plant from being brought to a cold shutdown condition. As part of the HELB evaluations, any equipment rendered inoperable by a HELB must be assumed to be inoperable. Additionally, the single active failure that has the most negative impact on mitigating the consequences of the HELB must be assumed.

The NUREG 0800 evaluation allows any remaining systems, including those actuated as a result of operator action, to be used to mitigate those consequences of the HELB.

Any operator action credited for mitigation must occur in a time reasonable for the operators to perform, and the operators must have access to the required equipment during the HELB.

In addition to a HELB which could render only one train of the SSPS inoperable, a seismic event could also render both SSPS trains inoperable (affecting all four power supplies).

The proposed notice of enforcement discretion seeks 96 hours to restore operability of both train of SSPS. Throughout most of this period, both SSPS trains will remain functional. During the design modification, only one SSPS train at a time will be rendered inoperable. The redundant SSPS train will be maintained operable, as well as the reactor trip function from SSPS. In support of this extension the following accident initiators were considered to be applicable: 1) Seismic (alone); 2) Seismic event resulting in a loss of off-site power; 3) Seismic resulting in a steam line break in the affected area; 4) Fire; and 5) Steam line break. Other events such as turbine building crane operation, handling and/or dropping of heavy loads, missile generation, and tornado were considered as potential initiators. However, their consequences were less severe or comparable to that of the seismic event.

#### Regarding a seismic event alone.

The Salem design basis does not require, in accordance with regulations, postulating a design basis accident in conjunction with a seismic event. Therefore, a seismic (earthquake) event by itself has no adverse safety consequences even with the loss of both SSPS trains. Since no ESF actuation system is needed, the loss of the SSPS is inconsequential to this event. This event is reduced to a reactor trip with a "temporary" loss of heat sink. Because of the loss of SSPS, the auxiliary feedwater pump would not be automatically started. However, in accordance with the approved emergency operating procedures (EOPs), the auxiliary feedwater pumps will be manually started. It is expected that this will occur within 5 minutes of the event. The 5 minute delay in auxiliary feedwater initiation has no significant impact or adverse affect on the current licensing basis.

#### Regarding a seismic event resulting in a loss of off-site power.

The discussion and conclusions provided above for the seismic event alone apply to this event. The loss of off-site power represents a benefit, since the auxiliary feedwater pumps will be immediately started due to the black-out loading of the Emergency Diesel Generators (EDGs) by the safeguard cabinets (SEC). The SEC cabinets, which start and load the EDGs, are not affected by the loss of the SSPS.

The sensors (undervoltage relays) that detect the loss of voltage in the vital buses are seismically qualified and located in a seismic environment.

Regarding a seismic event resulting in a steam line break at this location.

This event is discussed below as a steam line break event.

Regarding a fire.

Similar to the seismic event, the Salem design basis does not require, in accordance with regulations, postulating a design basis accident in conjunction with the fire. Therefore, the conclusions reached for the seismic event alone are applicable to fires.

Regarding a steam line break at this location.

The postulated steam line break could affect any of the SSPS trains by possibly shorting out the power supplies. In accordance with the guidance provided in GL 91-18, this failure is considered a consequential failure of the event and an additional single failure must be postulated. Without any SSPS train available, the automatic safety injection actuation will not occur. However, the required ESF equipment (pumps and valves) can be manually started/opened by operator action. This action would be accomplished in accordance with existing EOPs.

Westinghouse evaluated the cooldown and subsequent heat-up associated with this event, and provided PSE&G with reasonable assurance that DNBR limits will not be exceeded and that the long term cooling is not compromised. Westinghouse performed a safety assessment to evaluate the impact of a double ended rupture of a steam line break postulated to occur in the Salem Units 1 and 2 turbine building. The postulated event is a double ended break resulting in the blowing down of all four steam generators. The analysis credits no immediate operator action (other than the initiation of auxiliary feedwater at five minutes into the reactor trip), nor credits any automatic mitigation from engineered safety features (ESF) actuation signals. The evaluation shows that the current FSAR licensing basis analysis of SLB core response remains bounding (DNBR limits are not exceeded). In addition, the long term consequences of the subsequent heatup of the reactor coolant system (RCS) was analyzed with acceptable results. An evaluation of the integrity of the Salem reactor vessel for the effects of pressurized thermal shock was also performed with acceptable results.

In addition the frequencies of these events are relatively low. The frequency of a steam line break that causes three of the four SSPS power supplies to short, and a random failure of the fourth power supply is calculated to be  $3.73 \times 10^{-7}$ /year for each of the Salem units.

The mean frequency of the design basis earthquake (0.2 G) for the Salem plant is  $8 \times 10^{-5}$ /year.

This Notice of Enforcement Discretion also requests 4 hour extensions to the allowable time for closing in the reactor trip bypass breaker.

While performing this modification, one of the SSPS trains will remain operable. Only one train of SSPS will be modified at a time. Presently there is no ESF equipment out service. As stated below in the compensatory action section, no planned maintenance will be performed on any ESF equipment while the modifications are being performed. Consequently, PSE&G has not identified any other potential initiators from the one described above.

A Salem PRA was performed to measure the effect of allowing for a 4 hour extension of the TS 3/4.3.1 Action 1.

The increase in the probability of core damage from closing a reactor bypass trip breaker for an additional four hours, up to four times for each Salem Plant is  $1.95 \times 10^{-8}$  for Salem Unit One, and  $1.84 \times 10^{-8}$  for Salem Unit Two.

The revised probability of core damage from manually shutting down Salem Unit One is  $4.96 \times 10^{-7}$ , and from manually shutting down Salem Unit Two is  $1.37 \times 10^{-6}$ . In both cases, the increase in the probability of core damage is less if the modifications are made while the plant is operating rather than manually shutting it down.

The final facility configuration and the interim configuration during modification have been reviewed under the requirements of 10CFR50.59 for the determination of an unreviewed safety question (USQ). This safety evaluation is an inherent portion of PSE&G's design modification process.

#### **4. Proposed compensatory measure(s).**

The following actions will be taken to provide additional assurance that the public health and safety will not be adversely affected by this enforcement discretion request.

1. The design modification will be performed on only one train of the SSPS at any given time. This will provide assurance that at least one train of SSPS on each unit would perform its required function to mitigate the consequences of all accidents.

2. Train related maintenance and surveillance testing that poses a high risk of tripping the reactor will be suspended until the installation of the design modification is completed.

3. An operations night order has been prepared describing this condition and providing operators with guidance and added sensitivity to a potential SLB in this location.

4. No planned maintenance activity will be performed on any ESF component during the duration of this enforcement discretion.

5. During installation of the modification steady state power conditions will be maintained in Salem Unit 1.

6. During installation of the modification Salem Unit 2 will be maintained in Mode 2 with the MSIV closed.

**5. The justification for the duration of the noncompliance.**

The 96 hour extension request assures that PSE&G will have appropriate time for modification preparation, implementation, and retest. Included in this portion is execution of a pre-job brief with personnel involved in this evolution.

PSE&G has also performed a dry run of the modification utilizing the spare SSPS cabinet at the nuclear training center (NTC), to ensure that the installation is uneventful.

**6. The basis for the licensee's conclusion that the noncompliance will not be a potential detriment to the public health and safety and that a significant hazards consideration is not involved.**

**Determination of No Significant Hazards Consideration**

This proposed Enforcement Discretion:

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

SSPS is used for mitigating the consequences of accidents, but is not an accident initiator.

Therefore there is no increase in the probability or consequences of an accident previously evaluated. Additionally, the probability of a main steam line break accident is not affected by the proposed enforcement discretion. The consequence of a malfunction of the SSPS train due to a SLB in the turbine building with the single active failure of the redundant SSPS train is not affected as demonstrated by the Westinghouse analysis described above.

Therefore, the probability or consequences of an accident previously evaluated are not affected.

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

Increasing the allowable time of operation with two SSPS trains inoperable, or allowing the additional 4 hours for surveillance testing as per TS 3/4.3.1 does not introduce any new accident initiators.

Accident sequences in this condition are shown to result in consequences bounded by existing analyses.

Therefore, the granting of this request does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

As demonstrated above, all potential accidents and their consequences remain bounded by existing analyses. This demonstrates an acceptable margin of safety.

As provided above, PSE&G's conclusion is that the proposed waiver does not involve a Determination of No Significant Hazards Consideration.

#### **7. Determination that the Request does not Involve Irreversible Environmental Consequences**

PSG&E has evaluated the proposed request for enforcement discretion and determined the request does not involve a (i) significant hazards consideration, as described above, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the request for enforcement discretion is not required.

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 submittal has been reviewed and approved by SORC.