



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 27 TO FACILITY OPERATING LICENSE NO. DPR-70

PUBLIC SERVICE ELECTRIC AND GAS COMPANY,  
PHILADELPHIA ELECTRIC COMPANY,  
DELMARVA POWER AND LIGHT COMPANY, AND  
ATLANTIC CITY ELECTRIC COMPANY

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. 50-272

Introduction

Salem Unit No. 1 plans to terminate its second fuel cycle in September 1980. Salem Unit No. 2 received a license to operate up to 5% of rated power in April 1980 and the licensee, the Public Service Electric and Gas Company, has applied for a full-power license. As the result of the Staff's review of the Salem 2 Operating License and the development of Technical Specifications for Unit No. 2 we became aware of many areas where the Technical Specifications for Unit No. 1 differ from those for Unit No. 2. A major effort to rectify these differences is being postponed until Unit No. 2 becomes operational at full power. This amendment, however, is being used to update the Technical Specifications and to revise the Safety Evaluation for the Salem Fire Protection Program where the existing texts for the two Units are not consistent.

I. Administrative Changes

(A) Appendix B - Technical Specification 3.1.1.4

By means of Amendment No. 23, issued on December 13, 1979, the Staff made extensive changes to the non-radiological Environmental Technical Specifications for Salem No. 1. In making these revisions the requirements for sampling station cooling water for "free chlorine residual" and "30-second chlorine demand" were removed from T.S. 3.1.1.4 but were inadvertently retained in Table 3.1-1. This oversight is hereby corrected by issuance of a revised Page 3.1-22 to Appendix B.

(B) Appendix A - Technical Specification 3.2.1

By Amendment No. 20, dated October 30, 1979, we approved the return to power of Salem Unit No. 2 for Fuel Cycle 2. While giving this

approval we placed limitations on the Axial Flux Difference (AFD) during the first 72 effective full power days (EFPD) at 2700 MWD/MTU Operation in Cycle 2. As defined in T.S. 3.2.1, the AFD was to remain less than 7.5% of rated thermal power with the allowed AFD increasing by 1.0% for each 1.0% reduction in thermal power.

Salem Unit No. 1 completed 72 EFPD in Cycle 2 on March 28, 1980; therefore, this limitation is no longer required and has been deleted from T.S. 3.2.1.

(C) Appendix A - Technical Specification 6.2.2(f)

As the result of the licensing review for Salem Unit No. 2, the licensee committed to an onsite Fire Brigade of at least five members at all times. This commitment has been documented in T. S. 6.2.2(f) for Unit No. 2 (License DPR-75). We are taking this opportunity to revise T. S. 6.2.2(f) for Unit 1 to also reflect this change from a previous commitment of three members.

(D) Fire Protection Safety Evaluation Report

By means of Amendment No. 21, dated November 20, 1979, we added conditions to License No. DPR-70 for Salem Unit 1. These conditions related to the completion of facility modifications for fire protection. The basis for this amendment was the Staff's Safety Evaluation Report (Fire Protection Review), by means of which we approved the fire protection program at Unit 1.

As the result of continued review by the Staff and PSE&G during the licensing of Unit No. 2, two sections of the Salem 2 SER (Appendix E of Supplement No. 4, April 1980) differ in text from the same sections at the Salem 1 SER. We believe that the revised sections more accurately describe systems that have been approved as providing acceptable protection against fire. Consequently, we take this opportunity to revise Section IV.B and IV.D(2) in the Salem 1 SER:

(1) Page 20, Section IV.B

Replace the fourth and fifth sentences of the first paragraph with the following sentence: "In lieu of the two options proposed by the staff (i.e., a one-hour rated fire barrier or a one-half hour barrier and sprinkler system), we have accepted an equivalent system that consists of a water sprinkler system with redundant valves operated by separate actuators which, in turn, are actuated by redundant fire detectors."

(3) Page 21, Section IV.D(2)

In the Licensee's Commitment No. 2, the first line should be changed to read "provide a one-half hour fire rated barrier..."

(4) Page 29, Action Item 21

As the result of its experience since implementation of its fire protection program, the licensee contacted the Staff (by letter on September 26, 1980) to request a minor modification in this Action Item. The original Action Item called for storing two self-contained air breathing units in the mechanical penetration at the Reactor Containment entrance. Because of the hot and humid environment, the breathing units were undergoing serious deterioration. Consequently, the licensee requested that the breathing units be stored at the radiological control point approximately 100 feet from the Containment Entrance since this area is air conditioned. We find this change in location to be acceptable since any person who plans to enter Containment must pass through this control point. Also, the distance from control point to the Containment entrance is not significantly increased from the former storage location. This Action Item is revised to read, "Ten (2) dedicated air breathing units (Scott) will be stored at the Radiological Control Point for entry into the Reactor Containment Areas."

(E) Redefining the Term "Operable"

In response to the Staff's request dated April 10, 1980, the licensee, by letter of May 16, 1980, proposed changes to Appendix A, Safety Technical Specification 3/4.0. These changes reflect the Staff's current definition of the term "operable" as it applies to the single failure criterion for safety systems in power reactors.

The NRC's Standard Technical Specifications (STS) were formulated to preserve the single failure criterion for systems that are relied upon in the safety analysis report. By and large, the single failure criterion is preserved by specifying Limiting Conditions for Operation (LCOs) that require all redundant components of safety related systems to be OPERABLE. When the required redundancy is not maintained, either due to equipment failure or maintenance outage, action is

required, within a specified time, to change the operating mode of the plant to place it in a safe condition. The specified time to take action, usually called the equipment out-of-service time, is a temporary relaxation of the single failure criterion, which consistent with overall system reliability considerations, provides a limited time to fix equipment or otherwise make it OPERABLE. If equipment can be returned to OPERABLE status within the specified time, plant shutdown is not required.

LCOs are specified for each safety related system in the plant, and with few exceptions, the ACTION statements address single outages of components, trains or subsystems. For any particular system, the LCO does not address multiple outages of redundant components, nor does it address the effects of outages of any support systems - such as electrical power or cooling water - that are relied upon to maintain the OPERABILITY of the particular system. This is because of the large number of combinations of these types of outages that are possible. Instead, the STS employ general specifications and an explicit definition of the term OPERABLE to encompass all such cases. These provisions have been formulated to assure that no set of equipment outages would be allowed to persist that would result in the facility being in an unprotected condition.

To achieve the necessary clarification, the Staff provided the licensee with model Technical Specifications that have been accepted and re-submitted without change. We, therefore, find these changes to be acceptable. The licensee shall implement appropriate procedures to assure that the necessary records, such as plant logs or similar documents, are reviewed to determine compliance with these specifications.

## II. Safety Evaluation

### Surveillance Requirements for Emergency Core Cooling Systems

#### Introduction

By letter of June 30, 1977, the Staff requested the licensee to propose Technical Specification changes to incorporate surveillance requirements for HPSI/LPSI throttle valves. The purpose of these surveillance requirements is to assure that proper flow resistances in HPSI/LPSI systems are maintained throughout plant life. The licensee responded by submittal dated June 29, 1979. This submittal contained proposed

changes to the Technical Specifications that were not in complete conformance with the Staff's requirements. Through subsequent discussions between the Staff and licensee acceptable Technical Specifications were developed and were included in Appendix A of License DPR-75 for Salem Unit No. 2. Inasmuch as the ECCS systems for Salem Units 1 and 2 are identical, the licensee proposed that the surveillance requirements for HPSI/LPSI flow balancing in the Salem 2 Technical Specifications (4.5.2(g) and (h)) be substituted for those proposed in the June 29, 1978 letter. The Staff agrees that not only is the substitution valid and acceptable, but also requirement 4.5.2(f) in the Unit 2 Technical Specifications should be included as an identical requirement for Unit 1 so that the surveillance requirements for both units will be the same. The licensee has agreed.

#### Discussion and Evaluation

The High and Low Pressure Safety Injection system (HPSI and LPSI) designs of many Pressurized Water Reactors (PWRs) utilize a common low pressure and a common high pressure header to feed the several cold (and in some cases hot) leg injection points. 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 runoff conditions when the system is in its minimum resistance configuration; (2) provide a 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. On many plants, there are motor-operated valve(s) in the lines to each injection point that have stops which are set during pre-operational flow testing of the plant to insure that these flow requirements are satisfied. On other plants, electrical or mechanical stops on the Safety Injection System's isolation valve(s) are used for this purpose. Salem 1 utilizes hand-set throttle valves to satisfy these ECCS flow requirements.

While pre-operational HPSI/LPSI flow testing is utilized to assure that the valves used to throttle flow have been properly set, the NRC Staff has concluded that periodic surveillance requirements are needed to assure that these settings are maintained throughout the life of the plant. Consequently, we requested all PWR licensees to propose changes to their Technical Specifications, as appropriate, to incorporate periodic surveillance



requirements for these valves. Sample surveillance requirements, developed by the NRC Staff, were provided to the licensees for guidance in developing proposed changes. The sample requirements include periodic verification of throttle valve position stop settings and verification of proper ECCS flow rates whenever system modifications are made that could alter flow characteristics.

Based on our review, we have concluded that the licensee's proposed increased surveillance requirements would provide sufficient additional assurance that proper valve settings for ECCS flows and flow distributions will be maintained throughout plant life; and thus, the proposed changes are acceptable.

#### Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

#### Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: November 29, 1980

References

1. Letter, NRC (Schwencer) to PSE&G (Librizzi), November 28, 1978.
2. Letter, PSE&G (Librizzi) to NRC (Schwencer), January 30, 1979.
3. Letter, PSE&G (Midura) to NRC (Grier), August 30, 1979.
4. Letter, PSE&G (Martin) to NRC (Grier), October 5, 1979.
5. Letter, NRC (Schwencer) to PSE&G (Librizzi), October 30, 1979.
6. Letter, PSE&G (Librizzi) to NRC (Schwencer), November 21, 1979.