



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NOS. 115 AND 97 TO FACILITY OPERATING
LICENSE NOS. DPR-70 AND DPR-75
PUBLIC SERVICE ELECTRIC & GAS COMPANY
PHILADELPHIA ELECTRIC COMPANY
DELMARVA POWER AND LIGHT COMPANY
ATLANTIC CITY ELECTRIC COMPANY
SALEM GENERATING STATION, UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311

1.0 INTRODUCTION

By letter dated December 24, 1987, and supplemented by letters dated February 26, 1990, June 20, 1990, June 28, 1990, and September 19, 1990, Public Service Electric & Gas Company (PSE&G) requested amendments to Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Generating Station, Unit Nos. 1 and 2. The proposed amendments would revise Salem Unit No. 2 Technical Specification (TS) 3/4.3.4 and the associated bases for Turbine Overspeed Protection surveillance requirements. Salem Unit No. 1 currently has no technical specifications addressing turbine overspeed protection. This amendment would add these specifications to the Salem Unit No. 1 TSs.

Additional information on turbine valve test frequency was provided in the February 26, 1990 letter. The June 20, 1990 supplemental letter included an additional provision in the event unacceptable flaws or excessive corrosion are found upon turbine valve inspection, to require all other valves of that type to be inspected. The June 28, 1990 and September 19, 1990 supplemental letters forwarded the corrected and retyped TSs pages for the proposed amendments. The June 20, 1990, June 28, 1990, and September 19, 1990 supplements did not increase the scope of the original amendment request and did not affect the staff's original no significant hazards determination.

2.0 EVALUATION

The proposed amendments would change the TS surveillance test frequency for the turbine stop valves, control valves, hot-reheat stop valves, and hot-reheat intercept valves. Rather than having a specific turbine valve test frequency in the TSs, the licensee proposes to use a turbine valve testing frequency determined by the methodology presented in Westinghouse Electric Corporation Topical Report WCAP-11525, "Probabilistic Evaluation of the Reduction in the Turbine Valve Test Frequency," that meets the established NRC acceptance criteria for the probability of a missile ejection incident of less than 1.0×10^{-5} per year. However, the turbine valve test interval shall not exceed one year.

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For the Salem Units, the licensee tests four high-pressure turbine stop valves, four high-pressure turbine control valves, six low-pressure hot reheat stop valves, and six low-pressure hot reheat intercept valves. Currently, Salem turbine valve testing is performed on a weekly basis. In order to conduct turbine valve testing, the reactor power level must be reduced to between 85 percent and 90 percent of full power due to the reduced steam flow to the turbine generator and the limited steam that can bypass the turbine. Reducing power is typically achieved by boron addition to the reactor coolant system (RCS) with control rods being used primarily for axial flux distribution (Delta I) control.

Current operating procedures call for an operator to be stationed at the valves to check for movement during turbine valve testing. Testing of the turbine valves involves movement of the stem from its position prior to testing to the full closed position and returning the valve stem to the original position. The control valves and stop valves test circuits are electrically interlocked to prevent the testing of more than one at the same time. Similarly, the test circuits for the reheat stop valves and reheat intercept valves are interlocked so that it is not possible to test the reheat stop and interceptor valves on one side of the turbine generator unit when the valves on the other side are in other than the full open position.

Upon return to full reactor power, the added boron must be removed from the RCS. The boron dilution required to return the reactor to full power involves a substantial amount of water which must be processed by plant systems. Consequently, the reactor power cycling described above (1) places unnecessary thermal and pressure cycles on plant equipment, (2) increases the probability of equipment failures which may lead to reactor trips, (3) increases the amount of liquid and solid radioactive waste that results in an increase to plant personnel exposure, and (4) places the plant operator in a vulnerable position where an inadvertent reactor trip is more likely during the transient power reduction and increase.

In support of this amendment request, the licensee references the Westinghouse Topical Report WCAP-11525. Topical Report WCAP-11525 was prepared by Westinghouse Electric Corporation for the Westinghouse Owners Group (Turbine Valve Test Frequency Evaluation Subgroup). WCAP-11525 provides a detailed probabilistic basis for extending the testing interval for turbine valves. The methodology described in WCAP-11525 for determining turbine valve test frequency has received staff approval in a supplemental safety evaluation report dated November 2, 1989. Prairie Island served as the lead plant for the extended turbine valve surveillance interval issue. Using the WCAP-11525 methodology, the licensee has calculated the probability of total turbine missile generation/ejection for each of the Salem units of less than 1.0×10^{-5} per year. The staff has determined that this meets the NRC acceptance criterion of a total turbine missile generation probability of less than 1.0×10^{-5} per year. Based on the above, the staff finds this acceptable.

The February 26, 1990 supplemental letter provided additional information on Salem turbine valve history and supplementary plant specific information. The licensee informed the staff that the Salem Unit 2 turbine valves were tested 119 times during the review period. The review period was from January 1984 through September 1989. Salem Unit 1 turbine valves were tested 103 times during the referred period although Unit 1 turbine valve tests are not subject to TS requirements. The licensee also noted that during the turbine valve test period, there were no instances of unplanned turbine design overspeed (greater than 120 percent of operating speed). Also, there were no single turbine valve failures that could have led to turbine overspeed condition.

As indicated in the February 26, 1990 supplemental letter, the licensee has committed to maintain, in an auditable manner, and share all available turbine valve failure information with Westinghouse, the manufacturer, in support of their turbine valve component failure data base. PSE&G will review turbine valve failure rate information at least once every three years and update when more than minor changes occur in the data base. The licensee has also committed to reevaluation of the Turbine Valve Testing Frequency probabilistic analysis (by the WCAP-11525 methodology) when any changes to the turbine system are made in accordance with 10 CFR 50.59 or when a significant upward trend in the valve failure data is identified. The staff finds these commitments acceptable.

The June 20, 1990 supplemental letter provided clarification of the actions to be taken following inspection of turbine valves. PSE&G has added a provision to the original license amendment request for additional inspection of valves when unacceptable flaws or excessive corrosion is found when inspecting turbine valves. The additional requirement involves the inspection of all valves of the type that were found to be unsatisfactory. PSE&G has indicated that the definitions of unacceptable flaws and excessive corrosion will be included in the station implementing procedures. The staff has determined that this added requirement is acceptable.

The September 19, 1990 letter provided a corrected and updated page XII of the Salem 1 Table of Contents. These were administrative changes that the staff finds acceptable.

In conclusion, Salem Unit Nos. 1 and 2 were primarily designed for base load operation. Load following and load reduction increases the probability of equipment failure, which may lead to reactor trips. Salem operating experience indicates that during the turbine valve test period from January 1984 to September 1989, there were no single valve failure that could have led to turbine overspeed conditions. Based on operating experience, test results, and calculated probabilities for turbine missile ejection for Salem Unit Nos. 1 and 2, the staff finds the proposed change in turbine valve testing frequency acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

4.0 CONCLUSION

The Commission made a proposed determination that the amendments involve no significant hazards consideration which was published in the Federal Register (55 FR 12599) on April 4, 1990 and consulted with the State of New Jersey. No public comments were received and the State of New Jersey did not have any comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

Dated: November 13, 1990

Principal Contributor: M. Franovich