

October 10, 2002

Mr. Harold W. Keiser
Chief Nuclear Officer & President
PSEG Nuclear LLC - X04
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2, ISSUANCE OF
AMENDMENT RE: CONTAINMENT SPRAY NOZZLES (TAC NOS. MB5629 AND
MB5630)

Dear Mr. Keiser:

The Commission has issued the enclosed Amendment Nos. 252 and 233 to Facility Operating License Nos. DPR-70 and DPR-75 for the Salem Nuclear Generating Station, Unit Nos. 1 and 2 (Salem). These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated July 18, 2002.

These amendments change the Salem Technical Specifications (TS) requirements associated with its containment spray nozzles. The frequency of TS Surveillance Requirement (SR) 4.6.2.1.d for verifying that the containment spray nozzles are unobstructed is changed from a fixed 10-year frequency to after activities that could result in nozzle blockage. In this case, PSEG Nuclear, LLC will be required to evaluate the work performed to determine the impact to the containment spray system, or perform an air or smoke flow test. The applicable Bases pages are revised to reflect this change.

A copy of our safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

/RA/

Robert J. Fretz, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosures: 1. Amendment No. 252 to
License No. DPR-70
2. Amendment No. 233 to
License No. DPR-75
3. Safety Evaluation

cc w/encls: See next page

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- 2. Amendment No. 233 to License No. DPR-75
- 3. Safety Evaluation

cc w/encls: See next page

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PSEG NUCLEAR LLC

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-272

SALEM NUCLEAR GENERATING STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 252

License No. DPR-70

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:
 - A. The application for amendment filed by the PSEG Nuclear LLC and Exelon Generation Company, LLC (the licensees) dated July 18, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-70 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 252, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

James W. Andersen, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: October 10, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 252

FACILITY OPERATING LICENSE NO. DPR-70

DOCKET NO. 50-272

Replace the following pages of the Appendix A, Technical Specifications, with the attached revised pages as indicated. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

3/4 6-9
B 3/4 6-3
B 3/4 6-4

Insert Pages

3/4 6-9
B 3/4 6-3
B 3/4 6-4

PSEG NUCLEAR LLC

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-311

SALEM NUCLEAR GENERATING STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 233
License No. DPR-75

1. The Nuclear Regulatory Commission (the Commission or the NRC) has found that:
 - A. The application for amendment filed by the PSEG Nuclear LLC and Exelon Generation Company, LLC (the licensees) dated July 18, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-75 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 233, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

James W. Andersen, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: October 10, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 233

FACILITY OPERATING LICENSE NO. DPR-75

DOCKET NO. 50-311

Replace the following pages of the Appendix A, Technical Specifications, with the attached revised pages as indicated. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

3/4 6-10

B 3/4 6-3

B 3/4 6-4

Insert Pages

3/4 6-10

B 3/6 6-3

B 3/4 6-4

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 252 AND 233 TO FACILITY OPERATING

LICENSE NOS. DPR-70 AND DPR-75

PSEG NUCLEAR LLC

EXELON GENERATION COMPANY, LLC

SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-272 AND 50-311

1.0 INTRODUCTION

By letter dated July 18, 2002, PSEG Nuclear LLC (PSEG/the licensee) submitted a request for changes to the Salem Nuclear Generating Station, Unit Nos. 1 and 2 (SNGS), Technical Specifications (TSs). The requested changes would revise the testing frequency for the containment spray nozzles as specified in TS Section 3/4 6.2, "Depressurization and Cooling Systems, Containment Spray System," Surveillance (SR) 4.6.2.1. The licensee proposes to revise the testing frequency for the containment spray nozzles from "At least once per 10 years by: 1) Performing an...." to "Following activities that could result in nozzle blockage, either evaluate the work performed to determine the impact to the containment spray system, or perform an...." The licensee stated that the performance of the airflow test presents a safety risk for individual(s) required to access the upper regions of the containment. Even though SNGS Unit 2 has installed a containment dome access system, this airflow test still poses some risk. The licensee also stated that a small reduction in individual radiation exposure will be recognized as well as a reduction in the refueling outage schedule impact.

2.0 BACKGROUND

In accordance with NUREG-1431, "Improved Standard Technical Specifications, Westinghouse Plants," containment spray nozzle flow surveillance should be performed once every 10 years. The licensee stated that the nozzles are of a passive design and the spray headers and nozzles are constructed of stainless steel and kept in a normally dry state. Previous testing has verified that the nozzles are not blocked. The two most recent airflow tests of the containment spray nozzles were performed on SNGS Unit 1 in April 1986 and April 1991 and for SNGS Unit 2 in May 1990 and November 1994. Also during the April 2001 refueling outage, SNGS Unit 1 had the lower rings of each spray train satisfactory tested.

3.0 REGULATORY EVALUATION

In Attachment 1 of its submittal, the licensee identified the applicable regulatory requirements. The regulatory requirements on which the staff based its acceptance are Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, General Design Criterion (GDC) 38,

“Containment heat removal”, GDC 39, “Inspection of Containment Heat Removal System,” GDC 40, “Testing of Containment Heat Removal System,” and GDC 50, “Containment Design Bases.” The staff also used NUREG-1366, “Improvements to Technical Specifications Surveillance Requirements,” (May 1992).

4.0 TECHNICAL EVALUATION

The SNGS containment spray (CS) system will function, by automatic or manual initiation, to spray cool water into the containment in the event of a Loss-of-Coolant-Accident (LOCA) to ensure that containment pressure does not exceed its design value. The secondary purpose of the CS system is to remove radioactive iodine from the containment atmosphere. The CS system consists of two independent subsystems capable of delivering the CS system design flow, each with its own spray header.

As stated in the SNGS Updated Final Safety Analysis Report (UFSAR) the principal components of the CS system for each SNGS unit are two pumps, one spray additive tank, two eductors, spray ring headers with nozzles, and necessary piping and valves. The stainless steel headers in SNGS Unit 1 has 67 nozzles in the upper ring and 96 nozzles in the lower ring while Unit 2 has 68 nozzles in the upper ring and 96 nozzles in the lower ring. These stainless steel nozzles are of a hollow-cone pressure-nozzle design without any internal parts subject to clogging. The nozzles produce a drop size spectrum with a Sauter mean drop size less than 1,000 microns with the spray pump operating at design conditions and the containment at design pressure and temperature. The nozzles and headers are oriented to maximize coverage of the containment volume. The licensee also stated in the July 18, 2002, letter that it is not expected that corrosion or any other mechanism would cause obstruction of the nozzles in the future, based on the temperature of the containment spray header piping being maintained near ambient conditions, and the headers being maintained dry and isolated from water by normally closed valves.

NUREG-1366, “Improvements to Technical Specifications Surveillance Requirements,” (May 1992) reported on a U.S. Nuclear Regulatory Commission (NRC) staff review of industry experience which indicated that containment spray systems of similar design are highly reliable and not subject to plugging after testing following construction. The staff reviewed industry experience and found that, in general, once tested after construction, containment spray systems have not been subject to blockage. There have been several exceptions identified in containment spray and fire protection systems in which water leakage resulted in corrosion which resulted in some, but not complete, blockage. At SNGS it is not expected that corrosion or any other mechanism would cause obstruction of the nozzles in the future because: (1) the temperature of the containment spray header is maintained near ambient conditions at all times; (2) the containment spray headers are maintained dry and isolated from water by a normally closed isolation valve that is subject to containment leakage testing; and (3) the headers and nozzles are located near the top of the containment.

In addition, the licensee stated that the current foreign material exclusion (FME) program requires that any breaches of the system boundaries during maintenance activities be appropriately protected from the intrusion of foreign material. This program normally includes covers for system breaches, inspection of tools to avoid introduction of foreign parts, accounting for tools and material during the work activity and other controls as appropriate. The FME program provides guidelines that establish cleanliness requirements and accounting

for material, tools, and parts to preclude the introduction of foreign materials into systems or components during maintenance, modification, test, or inspection activities. The program requires supervision and management involvement if FME integrity is lost or could not be ensured, and that a condition report be written if an item cannot be found or retrieved.

The licensee stated that normal plant operation and maintenance practices at SNGS are not expected to trigger the surveillance requirement as proposed. Only an unanticipated circumstance would initiate this surveillance, such as an inadvertent spray actuation, a major configuration change, or a loss of foreign material control when working within the affected boundary of the system. SNGS will perform an evaluation to determine whether a containment spray nozzle test would be required to ensure the nozzles remain unobstructed. If the evaluation can determine conclusively that the performance of the containment spray system is not adversely affected, then the new requirements would not require an air or smoke flow test be performed to determine if any nozzle blockage has occurred.

4.1 Salem Nuclear Generating Station Experience

As discussed in Section 2.0 of this evaluation, previous testing has shown that no blockage exists in the spray headers or nozzles.

4.2 Industry Experience and Failure Mechanisms

Review of industry experience using the NRC's Sequence Coding and Search System for Licensee Event Reports indicates that spray systems of similar design are highly reliable (i.e., not susceptible to plugging). The staff reviewed industry experience and found that, with a few exceptions, once tested after construction, containment spray nozzles have not been subject to blockage. There have been several exceptions. In the case of one pressurized water reactor (PWR), a chemical added to the inner surface of a spray system pipe to eliminate a corrosion problem detached and the loose material blocked some spray nozzles. Spray piping in PWRs, and in particular at SNGS is corrosion resistant; therefore this failure mechanism is not applicable to SNGS. The licensee for another PWR found debris, identified as construction debris, in the spray nozzle headers. The fraction of blockage was not significant and the sprays remained functional. The debris was found by visual observation, not by an air flow test.

4.3 Evaluation Conclusion

Based on its review of the information provided by the licensee, including information in the SNGS UFSAR, and a review of past operating experience, the NRC staff considers that the design of the SNGS containment spray system and the licensee's FME program which requires that any breaches of system boundaries during maintenance activities be appropriately protected from intrusion of foreign material, will provide reasonable assurance that the potential for nozzle obstruction is acceptably low. Because the potential for nozzle obstruction remains acceptably low as a result of implementing the proposed change, the staff concludes that PSEG will still conform to the applicable requirements of GDCs 38, 39, 40 and 50. Therefore, the staff finds that the proposed amendment is acceptable.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State official was notified of the proposed issuance of the amendments. In a letter dated October 9, 2002, the State official provided the following comments:

We agree that the potential for containment spray piping and nozzle blockage is low but not zero. The containment spray system for pressurized water reactors is much more safety significant than the containment spray system for the boiling water reactor (BWR). Therefore, referencing BWRs as a basis for elimination of this requirement is not appropriate. We recommend that PSEG perform a visual inspection of the Salem containment spray system following activities that could result in nozzle blockage. This is a much more meaningful test. Also, if PSEG applies for life extension for Salem 1 and 2, then we will recommend that the containment spray piping and spray nozzles be visually inspected as part of the life extension approval process. Since it is possible that the nozzles may never be inspected, this seems reasonable. The dose saving justification is not supported by any data. The radiation environment is low on the refueling floor and even lower at higher elevations. The real savings comes from the reduced refueling outage time.

The State of New Jersey official's comments were further discussed in a telephone call on October 9, 2002, between Messrs. D. Zannoni and R. Pinney of the NJ Bureau of Nuclear Engineering (BNE), and Mr. R. Fretz of the NRC staff.

NRC Response

Licensees are encouraged to reference precedent amendments (if one exists) at the time a license amendment request is submitted to the NRC. This practice promotes more timely reviews, and allows a more efficient use of NRC resources. In some cases, the staff has found that licensees have inappropriately cited precedent amendments. Whether or not an appropriate precedent exists or is cited, the NRC staff reviews all amendments on an individual basis. The staff did not rely exclusively on the BWR precedent in considering the safety significance of the changes to Salem's containment spray system surveillance requirements. With respect to BNE's comment on the licensee's dose savings justification, the staff agrees that the potential for reductions in occupational dose will be small. As previously discussed, the NRC staff reviewed industry operating experience; the spray nozzles' design, location and physical environment; as well as the implementation of PSEG's FME program; and concluded that there is reasonable assurance that the potential for nozzle obstruction remains acceptably low. PSEG will be required to perform an evaluation and take appropriate action following activities that could result in nozzle blockage. Therefore, because the potential for nozzle obstruction remains acceptably low, the staff concludes that PSEG will still conform to the applicable requirements of GDCs 38, 39, 40 and 50.

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC 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 (67 FR 53989). 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.

7.0 CONCLUSION

The Commission 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: R. Pulsifer
R. Fretz

Date: October 10, 2002

PSEG Nuclear LLC

Salem Nuclear Generating Station,
Unit Nos. 1 and 2

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