

January 7, 2004

Mr. Roy A. Anderson  
President & Chief Nuclear Officer  
PSEG Nuclear, LLC - X04  
Post Office Box 236  
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NO. 2, ISSUANCE OF  
AMENDMENT RE: REQUEST FOR CHANGES TO LICENSE  
CONDITION 2.C.(10) (TAC NO. MB9896)

Dear Mr. Anderson:

The Commission has issued the enclosed Amendment No. 242 to Facility Operating License No. DPR-75 for the Salem Nuclear Generating Station (Salem), Unit No. 2. This amendment consists of changes to the License Condition 2.C.(10), "Fire Protection," in response to your letters dated June 16 and July 1, 2003, as supplemented on November 11, 2003.

This amendment revises License Condition 2.C.(10) to document changes to the Salem Post-Fire Safe Shutdown strategy for Fire Areas 2-FA-AB-64B, 2-FA-AB-84B, and 2-FA-AB-84C.

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 No. 50-311

Enclosures: 1. Amendment No. 242 to  
License No. DPR-75  
2. Safety Evaluation

cc w/encls: See next page

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ACCESSION NUMBER: ML040070291 \* SE Input provided by memo. No major changes made.  
TS(s): ML, Package: ML040070361

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Salem Nuclear Generating Station, Unit No. 2

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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. 242  
License No. DPR-75

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by PSEG Nuclear, LLC and Exelon Generation Company, LLC (the licensees) dated July 1, 2003, as supported by letter dated June 16, 2003, and supplemented on November 11, 2003, 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 Title 10 of the *Code of Federal Regulations* (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 License Condition 2.C.(10) 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. 242, 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 by VNurses for/*

Darryl Roberts, Acting Chief, Section 2  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility  
Operating License

Date of Issuance: January 7, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 242

FACILITY OPERATING LICENSE NO. DPR-75

DOCKET NO. 50-311

Replace the following page of the Facility Operating License DPR-75 with the attached revised page as indicated. The revised page is identified by amendment number and contains marginal lines indicating the area of change.

Remove Pages

Page 7

Insert Pages

Page 7

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 242 TO FACILITY OPERATING

LICENSE NO. 75

PSEG NUCLEAR, LLC

EXELON GENERATION COMPANY, LLC

SALEM NUCLEAR GENERATING STATION, UNIT NO. 2

DOCKET NO. 50-311

1.0 INTRODUCTION

By letters dated June 16 and July 1, 2003, as supplemented on November 11, 2003, PSEG Nuclear, LLC (PSEG or the licensee) submitted a request for changes to the Salem Nuclear Generating Station (Salem), Unit No. 2, Facility Operating License (FOL). The requested changes would revise License Condition 2.C.(10) to document changes to the Salem Post-Fire Safe Shutdown strategy for Fire Areas 2-FA-AB-64B, 2-FA-AB-84B, and 2-FA-AB-84C. The November 11, 2003, letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.48, requires that all nuclear power plants have a fire protection plan that satisfies 10 CFR Part 50, Appendix A, General Design Criterion No. 3, "Fire Protection." Fire protection requirements for Salem, Unit No. 2, are further defined in License Condition 2.C.(10) to FOL DPR-75. License Condition 2.C.(10) states that:

PSEG Nuclear LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report, and as approved in the NRC Safety Evaluation Report, dated November 20, 1979, and in its supplements, subject to the following provision:

PSEG Nuclear LLC may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

As stated in License Condition 2.C.(10), PSEG's approved fire protection program (AFPP) for Salem, Unit No. 2, is described in the Updated Final Safety Evaluation Report (UFSAR). The AFPP includes a report that demonstrates Salem's capability to achieve and maintain post-fire

safe shutdown in accordance with the technical standards of Appendix R to 10 CFR Part 50. Therefore, unless otherwise stated in the AFPP, Salem, Unit No. 2, fire areas must meet the technical standards of 10 CFR Part 50, Appendix R.

In addition, whenever licensees rely on manual actions to comply with certain U.S. Nuclear Regulatory Commission (NRC) requirements, the NRC staff's review criteria are based on an adaptation of existing review guidance for human factors engineering as found in:

- NUREG-800, "Standard Review Plan," (draft for comment, 2003);
- NUREG-0711, Revision 1, "Human Factors Engineering Program Review Model"
- NUREG-0700, Revision 2, "Human-System Interface Design Review Guideline"
- NUREG-1764, "Guidance for the Review of Human Actions, Draft Report for Comment"
- Regulatory Guide (RG)1.174, "An Approach To Using Probabilistic Risk Assessment In Risk-Informed Decisions On Plant-Specific Changes To The Licensing Basis"
- RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications"
- Information Notice (IN) 97-78, "Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times"
- IN 91-18, "Information to Licensees Regarding Two Inspection Manual Sections On Resolution of Degraded and Non-Conforming Conditions and on Operability"
- American National Standards Institute(ANSI) and American Nuclear Society (ANS) Standard ANSI/ANS 58.8, "Time Response Design Criteria for Safety Related Operator Actions"

### 3.0 TECHNICAL EVALUATION

In letters dated June 16 and July 1, 2003, PSEG stated that its revised safe shutdown strategy (SSD) for Salem would rely on certain manual actions performed by plant operators and site fire department personnel. Therefore, the NRC staff's review of this aspect of the licensee's proposed SSD will be provided first, followed by an evaluation of each of the three fire areas.

#### 3.1 Crediting Operator/Manual Actions

The proposed SSD for Fire Area 2-FA-AB-64B changes this area from a normal shutdown area (Appendix R, III.G.2) to an alternate shutdown area (Appendix R, III.G.3). Because Fire Area 2-FA-AB-64B does not have a fixed suppression system, Salem, Unit No. 2, does not meet the technical standards of Appendix R, Section III.G.3. In addition, PSEG does not meet the technical standards of Appendix R, Section III.L.3, to the extent that alternate shutdown capability must accommodate conditions where offsite power is not available for 72 hours. Specifically, Fire Area 2-FA-AB-64B relies on offsite power for alternative shutdown capability.

PSEG proposes to use the following manual actions to achieve hot standby and cold shutdown:

- (1) Achieve positive control of the affected unit's Chemical and Volume Control System (CVCS) flowpath
- (2) Align the Service Water System from the unaffected unit
- (3) Align the Control Area HVAC systems
- (4) Align the Residual Heat Removal (RHR) system
- (5) Align Component Cooling Water (CCW) system.



The new SSD strategy for Fire Area 2-FA-AB-84B changes this fire area from a normal shutdown area (Appendix R, III.G.2) to an alternate shutdown area (Appendix R, III.G.3). The licensee does not meet the technical standards of Appendix R, Section III.G.3, because alternative shutdown capability must accommodate post fire conditions where offsite power is not available for 72 hours. Specifically, Fire Area 2-FA-AB-84B relies on offsite power for alternative shutdown capability.

To support a separation evaluation of the Service Water for hot standby, the licensee performed an evaluation that demonstrated that at least two Service Water pumps would remain available due to a distance separation of over 75 horizontal feet. This distance separation assures that either the A-channel Service Water pumps or the B and C-channel pumps would remain available for hot standby under fire conditions. As part of this evaluation, the licensee conducted a review of spurious actuations to assess the affect on the Service Water function. Based on the evaluation, the licensee modified the Hot Shutdown Panel to relocate the remote/manual selector switches for the A-channel Service Water pumps. These switches have been relocated from the Hot Shutdown Panel into another fire area to eliminate any spurious actuations from affecting ability to use the A-Service Water pumps.

PSEG proposes to use the following manual actions to achieve hot standby and cold shutdown:

- (1) Achieve positive control of the affected unit's CVCS flowpath
- (2) Align the Control Area HVAC systems
- (3) Align the RHR system components
- (4) Align CCW system components.

Furthermore, the new SSD strategy for Fire Area 2-FA-AB-84C also changes this area from a normal shutdown area (Appendix R, III.G.2) to an alternate shutdown area (Appendix R, III.G.3). Because Fire Area 2-FA-AB-84C does not have a fixed suppression system, this fire area also does not meet the technical standards of Appendix R, Section III.G.3.

PSEG proposes to use the following manual actions to achieve hot standby and cold shutdown:

- (1) Achieve positive control of the affected unit's CVCS flow path
- (2) Align the CCW System

In Attachment 8 to its July 1, 2003, submittal, the licensee described each of the manual actions required to achieve these functions, identifying the personnel taking the actions, locations where the actions would be taken, and time required to successfully complete the actions. PSEG stated that the required actions can be accomplished before the plant reaches an unrecoverable state. Operator action locations and the associated pathways, for actions that must occur within the first eight hours, are being provided with eight-hour battery-backed emergency lighting. Staffing levels are sufficient to accomplish the required actions. Plant procedures will address the potential operator actions and the operator staff will be trained, as necessary, on the use of these procedures. The ability to achieve and maintain cold shutdown for the 2-FA-AB-64B area includes repairs to restore power to CCW system components. The licensee indicated that the repairs relied upon to achieve cold shutdown capabilities are reasonable and achievable. Repair procedures govern the performance of repairs and materials that are needed to implement the repairs are dedicated for use and stored on site.

The required repairs can be performed and cold shutdown can be achieved within 72 hours of a fire event.

In a November 11, 2003, letter, in response to the NRC staff's request for additional information (RAI), PSEG provided additional details on how the required manual actions were verified and validated to be achievable. As part of the revision to the SSD analysis, the licensee performed a manual action feasibility evaluation for each hot standby manual action. Each hot standby manual action was walked-down to evaluate fire area accessibility (where the component is located, and needed equipment availability), habitability (radiation, heat and smoke), emergency lighting, and communications. A checklist was generated for each manual action. The manual actions were "field-verified" to determine that the actual operator response time to perform the action was less than the estimated time calculated to perform the action as provided in the licensee's July 1, 2003, submittal. The validated response times included the time to review procedures, proceed to the required location, and successfully perform the required manual action. Validation was performed using Operations personnel. The Operations Department was closely involved in the development of the revised safe shutdown strategy and guidance procedures. In all cases, the validated time to perform the required manual actions was less than the calculated, or estimated, time. Estimated and validated time estimates included the time that it takes to dispatch the operators, travel time to reach the component, the time to access the component, and the time to actually perform the manual action.

With regard to staffing levels, the licensee indicated in its November 11, 2003, RAI response that available personnel are part of Salem's minimum shift staffing. The licensee indicated that it is committed to maintain minimum shift staffing levels for the performance of simultaneous alternate safe shutdown of Salem, Unit Nos. 1 and 2, from outside the control room, because Salem has a common control room for both units. For the three fire areas included in the proposed amendment request, post-fire shutdown is being performed only on one unit. The staffing levels are above the current levels in the Salem Technical Specifications. PSEG indicated that the manual actions that were identified by the licensee for all three scenarios are, "well within the limits of [the licensee's] proceduralized minimum staffing levels." The licensee has committed to maintain the staffing levels required to successfully complete the credited manual actions proposed in its amendment request as part of its Fire Protection Plan.

In response to the NRC staff's question of what the consequences might be if plant operators failed to take any of the proposed, required manual actions, PSEG provided the following explanation in its letter dated November 11, 2003:

For the fire areas identified in this license amendment, although these areas are identified as alternate shutdown areas (due to use of the CVCS cross-connect), the monitoring of the plant systems and parameters will still be performed from the control room. The operator in the control room would be in communication through radios with operators performing manual actions in the field. After the manual action is completed, the operator in the field notifies the control room of completion of the action.

In the event the field operator fails to perform the action, process monitoring indication would be available in the control room that would indicate the plant condition if the manual action is not performed. For example, if the operator

does not stop the charging pump, the pressurizer level would start to rise which would be indicated in the control room through the pressurizer level indication. At this point, the control room operator would then take necessary actions in accordance with their training to address the failure to perform the manual action utilizing the guidance available in existing operating procedures and available personnel. Since Salem is manned at a level to perform a simultaneous alternate shutdown of both Units from outside the common control room, additional personnel are available to complete actions that are required or to perform an alternate manual action to complete the necessary safe shutdown function.

With regard to defense-in-depth, the licensee stated in its November 11, 2003, letter that the Salem Fire Protection Program (FPP) uses defense-in-depth with multiple levels of protection including control of combustibles and ignition sources in plant design, the use of both smoke and heat detectors for prompt detection of fires, suppression in areas with high fire loads, fire barriers to provide separation and containment of fires and an onsite fire department (separate from the operating staff) which responds to and extinguishes fires upon detection. Therefore, the licensee indicated that multiple barriers in the Salem FPP must fail before there would be any adverse consequences to the plant or public if operators failed to complete the proposed operator actions.

Based on its review, the NRC staff has determined that the manual actions credited in PSEG's proposed changes to its AFPP are reasonable and achievable, and are consistent with NRC staff positions described in the documents identified in Section 2.0 of this Safety Evaluation. Therefore, the NRC staff finds the manual actions proposed by the licensee to be acceptable.

### 3.2 Fire Area 2-FA-AB-64B

Fire Area 2-FA-AB-64B contains waste gas compressors, waste gas tanks, storage tank recirculation pumps, a laundry pump, a chemical drain tank pump, and holdup tanks and pumps. The proposed Salem post-fire SSD strategy for this fire area credits alternative shutdown capability to ensure post-fire safe shutdown. Because the area does not have a fixed suppression system and offsite power is necessary to accomplish safe shutdown, PSEG does not meet the technical standards of Appendix R, Sections III.G.3 and III.L.3.

Fire Area 2-FA-AB-64B is made up of multiple rooms that are separated by reinforced concrete barriers. Each room contains either a single component or groups of similar components. The area boundaries are also constructed of reinforced concrete. In-situ combustibles in the fire area consist of lubricating oil in pumps and motors, paper, electrical cabinet internals, and cable insulation. A fire detection system is installed throughout the area except in the Holdup Tank Room, No. 1 Pump Waste Monitor Hold-up Tank Pump Room, the Waste Evaporator Feed Pump Room, and in unused space.

Manual fire alarm stations are provided in the area, and, along with fire detection system alarms, they annunciate in the Control Room. Manual fire suppression capability is provided in the form of portable fire extinguishers and manual hose stations.

In its June 16 and July 1, 2003, letters, PSEG stated that a fire in this area has the potential to result in a loss of the emergency diesel generators (EDGs). However, the fire area contains no

cables or equipment that could cause the station to lose offsite power. Offsite power would not be adversely affected by a fire and, therefore, can be assumed to be available to support safe shutdown activities. Alternative shutdown capability, independent of the fire area, is provided to ensure post-fire safe shutdown. Based on its review, the NRC staff agrees that the licensee would be able to accomplish required safe shutdown activities for a fire in this fire area using offsite power.

The fire area also has a low in-situ combustible loading with few potential ignition sources. Areas containing significant amounts of combustible materials also have a detection system to warn plant operators in the event of a fire. If a fire were to ignite in this area, the low combustible loadings, the inherent protection offered by the concrete wall construction, and the limited propagation pathways, would restrict the size of the fire. Fire detectors in the area would alarm, and the site fire brigade would be able to extinguish the fire using manual equipment. The NRC staff agrees that an automatic fire suppression system is not necessary to control a fire with the configuration of this fire area. Control Room operators would be able to promptly detect a fire, and the station fire brigade would rapidly respond and extinguish a fire in this area.

The NRC staff concludes that the lack of fire suppression specified in Section III.G.3, and the lack of capability to accommodate a loss of offsite power specified by Section III.L.3, in Fire Area 2-FA-AB-64B does not present an undue risk to the public health and safety, and is not necessary to achieve safe shutdown. Therefore, the NRC staff finds the proposed changes to the Salem SSD strategy for Fire Area 2-FA-AB-64B to be acceptable.

### 3.3 Fire Area 2-FA-AB-84B

Fire Area 2-FA-AB-84B contains pumps, heat exchangers, tanks and control centers for the CVCS, CCW, safety injection, containment spray, auxiliary feedwater, waste disposal, and spent fuel pool cooling systems. This area consists of multiple rooms separated by reinforced concrete barriers. Each room contains either a single component or groups of similar components. In-situ combustibles in the area consist of lubricating oil in pumps and motors, flammable liquids stored in cabinets, and cable insulation. The area contains few ignition sources and few paths for fire propagation.

Fire suppression is provided for the auxiliary feedwater pumps by automatically-actuated pre-action sprinkler systems. Fire suppression is provided for the charging pump area by a wet pipe sprinkler system.

PSEG does not meet the technical standards of Appendix R, Section III.L.3, in that the proposed SSD strategy for Fire Area 2-FA-AB-84B credits alternative shutdown capability, and offsite power is required to accomplish safe shutdown.

A fire in this area has the potential to result in a loss of the EDGs. However, the fire area contains no cables or equipment that could cause the station to lose offsite power. Consequently, offsite power would not be adversely affected by a fire in this area and would, thus, be available to support safe shutdown activities. Alternative shutdown capability, independent of the fire area, is provided to ensure post-fire safe shutdown. Based on its review, the staff agrees that the licensee would be able to accomplish required safe shutdown activities for a fire in this fire area using offsite power.

The NRC staff concludes that the lack of capability to accommodate a loss of offsite power as set out in Appendix R, Section III.L.3, in Fire Area 2-FA-AB-84B does not present an undue risk to the public health and safety, and is not necessary to achieve safe shutdown. Therefore, the NRC staff finds the proposed changes to the Salem SSD strategy for Fire Area 2-FA-AB-84B to be acceptable.

#### 3.4 Fire Area 2-FA-AB-84C

Fire Area 2-FA-AB-84C contains the CCW Pump and Heat Exchanger. An area-wide fire detection system is installed, and a manual fire alarm station is provided in the corridor outside the room. Both systems alarm in the Control Room. Manual fire suppression capability is provided by portable fire extinguishers and manual hose stations located in the corridor outside of the fire area. A fire in this area could affect several systems required for redundant safe shutdown. Therefore, alternative shutdown capability, independent of the fire area, is provided to ensure post-fire safe shutdown.

The licensee does not meet the technical standards of Appendix R, Section III.G.3, in that Fire Area 2-FA-AB-84C credits alternative shutdown capability and does not have a fixed fire suppression system.

The fire area boundaries are constructed of reinforced concrete. Alternative shutdown capability exists, independent of the fire area, to ensure that the plant can be safely shutdown for a fire in this area. The area has a low combustible material loading, consisting of lubricating oil for the CCW pump and motor and cable insulation. The area contains few fixed ignition sources. The low combustible loadings, principally electrical cable insulation, would result in a fire of limited size with slow growth characteristics. In the event of a fire in the area, the fire detectors would alarm and the fire brigade would extinguish the fire using manual equipment. The NRC staff agrees that an automatic fire suppression system is not necessary to control a fire in this configuration in this fire area. Control Room operators could detect a fire, and the station fire brigade would be able to respond in a timely manner to extinguish a fire in this area.

Therefore, based on its review, the NRC staff concludes that the lack of fixed fire suppression as set out in Appendix R, Section III.G.3, in Fire Area 2-FA-AB-84C does not present an undue risk to the public health and safety.

#### 3.5 NRC Staff's Conclusion

The staff examined the licensee's rationale to support changes to the Salem post-fire SSD strategy, and concludes that the fire protection measures implemented in Salem, Unit No. 2, Fire Areas 2-FA-AB-64B, 2-FA-AB-84B, and 2-FA-AB-84C, including the licensee's commitment to maintain the staffing levels required to successfully complete the credited manual actions proposed in its amendment request as part of its Fire Protection Plan, provide reasonable assurance that at least one means of achieving and maintaining safe shutdown conditions will remain available during and after any postulated fire. The NRC staff finds that the fire protection program for Salem will continue to meet the requirements of 10 CFR 50.48 and GDC 3, and that the proposed changes to the Salem post-fire SSD strategy are acceptable.

#### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State official was notified of the proposed issuance of the amendments. The State official had no comments.

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (68 FR 42134). Accordingly, the amendment meets 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 amendment.

#### 6.0 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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: P. Qualls  
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R. Fretz

Date: January 7, 2004