May 23, 2006

Mr. William Levis
Senior Vice President and Chief Nuclear Officer
PSEG LLC - N09
P. O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION - NRC TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000272/2006007, 05000311/2006007

Dear Mr. Levis:

On March 31, 2006, the NRC completed a triennial fire protection team inspection at your Salem Nuclear Generating Station. The enclosed report documents the inspection results which were discussed at an initial meeting on March 31, 2006, and a telephone conference call exit meeting to update the initial findings on April 10, 2006, with Mr. T. Joyce and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC identified one finding of very low safety significance (Green) that was a violation of NRC requirements. However, because of the very low safety significance and because it is entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy. Additionally, a licensee-identified violation which was determined to be of very low significance is documented in this report. If you contest the NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with copies to the Regional Administrator Region I, the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001, and the NRC Resident Inspector at the Salem Nuclear Generating Station.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/ADAMS.html (the Public Electronic Reading Room).

Sincerely,

***/RA/***

John F. Rogge, Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos. 50-272, 50-311
License Nos. DPR-70, DPR-75

Enclosure: NRC Inspection Report 05000272/2006007, 05000311/2006007

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REGION I

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| Docket Nos. | 50-272, 50-311 |
| License Nos. | DPR-70, DPR-75 |
| Report No. | 05000272/2006007, 05000311/2006007 |
| Licensee: | Public Service Enterprise Group Nuclear LLC |
| Facility: | Salem Nuclear Generating Station, Units 1 and 2 |
| Location: | P. O. Box 236<br>Hancocks Bridge, NJ 08038 |
| Dates: | March 13 - 31, 2006 |
| Inspectors: | L. Cheung, Senior Reactor Inspector, DRS<br>P. Finney, Reactor Inspector, DRS<br>M. Patel, Reactor Inspector, DRS<br>T. Sicola, Reactor Inspector, DRS |
| Approved by: | John F. Rogge, Chief<br>Engineering Branch 3<br>Division of Reactor Safety |

Enclosure

## SUMMARY OF FINDINGS

IR 05000272/2006007, 05000311/2006007 on 03/13 - 31/ 2006, Salem Nuclear Generating Station, Units 1 and 2; Triennial Fire Protection Team Inspection, Fire Protection.

This report covered a two-week triennial fire protection team inspection by four Region I specialist inspectors. One Green NCV was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified Findings

Cornerstone: Mitigating Systems

- Green. The team identified a non-cited violation (NCV) for failure to maintain equipment required for cold shutdown (CSD) repairs in the designated location. Specifically, procedure SC.MD-AB.ZZ-0001, Installation of Temporary 4KV Power Cables to CCW and RHR Motors, states that "All equipment required to install jumpers, cooling fans and make cable terminations are located in the Salem Safe Shutdown Equipment Storage Area." Salem Safe Shutdown Equipment Storage Area is located in the Northwest area of the Hope Creek Unit 2 reactor building. An inventory of the designated area in response to inspector inquiries revealed that a significant number of CSD repair materials was found missing. The licensee generated a notification and restocked the missing repair materials.

  The finding is more than minor because it is associated with the Mitigating Systems cornerstones attribute objective to ensure the availability of the post-fire cold shutdown system that responds to initiating events to prevent undesirable consequences. Under Manual Chapter 0609 Appendix F, Fire Protection, the finding was evaluated as representing a medium degradation. However, because the equipment involved only effects Cold Shutdown, the finding was determined to be of very low safety significance in accordance with the Fire Protection Significance Determination Process. The performance deficiency had a problem identification and resolution cross-cutting aspect because there was a previous case where cold shutdown repair equipment were found missing and where the corrective actions were ineffective to prevent recurrence. (Section 1R10)

B. Licensee-Identified Violations

A violation of very low safety significance, which was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and its associated corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Background

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, "Fire Protection." The objective of the inspection was to assess whether PSEG, LLC, has implemented an adequate fire protection program and that post-fire safe shutdown capabilities have been established and are being properly maintained at the Salem Nuclear Generating Station, Units 1 and 2. Five plant areas that included the following fire areas (FAs), were selected for detailed review based on risk insights from the Salem Individual Plant Examination of External Events (IPEEE):

- Fire Area 12FA-AB-122A,
- Fire Area 1FA-AB-84B,
- Fire Area 1FA-EP-100G,
- Fire Area 2FA-AB-84B,
- Fire Area 2FA-EP-100G.

The inspection team evaluated PSEG's fire protection program (FPP) against applicable requirements which include plant Technical Specifications, Operating License Conditions 2.C.5 (Unit 1) and 2.C.10 (Unit 2), NRC Safety Evaluations, 10 CFR 50.48 and 10 CFR 50 Appendix R. The team also reviewed related documents that include the Updated Final Safety Analysis Report (UFSAR), Section 9.5.1, the Salem Fire Hazards Analysis (FHA) and Post-Fire Safe Shutdown Analysis (SSA).

Specific documents reviewed by the team are listed in the attachment.

## 2. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems

### 1R05 Fire Protection

#### .01 Post-Fire Safe Shutdown From Outside Main Control Room (Alternative Shutdown) and Normal Shutdown

a. Inspection Scope

Methodology

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings (P&IDs), electrical drawings, the UFSAR and other supporting documents to verify that hot and cold shutdown could be achieved and maintained from outside the control room for fires that rely on shutdown from outside the control room. This review included verification that shutdown from outside the control room could be performed both with and without the availability of offsite power. Plant walkdowns were

also performed to verify that the plant configuration was consistent with that described in the FHAR. These inspection activities focused on ensuring the adequacy of systems selected for reactivity control, reactor coolant makeup, reactor decay heat removal, process monitoring instrumentation and support systems functions. The team verified that the systems and components credited for use during this shutdown method would remain free from fire damage. The team verified that the transfer of control from the control room to the alternative shutdown location(s) would not be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

Similarly, for fire areas that utilize shutdown from the control room, the team also verified that the shutdown methodology properly identified the components and systems necessary to achieve and maintain safe shutdown conditions.

Operational Implementation

The team verified that the training program for licensed and non-licensed operators included alternative shutdown capability. The team also verified that personnel required for safe shutdown using the normal or alternative shutdown systems and procedures are trained and available onsite at all times, exclusive of those assigned as fire brigade members.

The team reviewed the adequacy of procedures utilized for post-fire shutdown and performed an independent walk through of procedure steps to ensure the implementation and human factors adequacy of the procedures. The team also verified that the operators could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits. Time critical actions which were verified included restoration of AC electrical power, establishing the remote shutdown panel, and establishing decay heat removal.

Specific procedures reviewed for alternative shutdown, including shutdown from outside the control room included the following:

- S1.OP-AB.CR-0002(Q), Control Room Evacuation Due To Fire In The Control Room, Relay Room, 460/230V Switchgear Room, or 4KV Switchgear Room;
- S2.OP-AB.CR-0002(Q), Control Room Evacuation Due To Fire In The Control Room, Relay Room, 460/230V Switchgear Room, or 4KV Switchgear Room;
- S1.OP-AB.FIRE-0001(Q), Control Room Fire Response;
- S2.OP-AB.FIRE-0001(Q), Control Room Fire Response;
- S1.OP-AB.FIRE-0002(Q), Fire Damage Mitigation;
- S2.OP-AB.FIRE-0002(Q), Fire Damage Mitigation;
- SC.MD-AB.ZZ-0001(Q), Installation Of Temporary 4KV Power Cables to CCW and RHR Motors.

The team reviewed manual actions to ensure that they had been properly reviewed and approved and that the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each fire

area. The team also reviewed the periodic testing of the alternative shutdown transfer capability and instrumentation and control functions to ensure the tests are adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

Introduction. The team identified an unresolved item concerning the ability of operators to perform the activities specified in alternate safe shutdown procedure S1.OP-AB.CR-0002(Q) Revision 18, and S2.OP-AB.CR-0002(Q) Revision 21, "Control Room Evacuation Due To Fire In The Control Room, Relay Room, 460/230V Switchgear Room, or 4KV Switchgear Room." Specifically, the procedure requires operators to enter the Turbine-Driven Auxiliary Feed Pump (TDAFP) Enclosure and the Outer Piping Penetration Area (OPPA) to perform manual actions during post-fire alternate shutdown (ASD). Environmental conditions due to losses of air-conditioning and steam flow through piping in these areas may cause temperatures to rise such that personnel would not be able to either enter or stay in the area to perform required tasks. This issue will remain unresolved pending further NRC review of temperature modeling of the areas under consideration and analysis of the results.

Description. Following review and walkdown of Attachments 4,5,7 and 9 of S2.OP-AB.CR-0002(Q) Revision 21, the team noted the following:

1) Attachment 7, actions for the #2 Nuclear Equipment Operator (NEO) require the operator to enter the Outer Piping Penetration Area (OPPA) to manually close two main steam power operated relief valves (22/24 MS10) and two Main Steam Isolation Valve (MSIV) bypass valves (22/24 MS 18). The Operator then stays in the area, maintaining communications with the Control Room Supervisor via sound-powered phones.

2) Attachment 5, actions for the Plant Operator (PO) require the operator to enter the Turbine-Driven Auxiliary Feed Pump (TDAFP) Enclosure to manually control the Steam Generator Auxiliary Feedwater Inlet Valves. The procedure then requires the operator to "Adjust AF11 valves to maintain all Steam Generator levels between 15% and 33% narrow range..." which may require the operator to enter the enclosure as necessary to maintain these levels.

After performing the walkdowns of the areas, the team questioned whether habitability concerns were accounted for during the development of the procedures, or if any studies were performed to determine temperature levels in the areas of concern during alternate shutdown conditions. The team was provided with Calculation S-C-AUX-MDC00737, Loss of Ventilation During Station Blackout, Revision 2, which indicated that during certain conditions, temperature in the TDAFP enclosure could reach temperatures between 177 EF and 256 EF. Additionally, the report indicated that the OPPA temperature could reach 211.5 EF. The licensee stated that the calculations were performed for a Station Blackout (SBO) condition, but conceded that enough similarities between the SBO and ASD scenarios existed to warrant further evaluation.

The team's review of Calculation S-C-ABV-MEE-1472, Revision 0, Effect of the Loss of Auxiliary Building Ventilation on Appendix R Safe Shutdown Electrical Equipment and the Heat Stress Effect on the Capability to Perform Manual Actions, indicated that the temperature in the TDAFP enclosure could reach 149 degrees with the door closed. This document continues to state "no manual actions are required to be performed inside of this room." The team's walkdown of Attachment 5 to Procedure S2.OP-AB.CR-0002(Q), Revision 21, indicates this to be an incorrect assumption.

While the licensee has procedures to evaluate stay times for heat stress concerns as described in NC.IS-TM.ZZ-0001(Z), Revision 8, Nuclear Department Safety Manual, it appears that the ASD procedures were not evaluated for heat stress concerns during operator manual actions.

The team concluded that the identified issue concerning potential effects of temperature on personnel ability to perform alternate safe shutdown is an unresolved item pending further NRC review of licensee's corrective actions. (**URI 05000272/2006007-01, 05000311/2006007-01, Temperature Habitability Effects on the Ability to Perform Alternate Shut Down Manual Actions)**

.02 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the fire hazards analysis, safe shutdown analyses and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected. The team ensured that separation requirements of Section III.G of 10 CFR 50, Appendix R were maintained for the credited safe shutdown equipment and their supporting power, control and instrumentation cables. This review included an assessment of the adequacy of the selected systems for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and associated support system functions.

The team reviewed PSEG's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the Fire Hazard Analysis (FHA). A sample of hot work and transient combustible control permits were also reviewed. The team performed plant walkdowns to verify that protective features were being properly maintained and administrative controls were being implemented.

The team also reviewed PSEG's design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the fire protection program and/or post-fire safe shutdown analysis and procedures.

b. Findings

Introduction. The team identified an unresolved item concerning the adequacy of Evaluation S-CAV-C-MDC-1583, Revision 4, Salem Generating Station - Compensatory Actions for Appendix R & IEEE Loss of Ventilation Scenarios. Specifically, the evaluation considers compensatory actions taken for a loss of air conditioning to the Control Area Relay Room (CARR) and subsequent heat up. This issue remains unresolved pending further NRC review of licensee's calculations of the temperature profile in the area under consideration, and the analysis of the results.

Description. Following review of Procedures S2.OP-SO.CAV-0001(Q), Revision 34, and S1.OP-SO.CAV-0001(Q), Revision 31, Control Room Area Ventilation Operation, Procedure S1.OP-AB.CAV-0001(Q), Revision 1, Loss of Unit 1 Control Area HVAC, and a walkdown of the Units 1 and 2 CARR areas, the team questioned if the actions taken for a loss of area HVAC (heating, ventilating, and air conditioning) would allow enough cooling to maintain the temperature-sensitive safety equipment at or below levels which would cause the equipment to be inoperable.

The two CARRs are separated by a common corridor. Procedure S1.OP-AB.CAV-0001(Q), Revision 1, calls for fire doors 102-1 (a single door between Unit 1 CARR and the corridor) and 102-2 (between Unit 2 CARR and the corridor) to be opened within 10 minutes of loss of HVAC, and fire doors 107-1 (a double door between Unit 1 CARR and the corridor) and 107-2 (between Unit 2 CARR and the corridor) to be opened at the 2-hour point. Opening of these doors would allow the cool air from the CARR of the unaffected Unit to cool, through the corridor, the components in the CARR of the affected Unit.

Evaluation S-C-CAV-MDC-1583, Revision 4, uses a computer based temperature model to determine the temperature profiles in the affected CARR following the loss of HVAC scenarios. The evaluation calculates an average or 'bulk temperature' for the room without considering the following:

1) Important electrical equipment required for safe shutdown and their operable temperature ranges,
2) Ventilation flow paths and cooling-air movement mechanisms in the CARR,
3) Locations of these safe shutdown equipment with regards to ventilation flows,
4) Flow restrictions (due to various electrical cabinets) throughout the CARR,
5) Localized temperatures in the areas where the important safe shutdown equipment are mounted.

After discussing the concerns with licensee system engineers, it was determined that the evaluation needed to be revised to address the team's concerns. The licensee has agreed to revise the analysis to more accurately model the conditions in the CARRs during this scenario and reassess the procedures based on the new computer model.

To ensure that the localized temperature does not exceed the operable temperature range of the safe shutdown equipment, the team concluded that the identified issue is an unresolved item (URI) pending further NRC review of licensee's revised calculation. (**URI 05000272/2006007-02, 05000311/2006007-02, Localized Temperatures in the CARR Not to Exceed Safe Shutdown Equipment Operable Temperature During a Loss of HVAC Event)**

.03 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries (including walls, fire doors and fire dampers) to ensure they were appropriate for the fire hazards in the area. The team reviewed installation/repair and qualification records for a sample of penetration seals to ensure the fill material was of the appropriate fire rating and that the installation met the engineering design.

b. Findings

No findings of significance were identified.

.04 Active Fire Protection

a. Inspection Scope

The team reviewed the design, maintenance, testing and operation of the fire detection and suppression systems in the selected plant fire areas. This included verification that the manual and automatic detection and suppression systems were installed, tested and maintained in accordance with the National Fire Protection Association (NFPA) code of record, or as NRC approved deviations, and that they would control and/or extinguish fires associated with the hazards in the selected areas. A review of the design capability of suppression agent delivery systems was verified to meet the code requirements for the fire hazards involved. The team also performed a walkdown of accessible portions of the detection and suppressions systems in the selected areas as well as a walkdown of major system support equipment in other areas (e.g., fire protection pumps, Carbon Dioxide ($CO_2$) storage tanks and supply system) and assess the material condition of the systems and components.

The team reviewed electric and diesel fire pump flow and pressure tests to ensure that the pumps were meeting their design requirements. The team also reviewed the fire main loop flow tests to ensure that the flow distribution circuits were able to meet the design requirements.

The team also assessed the fire brigade capabilities by reviewing training and qualification records, and drill critique records. The team also reviewed pre-fire plans and smoke removal plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown. In addition, the team inspected the fire brigade's protective ensembles, self-contained breathing apparatus (SCBA), and various fire brigade equipment (including smoke removal equipment) to determine operational readiness for fire fighting.

b. Findings

No findings of significance were identified.

.05 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

The team performed document reviews and plant walkdowns to verify that redundant trains of systems required for hot shutdown are not subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the team verified that:

- A fire in one of the selected fire areas would not directly, through production of smoke, heat or hot gases, cause activation of suppression systems that could potentially damage all redundant trains.
- A fire in one of the selected fire areas (or the inadvertent actuation or rupture of a fire suppression system) would not directly cause damage to all redundant trains (e.g., sprinkler caused flooding of other than the locally affected train).
- Adequate drainage is provided in areas protected by water suppression systems.

b. Findings

No findings of significance were identified.

.06 Alternative Shutdown Capability

a. Inspection Scope

Alternative shutdown capability for the areas selected for inspection utilizes shutdown from outside the control room and is discussed in Section 1R05.01 of this report.

.07 Circuit Analyses

a. Inspection Scope

The team verified that the licensee performed a post-fire safe shutdown analysis for the selected fire areas and that the analysis appropriately identified the structures, systems and components important to achieving and maintaining post-fire safe shutdown. Additionally, the team verified that PSEG's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts, shorts to ground or other failures were identified, evaluated and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The team's review considered fire and cable attributes, potential undesirable consequences and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, spurious actuations, actuations resulting in flow diversion or loss of coolant events.
The team also reviewed wiring diagrams and routing lists for a sample of components required for post-fire safe shutdown to verify that cables were routed as described in the cable routing matrices.

Cable failure modes were reviewed for the following components:

- Emergency Diesel Generators 1B and 2B,
- Pressurizer Power Relief Valves 1PR 6 and 1PR 7
- Volume Control Tank First Discharge Stop Valve 1CV 40
- Pressurizer Level Instruments 1LT 460 B,
- Pressurizer Pressure Instruments 1PT 1648,
- Steam Generator Level Instruments (narrow range) 1LT 1640,
- Steam Generator Pressure Instruments 1PT 1644.

The team reviewed circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination. The team confirmed that coordination studies had addressed multiple faults due to fire. Additionally, the team reviewed a sample of circuit breaker maintenance and records to verify that circuit breakers for components required for post-fire safe shutdown were properly maintained in accordance with procedural requirements.

b. Findings

No findings of significance were identified.

.08 Communications

a. Inspection Scope

The team reviewed safe shutdown procedures, the post-fire safe shutdown analysis and associated documents to verify an adequate method of communications would be available to plant operators following a fire. During this review, the team considered the effects of ambient noise levels, clarity of reception, reliability and coverage patterns. The team also inspected the designated emergency storage lockers to verify the availability of portable radios for the fire brigade. The team verified that communications equipment such as repeaters, transmitters, etc. would not be affected by a fire.

b. Findings

No findings of significance were identified.

.09 Emergency Lighting

a. Inspection Scope

The team observed the placement and coverage area of eight-hour emergency lights, and in specified locations permanent essential lighting, throughout the selected fire areas to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation and/or instrumentation monitoring for post-fire safe shutdown. The team also verified that the battery power supplies were rated for at least an 8-hour capacity. Preventive maintenance procedures and various documents, including the completed surveillance tests were reviewed to ensure adequate surveillance testing and periodic battery replacements were in place to ensure reliable operation of the eight-hour emergency lights and that the emergency lighting units were being maintained consistent with the manufacturer's recommendations and accepted industry practices.

b. Findings

No findings of significance were identified.

.10 Cold Shutdown Repairs

a. Inspection Scope

The team verified that PSEG had dedicated repair procedures, equipment, and materials to accomplish repairs of components required for cold shutdown, within the time frames specified in their design and licensing bases. The team verified that the repair equipment, components, tools and materials (e.g., precut cables with prepared attachment lugs) were available and accessible onsite.

b. Findings

Introduction. The team identified a Green NCV regarding the maintaining of repair components necessary to achieve Cold Shutdown in a specified location as required by the station procedure for installing temporary power cables to the component cooling water (CCW) and residual heat removal (RHR) pump motors.

Description. While conducting an inspection of the alternate and safe shutdown procedures, the team requested an inventory the Salem Safe Shutdown Equipment Storage Area described in procedure SC.MD-AB.ZZ-0001 (Q) Installation of Temporary 4KV Power Cables to CCW and RHR Motors. In response to this request, the licensee conducted a preliminary inspection of the storage area and concluded that substantial repair equipment was missing. A notification was prepared, and the inventory list from Procedure SC.MD-AB.ZZ-0001 (Q) was compared to the library copy of the inventory to verify accuracy. While there were some minor discrepancies between the administrative equipment lists, in either case a significant portion of the required equipment was missing. The licensee generated a notification and restocked the missing repair materials.

Per Salem USFAR, Salem is committed to 10 CFR 50 Appendix R section III.G.1b which states: "Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours." To meet this requirement, the licensee developed a procedure (SC.MD-AB.ZZ-0001 (Q)) to provide power to the Unit 1 or 2 Residual Heat Removal (RHR) pumps and/or the Component Cooling Water (CCW) pumps via electrical jumpers from the other Unit should a fire in the 4kV power supplies disable this equipment. The procedure specifies that "All equipment required to install jumpers, cooling fans and make cable terminations are located in the Salem Safe Shutdown Equipment Storage Area. Salem Safe Shutdown Equipment Storage Area is located in the Northwest area of Hope Creek Unit 2 reactor building 102' elevation." Contrary to this procedure, on March 30, 2006, not all equipment required to install jumpers was found in this specified area. As described in notification 20277307, the following equipment was missing:

SC.MD-AB.ZZ-0001 Inventory

- 3/C-2/0 AWG cable in 85', 125' and 170' lengths (1 each required, all present but improperly labeled.)
- Cable Reel Strands (none found)
- Raychem Kits (9 required, 5 found)
- Electrical insulating tape (none found)
- Electrical rubber tape (none found)
- A50H119 electrical putty (none found)
- D50H109 contact compound (none found)
- Storage bags and tags (none found)
- Socket Wrench (none found)
- Safety Flags (none found)

- Cords for cooling fans (none found)
- Heat gun (none found)

Library Inventory

- 1/4" Silicone Bronze flat Washers (18 required, 18 missing)
- Wire Markers #1 black on White Backgroung (50 required, 50 missing)
- Wire Markers #2 black on White Backgroung (50 required, 50 missing)
- Wire Markers #3 black on White Backgroung (50 required, 50 missing)
- Vinyl insulated ring terminal lugs 1/4 bolt, 10-12 gauge wire (50 required, 50 missing)
- Raychem high Voltage Termination Kits (18 required, 18 missing)
- Raychem heat Shrink Tubes 6" long x .25 I.D. (50 required, 50 missing)
- #14 Cable ties (500 required, 300 missing)
- ½" ASTM 562 nuts (20 required, 20 found, but of ASTM 563 vice the required 562)
- 3/8 -16 ASTM 563 nuts (20 required, none found)
- 3/8 - 16 x 1" ASTM 307 Hex Head bolts (20 required, 20 missing)
- 3/C-2/0 Triplex cable in 85', 125' and 200' lengths (1 each required, all present but improperly labeled.)

The team conducted a walkdown of the designated storage area, and noted that the area was locked, and a sign was posted designating the equipment in the area was exclusively for use during Salem Appendix R emergencies. The team also reviewed the results of one previous surveillance and two notifications (20158400 dated September 11, 2003, and 20228300 dated March 6, 2005) and noted that cold shutdown repair materials were missing in both of the previous inventories. Although the licensee subsequently restocked all missing items, they failed to take an effective corrective action to prevent a repeated recurrence (three consecutive deficient conditions).

Analysis. The ability to perform repairs to equipment required to achieve and maintain cold shutdown is vital to ensuring that the safety risks due to fire in a nuclear facility are not exacerbated by the inability to achieve a stable condition following the extinguishing of the fire.

The finding described above is more than minor because it is associated with the Mitigating Systems cornerstone attribute of configuration control in that a substantial portion of the equipment required to be available to repair mitigating systems was not in its designated location. While all equipment was eventually found on site, the significant amount of time (60 hours) required to locate the equipment exceeded the administrative control limit of 30 hours as delineated in SH.OP-AP.ZZ-0108(Q) Post-Fire Safe Shutdown Equipment – Administrative Controls, Attachment 11, Section 1.4 which states: "The Electrical system Cross-Connect capability should be AVAILABLE for alignment from the associated Unit to the opposite Unit within a 30-hour time period of a fire event…" Furthermore, the fact that the storage area is kept locked and specifically

posted as for use under specific circumstances indicates inadequate administrative policies and/or procedural adherence.

The finding was determined to be of very low safety significance (Green, as described below) because the likelihood of a scenario where a fire damages the equipment serviced by the repair equipment in the discussed storage area, is very low. Manual Chapter 0609 Appendix F, the Fire Protection Significance Determination Process (SDP), states if a finding only affects the ability to reach and maintain a cold-shutdown condition, the finding screens to Green with no further analysis required.

This finding is a performance deficiency and has a problem identification and resolution cross-cutting aspect because the licensee failed to take an effective corrective action to prevent recurrence after they identified cold shutdown repair materials were missing in March 2005.

Enforcement. License conditions 2.C.5 (for Unit 1) and 2.C.10 (for Unit 2) require that PSEG Nuclear implement and maintain in effect all provisions of the Fire Protection Program as described in the Updated Final Safety Analysis Report (UFSAR). Section 9.5.1.1.5 of the UFSAR identified that the Quality Assurance (QA) Program for Fire Protection assures that the requirements for administrative controls for the fire protection program for safety related areas must be satisfied. This section of the UFSAR also identified the fire protection procedures to be an element of the QA program. Section 4.0 of Salem fire protection procedure for post-fire cold shutdown repair, SC.MD-AB.ZZ-0001(Q), states, "All equipment required to install jumpers, cooling fans and make cable terminations are located in the Salem Safe Shutdown Equipment Storage Area." Contrary to the above, on March 30, 2006, the NRC identified that many of the materials required for cold shutdown repair were missing. The licensee issued a notification 20277307 and entered this deficiency into their corrective action program. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000272/2006007-03, 05000311/2006007-03, Failure to Comply with Station Cold Shutdown Repair Procedures)**

.11 Compensatory Measures

a. Inspection Scope

The team verified that compensatory measures were in place for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems and equipment, passive fire barriers, pumps, valves or electrical devices providing safe shutdown functions or capabilities). The team also verified that the short term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that PSEG was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems

.01 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team verified that the licensee was identifying fire protection and post-fire safe shutdown issues at an appropriate threshold and entering them into the corrective action program. The team also reviewed a sample of selected issues to verify that the licensee had taken or planned appropriate corrective actions.

b. Findings

No findings of significance were identified.

4OA5 Other Activities

.1 (Closed) URI 05000272,05000311/200500311 $CO_2$ Migration on Remote Shutdown Operations.

In January 2005, PSEG determined through preliminary results of an engineering assessment that upon discharge of carbon dioxide ($CO_2$) in some areas of the plant due to fire, hazardous levels of $CO_2$ concentration could exist in areas required to be accessible during safe shutdown events. On April 25, 2005, the licensee reported though revision 1 to the Licensee Event Report (LER) 2005-001 that the cause of the carbon dioxide system migration was due to insufficient system design. This issue remained unresolved pending further analysis of the condition and followup inspection to assess the significance of the condition and the adequacy of licensee's associated corrective actions.

In June 2005, PSEG completed the root cause evaluation on the timeliness of corrective actions for the $CO_2$ migration issue documented in notification 20223951. The team reviewed PSEG's root cause evaluation and noted that the evaluation had determined PSEG's failure to identify and to rectify the $CO_2$ migration issue in a timely manner was a condition adverse to quality.

During this inspection, the team reviewed and discussed the engineering assessment results with the licensee. The results from Framatone engineering assessment concluded that in the event of a $CO_2$ system actuation due to a fire in the 4160 volt or 460 volt Switchgear Rooms, or Lower Electrical Penetration Areas, $CO_2$ migration would

result in some of the adjacent areas having concentration levels that would require the use of self-contained breathing apparatus (SCBAs) for entry or would be restricted to transit activities only. On January 26, 2005, PSEG isolated the carbon dioxide suppression systems for Salem Units 1 and 2, and placed appropriate compensatory measures in accordance with the Salem Fire Protection Program. The team evaluated PSEG's long-term resolution strategy, which included eliminating $CO_2$ in these fire areas and converting to either an alternate, non-hazardous gaseous system or a water based suppression system. On March 10, 2006, PSEG's Plant Health Committee (PHC) approved the recommendation to initiate a project to complete conceptual designs, material estimates, and implementation of replacing the existing $CO_2$ fire suppression system with an interlocked preaction water suppression system. This unresolved item is closed. See Section 4OA7 of this report for the detailed risk assessment of this licensee identified finding.

.2 (Closed) URI 05000272,05000311/2003002-01 Fire Induced Spurious Opening of MS10 Valves

Inspection Report 05000272,311/2003002 documented a potential finding that for three fire areas (inner piping penetration area, outer penetration area, and 1(2)FA-TGA-88in the turbine building), the licensee has not protected a full train of equipment necessary to achieve and maintain hot shutdown. For each unit, there are four steam generator power operated relief valves (MS10), which discharge the steam to the atmosphere when open. These are 6" air operated valves which fail close when the pilot solenoid valves are de-energized or when the instrument air is lost. The control circuit for each solenoid valve is located in an instrument panel and a fire-induced hot short can cause the solenoid valve to be energized and the associated MS10 valve to open inadvertently. The pilot solenoid valves for two MS10 valves are located in one fire area, but the panels are separated by 12 feet.

The licensee completed an analysis, S-C-MS-MEE-1533, Loss of Main Steam Isolation Components due to an Appendix R Fire in 1(2)FA-PP-92K or 1(2)FA-PP-1000H to evaluate two concerns: 1) reactivity addition due to excessive cool down rate, and, 2) maintaining heat sink available. The analysis showed that with one MS10 valve inadvertently open, the initial steam flow rate (575,710 lbm/hr for a short duration) is within the analyzed condition (1,100.000 lbm/hr in USFAR Section 15.2.13). If two MS10s open simultaneously (beginning at the same moment), the excess cool down rate will be slightly outside the analyzed condition. The licensee stated that multiple spurious actuations (hot shorts) were outside their licensing basis. The above analysis also showed that maintaining heat sink was acceptable as the other two MS10 valves (in another fire area) were not affected. However, the affected MS10 valves must be closed manually to prevent steam generators from boiling dry. The licensee incorporated manual actions to close the potentially affected MS10 valves if a fire occurs in the identified fire areas. The licensee also completed another analysis, S-C-FP-FEE-1746, Acceptable Response Times to Appendix R Failures, which showed that (in Table 4), for the spurious opening of a single MS10, the cool down rate for the first hour is 79.2 EF, which is also within the allowed cooling rate of 100 EF per hour.

Salem's licensing basis only assumes a single fire-induced spurious action, and the inadvertent opening of a single MS 10 valve was determined to be within the analyzed condition. Therefore this unresolved item is closed.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. T. Joyce, Vice President, and other members of the site staff at an initial meeting on March 31, 2006, and a telephone conference call exit meeting to update the initial findings on April 10, 2006. No proprietary information was included in this inspection report.

4OA7 Licensee-Identified Violation

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meet the criteria of Section VI of the Enforcement Policy, NUREG-1600, for being dispositioned as NCVs.

•. License conditions 2.C.5 (for Unit 1) and 2.C.10 (for Unit 2) require that PSEG Nuclear implement and maintain in effect all provisions of the Fire Protection Program as described in the Updated Final Safety Analysis Report (UFSAR). UFSAR Section 9.5.1.1.5 requires corrective action measures to be established to ensure that conditions adverse to fire protection are promptly identified, reported, and corrected. Contrary to the above, as of January 25, 2005, PSEG failed to promptly identify, report and correct the $CO_2$ migration issue, although PSEG had received the final calculation from Framatome on December 3, 2003, which showed that the potential $CO_2$ leakage to the work control area (next to the control room) could reach an unacceptable level (up to 12.6% $CO_2$ concentration). The $CO_2$ migration issue is a condition adverse to fire protection. PSEG documented this issue in LER 2005-001 and in Notification 20223951.

This finding is more than minor because it had a potential to impact the ability to safely shutdown Salem Unit 1 and 2 in the event of fire in the 4160 volt and 460 volt Switchgear Rooms. The finding affects the Mitigating Systems Cornerstone and was evaluated using Inspection Manual Chapter (IMC) 0609, Appendix F, and was determined to represent a potential fire protection risk of very low safety significance (green). The Phase 2 risk assessment result by the NRC inspectors was formulated using conservative assumption. Based upon the limitation of Appendix F in characterizing the risk of fire scenarios impacting the control room and potentially resulting in a control room evacuation, the licensee performed a more detailed Phase 3 risk assessment. The licensee's detailed analysis confirmed the inspectors' Phase 2 result. This analysis was independently reviewed by the Region I Senior Reactor Analyst who agreed with the methodology and resulting characterization.

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

PSEG Personnel

J. Balcita, Engineer, Design Engineering
D. Benyak, Director, Regulatory Assurance
W. Buirch, Supt, Fire Protection Operations
M. Ewirtz, DPS Support Manager, Salem Operations
A. Fakhar, Senior Manager, Design Engineering
C. Fricker, Plant Manager, Salem
T. Joyce, Site Vice President, Salem
S. Mannon, Manager Regulatory Assurance
K. Mathur, Engineer, Mechanical Design Engineering
W. Mattinely, Manager, Salem Nuclear Oversight
M. Mog, Shift Supervisor, Salem Operation
T. Moore, director, Project Management
A. Robert III, Manager, Engineering Program
S. Robitzski, Director, Engineering
D. Shumaker, Engineer, Program Engineering
J. Stone, Director, Salem Maintenance
R. Wegner, Director, Salem Work Management
J. Wearne, Engineer, Salem Licensing

Exelon Corporation

W. Lewis, Manager, Engineering
C. Pragman, Manager, Corporate Fire Protection Program

New Jersey Department of Environmental Protection

E. Rosenfeld, Engineer

NRC

D. Orr, Senior Resident Inspector, Salem Units 1 and 2
J. Rogge, Chief, Engineering Branch 3, Division of Reactor Safety

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 05000272, 05000311/2006007-01 | URI | Temperature Habitability Effects on the Ability to Perform Alternate Shut Down Manual Actions |
| 05000272,05000311/2006007-02 | URI | Localized Temperatures in the CARR Not to Exceed Safe Shutdown Equipment Operable Temperature During a Loss of HVAC Event |

Open and Closed

| | | |
|---|---|---|
| 05000272, 05000311/2006007-03 | NCV | Failure to Comply with Station Cold Shutdown Repair Procedures (Section 1R05) |

Closed

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|---|---|---|
| 05000272,05000311/2005003-11 | URI | CO2 Migration on Remote Shutdown Operations |
| 05000272,05000311/2003002-01 | URI | Fire Induced Spurious Opening of MS10 Valves |

Discussed

None

## LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing Documents

- Amendment No. 2 to Facility Operating License No. DPR-70. NRC letter dated 11/20/79 to Mr. P. Librizzi, General Manager
- June 17, 1983, Letter to PSE&G, Salem Nuclear Generating Station, Unit No. 1, Fire Protection – Request for Exemption from Requirements of Appendix R to 10 CFR 50, Section III.G
- July 15, 1988, Letter to NRC, Revised Exemption Requests Fire Protection – 10 CFR Appendix R, Salem Generating Station Unit Nos. 1 and 2
- July 20, 1989, Letter to PSE&G, Exemption from the Requirements of 10 CFR 50, Appendix R (Fire Protection)
- June 24, 2003, Letter to PSE&G, Salem Nuclear Generating Station, Unit Nos. 1 and 2, Exemption from the Requirements of 10 CFR 50, Appendix R, Sections III.G.3 and III.L.3, for Fire Areas 1(2)FA-AB-64B, 1(2)FA-AB-84B and 1(2)FA-AB-84C
- January 7, 2004, Letter to PSE&G, Salem Nuclear Generating Station, Unit No. 2, Issuance of Amendment Re: Request for Changes to License Conditions 2.C.(10)
- Safety Evaluation Report, Exemptions from 10 CFR 50, Appendix R, Salem Generating Station, Units 1 and 2, response to letter dtd 07/15/88
- Information Notice 2002-24, Potential Problems with Heat Collectors on Fire Protection Sprinklers, 07/19/02

Calculations/Engineering Evaluation Reports

| | |
|---|---|
| S-C-CAV-MDC-1583 | Salem Generating Station – Compensatory Actions for Appendix R & IEEE Loss of Ventilation Scenarios, Revision 4. |
| S-O-FP-MEE-0756 | Salem Generating Station, Units 1 & 2 Fire Pump Piping (As-Built) Configuration Justification, Revision 3 |
| S-C-FBW-FEE-1609 | Evaluation of the Fire Resistance Capability of Ventilation Configuration in 3 Hour Structural Barriers, Revision 0 |
| S-C-FP-FEE-1663 | Fire Suppression System Performance Capability Evaluation - 1(2)FA-AB-84B, Revision 1 |
| S-C-FP-FEE-1659 | Evaluation of Fire Detection System Capabilities - Fire Area 1(2)FA-AB-84B (SGS), Revision 0 |
| S-C-FP-FEE-1667 | Generic Letter 86.10 Engineering Evaluation for Fire Area 1(2)FA-AB-84B, demonstrating adequate separation exists between "A", "B", & "C" Service Water Channels Revision 0 |
| S-C-FP-FEE-1746 | Acceptable Operator Response Times to Appendix R Failures, Revision 0 |
| S-C-FP-FEE-1748 | CO2 System Operability in Switchgear Rooms and Lower Electrical Penetration Areas, Revision 0 |
| S-C-FP-FEE-1802 | CO2 Migration Evaluation for SPAV Areas, Revision 0 |

| | |
|---|---|
| S-C-FBR-ZZEE-0317 | Design Requirements for Concrete and Grout Seal Details, Rev.1 |
| S-1-FBR-SEE-0284 | Compatibility of Dow Corning 3-6548 Silicone RTV Foam, BISCO SF-20, Semco PR-855, and BISCO SE-Foam, Revision 0 |
| S-C-FBR-SEE-0907 | 1-Hour 3M E-50 Series Fire Wrap Systems on Ventilation Ductwork, Revision 2 |
| S-C-FBR-SEE-0951 | 3-Hour 3M E-50 Series Fire Wrap Systems on Ventilation Ductwork, Revision 0 |
| BISCO Test Report 748-134 | Utilizing BISCO SF-20 and BISCO SE-Foam 05/14/84 |
| S-C-ZZ-NEE-0839 | Time Analysis for Alternative Shutdown Capability for an Appendix R Fire Scenario, Revision 1 |
| S-C-AUX-MDC-0737 | Loss of Ventilation During Station Blackout, Revision 2 |
| ES-44.018 | Salem units 1 & 2 Electrical Coordination for Appendix R Applications |
| DE-PS.ZZ-00001(Q) -A3-SSAR (003) | Safe Shutdown Manual Action Feasibility Assessment, Revision 1 |

Procedures

| | |
|---|---|
| NC.DE-PS.ZZ-0001(Q)-A2-GEN | Fire Hazard Analysis and Fire Protection Drawings, Rev.2 |
| NC.DE-PS.ZZ-0001(Q)-A6-GEN | Salem Fire Protection Report - General, Rev.2 |
| NC.NA-AP.ZZ-0025(Q) | Operational Fire Protection Program, Rev.6 |
| NC.FP-AP.ZZ-0020(Q) | Compensatory Measures Fire Watch Program, Rev.1 |
| NC.FP-AP.ZZ-0025(Q) | Precautions Against Fire, Rev.4 |
| NC.FP-AP.ZZ-0005(Q) | Fire Protection Surveillance and Periodic Test Program, Rev.11 |
| NC.FP-AP.ZZ-0010(Q) | Fire Protection Impairment Program, Rev.6 |
| NC.FP-AP.ZZ-0012(Q) | Safe Performance of Hot Work, Rev.1 |
| SC.FP-AP.ZZ-0003(Q) | Actions for Inoperable Fire Protection - Salem Station, Rev.11 |
| SC.SS-ST.FP-0003(Q) | Diesel Fire Pump and SBO Air Compressor Batteries Surveillance Testing and Preventive Maintenance, Rev.6 |
| SC.OP-ST.CAV-0002(Q) | Control Room Emergency Air Conditioning System, Rev. 2 |
| SC.MD-AB.ZZ-0001(Q) | Installation of Temporary 4KV Power Cables to CCW and RHR Motors, Rev 1 |
| S1.OP-AB.FIRE-0001(Q) | Control Room Fire Response, Rev.1 |
| S2.OP-AB.FIRE-0001(Q) | Control Room Fire Response, Rev.2 |
| S1.OP-AB.CR-0002(Q) | Control Room Evacuation Due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4KV Switchgear Room, Rev.18 |
| S2.OP-AB.CR-0002(Q) | Control Room Evacuation Due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4KV Switchgear Room, Rev.21 |
| S2.OP.CAV-0001(Q) | Control Area Ventilation Operation, Rev 34 |

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|---|---|
| S1.OP-SO.CAV-0001(Q) | Control Area Ventilation Operation, Rev 31 |
| S2.OP-PT.HSD-0003 (Q) | Alternate shutdown and Appendix "R" Equipment Storage Cabinet Inventory, Rev 8 |
| S1.OP.AB.CAV-0001(Q) | Loss of Unit 1 Control Area HVAC, Rev 1 |
| S2.OP.AB.CAV-0001(Q) | Loss of Unit 2 Control Area HVAC, Rev 1 |
| S2.OP.AB.115-0001(Q) | Loss of 2A 115 Vital Instrument Bus, Rev 14 |
| S2.OP-AB.CR-0002(Q) | Control Room Evacuation Due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4KVSwitchgear Room, Rev.21 |
| NC.FP-AP.ZZ-0009(Q) | Fire Protection Training Program, Rev.4 |

Completed Tests/Surveillances

| | |
|---|---|
| SC.SS-ST.FP-0003(Q) | Diesel Fire Pump and SBO Air Compressor Batteries Surveillance Testing and Preventive Maintenance, Rev.6, 03/14/06 |
| S1.FP-ST.FS-0016(Q) | Class 1 Pre-Action Sprinkler System Functional Test and Inspection, Rev.2, 03/06/04, 03/05/05, 01/28/06 |
| S2.FP-ST.FS-0016(Q) | Class 1 Pre-Action Sprinkler System Functional Test and Inspection, Rev.2, 03/05/03, 03/02/04, 03/05/05, 02/26/06 |
| S1.FP-ST.FS-0034(Q) | Charging/Safety Injection Pumps Area Wet Pipe Sprinkler System Functional Test and Inspection, Rev.1, 05/04/03, 07/02/04 |
| S2.FP-ST.FS-0034(Q) | Charging/Safety Injection Pumps Area Wet Pipe Sprinkler System Functional Test and Inspection, Rev.1, 02/01/04, 01/01/05, 01/28/06 |
| SC.FP-ST.FS-0007(Q) | Non-Class I Fire Water System's Valve Cycling, Rev.4, 09/04/03, 11/01/04, 10/03/05, 06/19/05 |
| SH.OP-AP.ZZ-0108(Q | Post-Fire Safe Shutdown Equipment – Administrative Controls, Rev. 21 |
| S1.FP-ST.FS-0009(Q) | #1 Diesel Fire Pump Operability Test, Rev.15, 01/05/06 |
| S2.FP-ST.FS-0009(Q) | #2 Diesel Fire Pump Operability Test, Rev.15, 12/29/05 |
| SC.FP-ST.FS-0004(Q) | Fire Suppression Water System Flush, Rev.2, 07/29/03, 07/24/04 |
| SC.FP-ST.FS-0006(Q) | Fire Pump Capacity Test, Rev.9, 06/02/02, 03/24/04, 09/24/05 |
| SC.FP-ST.FS-0008(Q) | Fire Main Flow Test, Rev.1, 08/24/02 |
| S1.FP-ST.FD-0030(Q) | Class I Smoke and Thermal Detector Circuit Operability Test, Rev.2, 11/26/05 |
| S2.FP-ST.FD-0030(Q) | Class I Smoke and Thermal Detector Circuit Operability Test, Rev.2, 11/28/04, 10/29/05 |
| S1.FP-ST.LTS-0039(Q) | "Appendix R" Self-Contained, Battery Powered Emergency Light Unit Test, Rev.12, 11/21/05, 11/25/05, 12/23/05 |
| S2.FP-ST.LTS-0039(Q) | "Appendix R" Self-Contained, Battery Powered Emergency Light Unit Test, Rev.10, 11/25/05, 11/28/05, 12/23/05 |

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| S1.FP-ST.LTS-0070(Q) | “Appendix R" Self-Contained, Battery Powered Emergency Lighting Unit 8 Hour Functional Test, Rev.5, 08/25/02, Rev.6, 03/02/04, 09/07/05 |
| S2.FP-ST.LTS-0070(Q) | “Appendix "R" Self-Contained, Battery Powered Emergency Lighting Unit 8 Hour Functional Test, Rev.4, 08/25/02, Rev.5, 02/23/04, 08/31/05 |
| S1.IC-SC.HSD-0006(Q) | Steam Generator Main Steam Pressure, Rev. 4, 02/14/05, 09/08/05 |
| S1.IC-SC.HSD-0006(Q | Steam Generator Main Steam Pressure, Rev. 6, 10/06/04 |
| S1.IC-SC.HSD-0011(Q) | 1LT-1649 Pressurizer Level, Rev. 4, 11/23/04 |
| S2.IC-SC.HSD-0002(Q) | Steam Generator Level, Rev. 7, 02/15/06 |
| S2.IC-SC.HSD-0006(Q) | Steam Generator Main Steam Pressure, Rev. 6, 02/23/05, 02/24/05 |
| S2.IC-SC.HSD-0010(Q) | 2PT-1648 Pressurizer Pressure, Rev. 4, 01/18/05 |
| SC.MD-ST.230-0001(Q) | 230 and 460 Volt ITE K-Series Breaker Overload Test, Rev. 16, 01/18/01 |
| SC.MD-ST.230-0002(Q) | 230 and 460 Volt ITE K-Series Breaker Solid State Overload Trip Device Test, Rev. 8, 06/10/02 |

Quality Assurance (QA) Audits and System Health Reports

Audit Report Fire Protection Program Audit, NOS Audit NOSA-SLM-05-10 (2005-0082), 09/19/05 - 09/23/05

80088423, NRC 2006 Triennial Fire Protection inspection Focused Area Self-Assessment Report, 2/13 - 2/17/06

Drawings

| | |
|---|---|
| 205328A8763,Sh.1-3 | Chemical and Volume Control Operation P&ID, Unit 2 |
| 203002A8789-34 | 4160V Vital Buses One Line, Unit 1 |
| 203003A8789-45 | 460V and 230V Vital and Nonvital Bus One Line Control |
| 211370A8859 - 40 | Unit 1 115V Control System One Line |
| 203007A8798 - 28 | Unit 1 125 VDC One Line |
| 219456A8933 - 30 | Units 1 & 2 Auxiliary Building El 84' Hot-Shutdown Panel |
| 217147A8943 - 11 | Units 1 & 2 Auxiliary Building Hot-Shutdown Station - Panel 213 |
| 205247A8761,Sh 1-3 | Unit 1 Reactor Containment and Penetration Area Control Air |
| 601241B9528 - 20 | Unit 1 Auxiliary Building Control Area 1A-230V Vital Bus One Line |
| 601232B9528 - 15 | Unit 1 Auxiliary Building Control Area 1B-230V Vital Bus One Line |
| 601243B9528 - 20 | Unit 1 Auxiliary Building Control Area 1C-230V Vital Bus One Line |
| 601526B9451 - 4 | Unit 1 Auxiliary Building El 84' Nuclear Instrumentation System Power and Source Range Monitors |

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|---|---|
| 205350-SIMP - 0 | ECCS - Simplified P&ID |
| 205201-Simp - 0 | Unit 1 Reactor Coolant Pressurizer & RPT |
| 205203A8760,Sh2&2 | Unit 1 Main, Reheat & Turbine By-pass Steam |
| 203828B9773,Sh1&2 | Unit 1 15 Service Water Pump 125V DC Schematic |
| 203834B9774,Sh1&2 | Unit 2 15 Service Water Pump 125V DC Schematic |
| 223684B9790,Sh1&2 | Unit 1 1B Diesel Generator Engine-Generator Control Schematic |
| 241106B9661 | Unit 1 Pressurizer Power Relief & Stop Valves 1PR1 and 1PR6 Schematic |
| 241107A9661 | Unit 1 Pressurizer Power Relief & Stop Valves 1PR1 and 1PR6 schematic |
| 242881B9678 | Unit 1 Pressurizer Power Relief & Stop Valves 1PR2 and 1PR7 Schematic |
| 242882A9678 | Unit 1 Pressurizer Power Relief & Stop Valves 1PR1 and 1PR6 Schematic |
| 211582B4025 Sh 1 | Unit 1 1CV40 Volume Control Tank First Discharge Valve Schematic |
| 247907B9707 - 6 | Hot Shutdown FPS PZR Pressure & Level Interconnection Diagram |
| 247905B9707 - 9 | Units 1 & 2, Hot Shutdown FPS Steam Generator Level Interconnections Wiring Diagram |
| 247905B9706 - 4 | Units 1 & 2, Hot Shutdown FPS Steam Generator Pressure Interconnections Wiring Diagram |
| 205248-A-8761 Sh.2, Rev.43 | Control Area Air Conditioning System Unit 1 |
| 205348-A-8763 Sh.2, Rev.34 | Control Area Air Conditioning System Unit 2 |
| 205222-A-8760 Sh.4, Rev.57 | Units 1 & 2 Fire Protection |
| 205222-A-8760 Sh.1, Rev.56 | Units 1 & 2 Fire Protection |
| 205222-A-8760 Sh.2, Rev.55 | Units 1 & 2 Fire Protection |
| 205222-A-8760 Sh.3, Rev.59 | Units 1 & 2 Fire Protection |
| 205222-A-8760 Sh.5, Rev.02 | Units 1 & 2 Fire Protection |
| 205222-A-8760 Sh.7, Rev.00 | Units 1 & 2 Fire Protection |
| 205222-A-8760 Sh.6, Rev.01 | Units 1 & 2 Fire Protection |

Penetration Seals

| | |
|---|---|
| Dwg 602535 Sh.1 | Unit 1 & 2 Common Seal Detail for Annular Reduction Utilizing Grout or Concrete, Rev.0 |
| Dwg 602535 Sh.2 | Unit 1 & 2 Common Seal Detail for Annular Reduction Utilizing Grout or Concrete, Rev.2 |
| Penetration Seal | N–25504-079 Database |
| Penetration Seal | S–15504-002 Database |
| SN-3 | SE-Foam with Cable Thru Fire and/or Pressure Barrier, Rev.4 |

Pre-Fire Plans

FRS-II-441 Salem Unit 1, Relay & Battery Rooms El.100', Rev.6
FRS-II-451 Salem Common Area, Control Area Access Corridor El.122' Rev.3
FRS-II-452 Salem Unit 1,(Unit 2), Control Room Area El.122', Rev.5
FRS-II-453 Auxiliary Building Ventilation Units El.122', Rev.2
FRS-II-432 Spent Fuel/Component Cooling Heat Exchanger & Pump Area El.84', Rev.3
FRS-II-433 Auxiliary Feed Water Pumps Area El.84', Rev.4
FRS-II-434 Charging Pump, Spray Additive Tank Area El.84', Rev.2
FRS-II-521 Inner Piping Penetration Area & Chiller Rooms el.100', Rev.3

Fire Brigade Documents

2006 Qualification Matrix - Fire Department
Fire Department Qualifications Training 2006
Unannounced Fire Drill 11/22/05
Unannounced Fire Drill 09/21/05
Announced Fire Drill 08/11/04
Announced Fire Drill 02/22/05
Announced Fire Drill 03/06/05
New Jersey Fire Fighter Training Lesson 11: Nozzles, Fire Streams, and Foam

Engineering Design Changes

DCR 1EC-0617, Fire Protection, 08/01/80
DCR 2EC-0619, Fire Protection, 07/01/80
80029403, SC-Cold Shutdown, Rev.2
80034844, S1-CO2 Cable Reroute, Rev.2

Hot Work and Ignition Source Permits

S06030902
S06030109
Hot Work Authorization Log

Transient Combustible Evaluations

STC-05-1FAAB84B-006 09/13/05
STC-05-2FAAB84C-003 09/13/05
STC-05-2FAAB84B-009 09/13/05
STC-06-12FAAB122A-003 02/27/06
STC-06-1FAEP100G-001 01/16/06

Condition Reports (Notifications)

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|---|---|---|---|---|---|
| 20158400 | 20225524 | 20225526 | 20228300 | 20234352 | 20252957 |
| 20257314 | 20269297 | 20270913 | 20273398 | 20275148 | 20275402 |
| 20275631 | 20275636 | 20275768 | 20275852 | 20277244 | 20277244 |
| 20277245 | 20277245 | 20277248 | 20277249 | 20277262 | 20277276 |
| 20277277 | 20277280 | 20277301 | 20277303 | 20277307 | 20277307 |
| 20277335 | 20277379 | 20277472 | 20273748* | 20275369* | 20275686* |
| 20275765* | 20275894* | 20275903* | 20275906* | 20275944* | 20275986* |
| 20276006* | 20276533* | 20277209* | 20277361* | 20277373* | 20277481* |
| 20277488* | 20277494* | 20277502* | 20277504* | 20277544* | |

Work Orders

| | |
|---|---|
| 30093280 | 18M Inventory Appendix R CSD Locker - 03/06/05 |
| 30120936 | 18M Inventory Appendix R CSD Locker - 03/28/06 |
| 30136590 | PM 7D CD: Fire Pump Diesel Batteries 03/14/06 Rev.0 |
| 60037929 | Red Ball Operators Faded, Replace - 07/11/03 |
| 60059822 | NRC – Stm Leak – 1HSE36 & Union/Perm RP - 03/06/06 |
| 60059608 | Heating Water Leak 2A EDG Room Heater - 03/06/06 |
| 70025026 | Ventilation Damper Leak - 5/18/02 |
| 70044438 | CO2 Hazard Potential - 12/29/05 |
| 70053399 | Evaluation of Gothic Temperature Model for CARR - 01/24/06 |
| 70054164 | Station Blackout Analysis Substantiation |
| 70048939 | Portable fans in U/1 P-250 Room |
| 70050146 | LTA Compliance W/ T-Mod Program |
| 70034817 | P250 Plant Computer Room High Temps |

Miscellaneous Documents

Fire Protection Impairments for Components Important to Safety Log
NFPA 25-02, Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
CHECK-IN Self Assessment Report dtd 03/12/06
Fire Damper 2CAF201 Database
Fire Damper 1CAF204 Database

| | |
|---|---|
| PSEG System Health Report - | Control Area Ventilation System, 4/1/05 to 6/30/06 |
| Update to Exemption Request - | Fire Protection, Appendix R Salem Generating Station Unit Nos. 50-272 and 50-311, 06/04/97 |

## LIST OF ACRONYMS USED

| | |
|---|---|
| AC | Alternating Current |
| ADAMS | Agency Documents Access & Management System |
| ASD | Alternate Shutdown |
| ASTM | American Society of Testing Materials |
| CARR | Control Area Relay Room |
| CCW | Component Cooling Water |
| CFR | Code of Federal Regulations |
| $CO_2$ | Carbon Dioxide |
| CSD | Cold Shutdown |
| DC | Direct Current |
| DRS | Division of Reactor Safety |
| FA | Fire Area |
| FHA | Fire Hazards Analysis |
| FHAR | Fire Hazards Analysis Report |
| FPP | Fire Protection Program |
| HVAC | Heating, Ventilating and Air Conditioning |
| IMC | Inspection Manual Chapter |
| IEEE | Institute of Electrical and Electronic Engineers |
| IPEEE | Individual Plant Examination of External Events |
| IR | Inspection Report |
| KV | Kilovolt |
| LER | Licensee Event Report |
| MSIV | Main Stem Isolation Valve |
| NCV | Non-cited Violation |
| NFPA | National Fire Protection Association |
| NRC | Nuclear Regulatory Commission |
| OPPA | Outer Piping Penetration Area |
| PAR | Publicly Available Records |
| PO | Plant Operator |
| P&ID | Piping and Instrumentation Drawing |
| QA | Quality Assurance |
| RHR | Residual Heat Removal |
| SBO | Station Blackout |
| SCBA | Self-Contained Breathing Apparatus |
| SDP | Significance Determination Process |
| TDAFP | Turbine Driven Auxiliary Feed Pump |
| UFSAR | Updated Final Safety Analysis Report |
| URI | Unresolved Item |
| V | Volt |
| WO | Work Order |