

March 24, 2009

Mr. Thomas P. Joyce
President and Chief Nuclear Officer
PSEG Nuclear LLC – N09
P.O. Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 - NRC
TRIENNIAL FIRE PROTECTION INSPECTION REPORT 05000272/2009006
and 05000311/2009006

Dear Mr. Joyce:

On February 13, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Salem Nuclear Generating Station, Unit Nos. 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on February 13, 2009, with Mr. Braun 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. 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 Title 10 of the Code of Federal Regulations Part 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 component of the NRC's document system (ADAMS).

T. Joyce

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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: Inspection Report No. 05000272/2009006 and 05000311/2009006
w/Attachment: Supplemental Information

T. Joyce

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T. Joyce

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cc w/encl:

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R. Braun, Site Vice President

P. Davison, Director of Nuclear Oversight

E. Johnson, Director of Finance

G. Gellrich, Salem Plant Manager

J. Keenan, Manager Licensing, PSEG

L. Peterson, Chief of Police and Emergency Management Coordinator

P. Baldauf, Assistant Director, NJ Radiation Protection Programs

P. Mulligan, Chief, NJ Bureau of Nuclear Engineering, DEP

H. Otto, Ph.D., Administrator, DE Interagency Programs, DNREC Div of Water Resources
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.: 05000272, 05000311

License Nos.: DPR-70, DPR-75

Report No.: 05000272/2009006 and 05000311/2009006

Licensee: PSEG Nuclear LLC (PSEG)

Facility: Salem Nuclear Generating Station, Unit Nos. 1 and 2

Location: P.O. Box 236
Hancocks Bridge, NJ 08038

Dates: January 26, 2009 through February 13, 2009

Inspectors: D. Orr, Senior Reactor Inspector, DRS
E. Huang, Reactor Inspector, DRS
M. Patel, Reactor Inspector, DRS

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

SUMMARY OF FINDINGS

IR 05000272/2009006; 05000311/2009006; 01/26/2009 - 02/13/2009; Salem Nuclear Generating Station, Unit Nos. 1 and 2; Triennial Fire Protection Team Inspection; Fire Protection.

This report covered a two-week triennial fire protection team inspection by 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," Rev. 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

Green. The team identified that PSEG failed to evaluate a single spurious operation of a safety injection signal during a main control room fire and its impact on the ability to achieve and maintain hot standby conditions. This finding was determined to be of very low safety significance (Green) and a NCV of the Salem Nuclear Generating Station, Unit Nos. 1 and 2 Operating License conditions 2.C.(5) and 2.C.(10) respectively, Fire Protection.

The team determined that this finding was more than minor because it was associated with the external factors attribute (fire) of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, PSEG did not ensure that post-fire operator manual actions subsequent to a single spurious operation of the safety injection signal during a main control room fire could be performed within sufficient time to achieve and maintain hot standby conditions. The team assessed this finding in accordance with NRC IMC 0609, Appendix F, Fire Protection Significance Determination Process (SDP). This finding affected the completeness of the post-fire safe shutdown analysis. This finding screened to very low safety significance (Green) in phase 1 of the SDP because it was assigned a low degradation rating. A low degradation rating was assigned because a technical evaluation of pressurizer level response to a spurious safety injection signal from a main control room fire concluded that pressurizer level would remain in the indicating range. The team determined that this finding had a cross cutting aspect in the area of problem identification and resolution because PSEG identified the issue on February 15, 2006 but never thoroughly evaluated the issue and its potential impact on the ability to achieve and maintain post-fire hot standby conditions. (P.1(c)) (Section 4OA2.01)

B. Licensee-Identified Violations

None.

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 Nuclear LLC (PSEG) 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, Unit Nos. 1 and 2 (Salem). The following fire areas and fire zones were selected for detailed review based on risk insights from the Salem Individual Plant Examination of External Events:

- 1(2)FA-AB-100A
- 1(2)FA-AB-64A
- 1(2)FA-AB-84A
- 1(2)FA-EP-78C

The inspection team evaluated PSEG's fire protection program (FPP) against applicable requirements which included plant technical specifications, OP-SA-108-115-1001, Operability Assessment and Equipment Control Program, Rev. 2, Operating License condition 2.C.5 and 2.C.10 for Unit Nos. 1 and 2 respectively, 10 CFR 50.48, and 10 CFR 50 Appendix R. The team also reviewed related documents that included NRC safety evaluation reports, Section 9.5.1 of the Updated Final Safety Analysis Report (UFSAR), the fire hazards analysis (FHA), and the post-fire safe shutdown analysis.

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

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (IP 71111.05T)

.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 instrumentations drawings, 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 FHA. 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 locations 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 alternating current (AC) electrical power, establishing the remote shutdown panel, establishing reactor coolant makeup, and establishing decay heat removal.

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

- S1(2).OP-AB.Fire-0001, Control Room Fire Response, Rev. 3(6)
- S1(2). OP-AB.CR-0002, Control Room Evacuation Due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4kV Switchgear Room, Rev. 23(26)

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 were adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

No findings of significance were identified.

Enclosure

.02 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, 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 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.

b. Findings

No findings of significance were identified.

.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), and electrical raceway fire barriers 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. The team also reviewed similar records for the fire protection wraps to ensure the material was of an 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 exemptions, and that each suppression system would control and/or extinguish fires associated with the hazards in the selected areas. A review of the design capability of the suppression agent delivery systems was verified to meet the code requirements for the hazards involved. The team also performed a walkdown of accessible portions of the detection and suppression systems in the selected areas as well as a walkdown of major system support equipment in other areas (e.g. fire pumps, storage tanks and supply system) to 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 assessed the fire brigade capabilities by reviewing training, qualification, 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 capability. In addition, the team inspected the 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 safe shutdown 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); and,
- 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 some of the areas selected for inspection utilizes shutdown from outside the control room and is discussed in section 1R05.01 of this report.

b. Findings

No findings of significance were identified.

.07 Circuit Analysis

a. Inspection Scope

The team verified that PSEG performed a post-fire safe shutdown analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the team verified that the 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, and actuations resulting in flow diversion or loss of coolant events.

The team also reviewed cable routing for a sample of components required for post-fire safe shutdown to verify that cable routing was consistent with the assumptions and conclusions of the safe shutdown analyses.

Cable failure modes were reviewed for the following components:

- 1CV68 & 1CV69, Charging Isolation Valves;
- 1CV2 & 1CV277, Normal Letdown Inboard and Outboard Isolation Valves;

- 1RC41 & 1RC42, Reactor Head Vent Valves;
- 2LT1641, Steam Generator 22 Level Instrument; and
- 2PT1648, Pressurizer Pressure Instrument.

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 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 FHA, 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 and for plant operators. The team also verified that communications equipment such as sound powered phone system cables, repeaters, and transmitters 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 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 eight-hour capacity. Preventive maintenance procedures, completed surveillance tests, and battery replacement practices were also reviewed to verify that the emergency lighting was being maintained in a manner that would ensure reliable operation.

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 which might be damaged by the fire to ensure cold shutdown could be achieved within the time frames specified in their design and licensing bases. The team verified that the repair equipment, components, tools, and materials (e.g. pre-cut cables with prepared attachment lugs) were available and accessible on site.

b. Findings

No findings of significance were identified.

.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, or 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 [OA]

4OA2 Identification and Resolution of Problems

.01 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team verified that PSEG 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 PSEG had taken or planned appropriate corrective actions.

b. Findings

Introduction. The team identified that PSEG failed to evaluate a single spurious operation of a safety injection signal during a main control room fire and its impact on the ability to achieve and maintain hot standby conditions. This finding was determined to be of very low safety significance (Green) and a NCV of the Salem Nuclear Generating Station, Unit Nos. 1 and 2 Operating License conditions 2.C.(5) and 2.C.(10) respectively, Fire Protection.

Description. During a post-fire circuit failure self assessment of Salem Appendix R safe shutdown program, PSEG documented on February 15, 2006 in notification 2027112 that several spurious operation questions involved additional research and reviews. The notification documented that DE-PS.ZZ-0001-A4, Salem Fire Protection Report – Shutdown Cables, Rev. 1, section 7.10 states that circuit analysis will conservatively assume that a safety injection signal output to components is possible to cause spurious operation. Notification 2027112 specifically documented “How has the analysis addressed the potential for spurious SI in general?” as well as other potential single spurious operations of individual safety injection components.

PSEG initiated condition report 70054167 to evaluate the post-fire safety injection signal spurious operation as well as the other issues in notification 2027112. The potential for a single spurious operation causing a complete safety injection signal and the subsequent impact on the ability to achieve and maintain hot standby conditions was not evaluated by PSEG. PSEG extended the evaluation due date several times: July 19, 2007, January 25, 2008, and finally September 25, 2008. The inspectors also noted that each new deadline was established after the due date had already past.

On January 9, 2009 PSEG performed a timeline study of S2.OP-AB.CR-0002, Control Room Evacuation Due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4kV Switchgear Room, Rev. 26 and walked down with operators all operator manual actions for a control room fire scenario. The team reviewed the collected timeline data and noted that the operator manual actions to completely terminate high-head injection, such as would be necessary during a spurious safety injection signal, would not occur until about 28 minutes after the reactor trip. The team questioned whether pressurizer level would remain in the indicating range during such a scenario. PSEG subsequently performed a technical evaluation that addressed the teams’ question. The technical evaluation was documented in condition report 70094126. The evaluation included conservative assumptions and concluded that pressurizer level would remain in the indicating range. When compared to the operator manual action timeline study of January 9, 2009, about one minute of margin existed before pressurizer level would exceed the reliable indication range. PSEG also documented this issue in corrective action notification 20402904. The team concluded that failing to ensure that a single spurious operation of a safety injection signal would not adversely impact post-fire safe

shutdown operations consistent with DE-PS.ZZ-0001-A4, Salem Fire Protection Report – Shutdown Cables, Rev. 1 is a performance deficiency.

Analysis. The team determined that this finding was more than minor because it was associated with the external factors attribute (fire) of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, PSEG did not ensure that post-fire operator manual actions subsequent to a single spurious operation of the safety injection signal during a main control room fire could be performed within sufficient time to achieve and maintain hot standby conditions.

The team assessed this finding in accordance with NRC IMC 0609, Appendix F, Fire Protection Significance Determination Process (SDP). This finding affected the completeness of the post-fire safe shutdown analysis. This finding screened to very low safety significance (Green) in phase 1 of the SDP because it was assigned a low degradation rating. A low degradation rating was assigned because a technical evaluation of pressurizer level response to a spurious safety injection signal from a main control room fire concluded that pressurizer level would remain in the indicating range.

The team determined that this finding had a cross cutting aspect in the area of problem identification and resolution because PSEG identified the issue on February 15, 2006 but never thoroughly evaluated the issue and its potential impact on the ability to achieve and maintain post-fire hot standby conditions. (P.1(c))

Enforcement. Salem Nuclear Generating Station, Units Nos. 1 and 2 Operating License conditions 2.C.(5) and 2.C.(10) respectively, requires 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 (UFSAR). UFSAR section 9.5.1.1.5 assures that corrective action measures are established to ensure that conditions adverse to fire protection such as non-conformances are promptly identified, reported, and corrected. Contrary to the above, from February 15, 2006, to February 13, 2009, PSEG did not promptly correct a non-conformance in its safe shutdown analysis in that a spurious operation of the safety injection signal was not conservatively assumed to occur consistent with fire protection program document, DE-PS.ZZ-0001-A4, Salem Fire Protection Report – Shutdown Cables, Rev. 1. Because this finding was of very low safety significance (Green) and has been entered into PSEG's corrective action program (Notification 20402904), this violation is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **NCV 05000272&311/2009006-01, Failure to Evaluate Spurious Operation of SI Signal.**

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. R. Braun, Site Vice President, and other members of the site staff at an exit meeting on February 13, 2009. No proprietary information was included in this inspection report.

Enclosure

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

M. Adair	Fire Protection Program Manager
R. Braun	Site Vice President
J. Carlin	Fire Department Superintendent
R. Chambers	Fire Marshall
K. Colville	Inspection Support Manager
E. Eilola	Engineering Director
J. Konovalchick	Senior Reactor Operator
K. Mathur	Design Engineer
L. Rajkowski	Design Engineering Manager
S. Savar	Safe Shutdown Engineer
B. Thomas	Senior Licensing Engineer
K. Wolf	System Engineer

NRC

J. Rogge	Chief, Engineering Branch 3, Division of Reactor Safety
C. Cahill	Senior Reactor Analyst, Division of Reactor Safety
D. Schroeder	Senior Resident Inspector, Salem Nuclear Generating Station
H. Balian	Resident Inspector, Salem Nuclear Generating Station

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Opened and Closed

05000272&311/2009006-01	NCV	Failure to Evaluate Spurious Operation of SI Signal
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Closed

None

Discussed

None

LIST OF DOCUMENTS REVIEWED

Fire Protection Licensing Documents

Salem Units 1 and 2 Updated Final Safety Analysis Report, Rev. 24
Letter to NRC, Revised Exemption Requests Fire Protection – 10 CFR Appendix R, Salem Generating Station Unit Nos. 1 and 2, 7/15/88
Letter to PSE&G, Exemption from the Requirements of 10 CFR 50, Appendix R (Fire Protection), 7/20/89
Letter to PSE&G, Correction to Salem Exemption – Exemption from the Requirements of 10 CFR 50, Appendix R, 8/15/89
Letter to NRC, Schedule for Completion of Fire Protection Features Modifications Salem Generating Station Unit Nos. 1 and 2, 12/28/90
Letter to NRC, Request for Reconsideration of Exemption Fire Protection – 10 CFR 50, Appendix R Salem Generating Stations Unit Nos. 1 and 2, 1/4/91
Letter to PSE&G, Request for Additional Information, Reconsideration of Exemption from Fire Protection Requirements, Salem Nuclear Generating Station, Units 1 and 2, 1/21/92
Letter to NRC, Additional Information – Reconsideration of Exemption from Fire Protection Requirements Salem Generating Station, Unit Nos. 1 and 2, 4/28/92
Letter to PSE&G, Emergency Control Air Compressors, Salem Nuclear Generating Station, Unit Nos. 1 and 2, 6/29/92
Letter to PSE&G, Exemption Correction, Exemption from the Requirements of 10 CFR 50, Appendix R, Salem Nuclear Generating Station, Units 1 and 2, 6/17/94
Letter to NRC, Update to Exemption Request Fire Protection – Appendix R Salem Generating Station Unit Nos. 1 and 2, 6/4/97
Letter to NRC, Control of Minimum Staffing Requirements for Dual Unit Shutdown Outside of the Control Room Commitment Change Salem Generating Station Unit Nos. 1 and 2, 1/2/02
Letter to NRC, Withdrawal of Exemptions from the Requirements of 10 CFR Part 50, Appendix R, Salem Nuclear Generating Station, Unit Nos. 1 and 2, 3/28/07

Calculations/Engineering Evaluation Reports/Design Bases Documents

CC-AA-211, Fire Protection Program, Rev. 4
DE-PS.ZZ-0001, Programmatic Standard for Fire Protection, Rev. 3
DE-PS.ZZ-0001-A2-FHA, Salem Fire Protection Report – Fire Hazards Analysis, Rev. 6
DE-PS.ZZ-0001-A3-SSA, Salem Fire Protection Report – Safe Shutdown Analysis, Rev. 5
DE-PS.ZZ-0001-A3-SSAR (003), Salem Fire Protection Report – Safe Shutdown Analysis, Safe Shutdown Manual Action Feasibility Assessment, Rev. 1
DE-PS.ZZ-0001-A3-SSAR-(005), Salem Fire Protection Report – Safe Shutdown Analysis, 1FA-AB-64A, Rev. 1
DE-PS.ZZ-0001-A3-SSAR-(005), Salem Fire Protection Report – Safe Shutdown Analysis, 2FA-AB-64A, Rev. 1
DE-PS.ZZ-0001-A3-SSAR-(007), Salem Fire Protection Report – Safe Shutdown Analysis, 1FA-AB-84A, Rev. 1
DE-PS.ZZ-0001-A3-SSAR-(007), Salem Fire Protection Report – Safe Shutdown Analysis, 2FA-AB-84A, Rev. 1

A-3

DE-PS.ZZ-0001-A3-SSAR-(015), Salem Fire Protection Report – Safe Shutdown Analysis, 1FA-EP-78C, Rev. 3
DE-PS.ZZ-0001-A3-SSAR-(015), Salem Fire Protection Report – Safe Shutdown Analysis, 2FA-EP-78C, Rev. 3
DE-PS.ZZ-0001-A3-SSAR-(059), Salem Fire Protection Report –Safe Shutdown Analysis, 12FA-AB-122A & 1FA-AB-100A, Rev. 0
DE-PS.ZZ-0001-A4, Salem Fire Protection Report – Shutdown Cables, Rev. 1
DE-PS.ZZ-0001-A6-GEN, Salem Fire Protection Report, Rev. 2
ES-44.018, Salem Units 1 & 2 Electrical Coordination for Appendix R Applications, Rev. 1
S-C-CAV-MDC-1878, Salem Units 1 and 2 SPAVS Gothic Appendix R Scenarios, Rev. 1
S-C-CVC-MEE-1475, Appendix R Fire in 1(2)FA-EP-78C Impact on CVCS, Rev. 0
S-C-FP-FEE-1746, Acceptable Operator Response Times to Appendix R Failures, Rev. 1
S-C-WD-MDC-2116, Electrical Equipment Room Water Drain Calculation, Rev. 1
S-C-ZZ-EEE-1430, Loss of Offsite Power Evaluation for a Postulated Appendix R Fire at Salem Generating Station Unit 1 & 2, Rev. 2
S-C-ZZ-NEE-0839, Time Analysis for Alternative Shutdown Capability for Appendix R Scenario, Rev. 2
S-1-FP-FDC-2115, Hydraulic Analysis for Unit 1 FP Sprinkler Piping for El. 78 Elec. Pen Area, Rev. 0

Design Change Packages

80089441
80089591

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NC.FP-AP.ZZ-0009, Fire Protection Training Program, Rev. 5
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ND.FP-ST.FS-0037, Fire Hose Service Test and EP Equipment Inspection, Rev. 1
OP-SA-108-115-1001, Operability Assessment and Equipment Control Program, Rev. 2
OP-AA-101-111-1004, Operations Standards, Rev. 2
SC.FP-AP.ZZ-0003, Actions for Inoperable Fire Protection - Salem Station, Rev. 13
SC.FP-SO.FP-0001, Fire Protection Water Suppression Systems Operation, Rev. 7
SC.FP-ST.FS-0004, Fire Suppression Water System Flush, Rev. 2
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SC.FP-ST.FS-0008, Fire Main Flow Test, Rev. 1
SC.FP-SV.FBR-0026, Flood and Fire Barrier Penetration Seal Inspection, Rev. 3

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SC.MD-PM.ZZ-0010, Model 7700 and 8000 Line Motor Control Center Maintenance, Rev. 18

SH.FP-EO.ZZ-0002, Fire Department Fire Response, Rev. 2

SH.MD-GP.ZZ-0007, General Guideline for Fuse Inspection/Replacement, Rev. 2

SH.MD-SP.FBR-0001, Installation and Repair of Penetration Seals, Rev. 1

SH.MD-SP.FBR-0002, Damming and Ceramic Fiber Seal Installation, Rev. 0

SH.MD-SP.FBR-0004, Installation and Repair of Silicone Nonfoaming Materials, Rev. 0

S1.FP-PM.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Inspection & Preventive Maintenance, Rev. 11

S1.FP-PM.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Test, Rev. 14

S1.FP-ST.FS-0009, #1 Diesel Fire Pump Operability Test, Rev. 17

S1.FP-ST.FS-0025, Triennial Fire Hose Service Test, Rev. 2

S1.FP-ST.FS-0116, Switchgear Rooms and Electrical Penetration Area Dry Sprinkler System Functional Test and Inspection, Rev. 0

S1.FP-ST.FBR-0028, Class 1 Fire Damper Operability Test, Rev. 4

S1.FP-SV.FBR-0005, Fire Wrapped Cable, Conduit, and Cable Tray Inspection, Rev. 1

S1.FP-SV.FBR-0027, Class 1 Fire Door Inspection and Operability Test, Rev. 4

S1.FP-SV.FBR-0031, Class 1 Fire Damper Visual Inspection, Rev. 3

S1.FP-SV.FS-0066, Relay Room Halon Cylinders Volume and Pressure Check, Rev. 7

S1.OP-AB.CAV-0001, Loss of Unit 1 Control Area HVAC, Rev. 2

S1.OP-SO.HSD-0001, Fire Related Alternate Shutdown Equipment, Rev. 4

S1.OP-ST.CVC-0006, Inservice Testing Chemical and Volume Control Valves Modes 1-6, Rev. 18

S1.OP-ST.CVC-0007, Inservice Testing Chemical and Volume Control Valves Modes 5-6, Rev. 13

S1. OP-AB.CR-0002, Control Room Evacuation Due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4kV Switchgear Room, Rev. 23

S1.OP-AB.Fire-0001, Control Room Fire Response, Rev. 3

S1.OP-AB.Fire-0002, Fire Damage Mitigation, Rev. 4

S1.OP-PT.HSD-0003, Alternate Shutdown and Appendix "R" Equipment Storage Cabinet Inventory, Rev. 5

S2.FP-PM.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Inspection & Preventive Maintenance, Rev. 11

S2.FP-ST.FBR-0028, Class 1 Fire Damper Operability Test, Rev. 4

S2.FP-ST.FS-0025, Triennial Fire Hose Service Test, Rev. 2

S2.FP-ST.FS-0048, Halon 1301 System Functional Test and Inspection, Rev. 3

S2.FP-ST.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Test, Rev. 12

S2.FP-SV.FBR-0005, Fire Wrapped Cable, Conduit, and Cable Tray Inspection, Rev. 1

S2.FP-SV.FS-0068, Relay Room Halon Cylinders Volume and Pressure Check, Rev. 6

S2.OP-AB.CR-0002, Control Room Evacuation Due to Fire in the Control Room, Relay Room, 460/230V Switchgear Room, or 4kV Switchgear Room, Rev. 26

S2.OP-AB.Fire-0001, Control Room Fire Response, Rev. 6

S2.OP-AB.Fire-0002, Fire Damage Mitigation, Rev. 4

S2.OP-PT.HSD-0003, Alternate Shutdown and Appendix R Equipment Storage Cabinet Inventory, Rev. 9

Completed Tests/Surveillances

ND.FP-ST.FS-0037, Fire Hose Service Test and EP Equipment Inspection, Rev. 1, 7/19/08
SC.FP-ST.FS-0004, Fire Suppression Water System Flush, Rev. 2, 11/15/07
SC.FP-ST.FS-0006, Fire Pump Capacity Test, Rev. 9, 8/11/07
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S1.FP-ST.FS-0009, #1 Diesel Fire Pump Operability Test, Rev. 17, 12/18/08
S1.FP-ST.FS-0025, Triennial Fire Hose Service Test, Rev. 2, 1/31/08
S1.FP-SV.FBR-0005, Fire Wrapped Cable, Conduit, and Cable Tray Inspection, Rev. 1, 11/12/07
S1.FP-SV.FBR-0031, Class 1 Fire Damper Visual Inspection, Rev. 3, 6/11/06
S1.FP-SV.FBR-0031, Class 1 Fire Damper Visual Inspection, Rev. 3, 3/6/08
S1.FP-PM.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Inspection & Preventive Maintenance, Rev. 11, 11/18/08
S1.FP-ST.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Test, Rev. 14, 12/14/08
S1.FP-SV.FS-0066, Relay Room Halon Cylinders Volume and Pressure Check, Rev. 7, 9/20/08
S1.OP-PT.HSD-0001, Instrumentation – Remote Shutdown Panel, Rev. 7, 8/31/08
S1.OP-PT.HSD-0002, Hot Shutdown Panel Functional Test, Rev. 8, 3/26/07 & 10/16/08
S1.OP-PT.HSD-0003, Alternate Shutdown and Appendix “R” Equipment Storage Cabinet Inventory, Rev 5, 10/11/08
S1.OP-ST.HSD-0001, Instrumentation - Remote Shutdown Panel, Rev. 2, 12/20/08
S2.FP-PM.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Inspection & Preventive Maintenance, Rev. 11, 8/8/08
S2.FP-ST.FBR-0028, Class 1 Fire Damper Operability Test, Rev. 4, 12/24/08
S2.FP-ST.FS-0025, Triennial Fire Hose Service Test, Rev. 1, 10/23/07
S2.FP-ST.FS-0048, Halon 1301 System Functional Test and Inspection, Rev. 3, 8/15/07
S2.FP-ST.LTS-0039, Appendix R Self-Contained, Battery Powered Emergency Light Unit Test, Rev. 12, 12/12/08
S2.FP-SV.FBR-0005, Fire Wrapped Cable, Conduit, and Cable Tray Inspection, Rev. 1, 1/17/08
S2.FP-SV.FS-0068, Relay Room Halon Cylinders Volume and Pressure Check, Rev. 6, 12/18/08
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S2.OP-PT.HSD-0002, Hot Shutdown Panel Functional Test, Rev. 8, 3/11/08
S2.OP-PT.HSD-0003, Alternate Shutdown and Appendix R Equipment Storage Cabinet Inventory, Rev. 9, 11/15/08
S2.OP-ST.HSD-0001, Instrumentation - Remote Shutdown Panel, Rev. 3, 12/14/08

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NOSA-SLM-06-09, Order 80090020, Salem Fire Protection Program Audit Report, September 2006

NOSA-SLM-08-07 Order 80096156, Salem Generating Station Fire Protection, September 2008

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203001 A 8789, Number 1 Unit – 4160V Group Buses One Line, Rev. 31
203002 A 8789, Number 1 Unit – 4160V Vital Buses One Line, Rev. 34
203003 A 8789, Number 1 Unit – 460V & 230V Vital & Non Vital Bus One Line Control, Rev. 45
203007 A 8789, Number 1 Unit – 125V DC One Line, Rev. 29
203061 A 8789, Number 2 Unit – 4160V Vital Buses One Line, Rev. 33
203063 A 8789, Number 2 Unit – 460V & 230V Vital & Non Vital Bus One Line Control, Rev. 36
205489 A 8768, Number 1 Unit – Penetration Area Trays Below EL. 100', Rev.41
205824 A 8774-20, Control & Electrical Penetration Area Fire Protection, Rev. 20
205839 A 8775, Number 1 Unit – Auxiliary Building Trays Below EL. 84', Rev.30
205840 A 8775, Number 1 Unit – Auxiliary Building Trays Below EL. 100', Rev.44
211365 B 9511, Number 1 Unit – Control Area 1B 115V AC Vital Instrument Bus, Rev. 29
211564 A 9772, Number 1 Unit – CVCS 1CV69 Charging Isolation Valves, Rev. 19
211566 B 583, Number 1 Unit – CVCS 1CV68 Charging Isolation Valves, Rev. 16
211586 B 9773, Number 1 & 2 Units – CVCS 1CV2 & 2CV2 RCS Letdown Line Isolation Valves, Rev.11
211587 B 9773, Number 1 & 2 Units – CVCS 1CV277 & 2CV277 RCS Letdown Line Isolation Valves, Rev. 7
211676 A 8863, Number 1 Unit – Auxiliary Building Instrument Panel Locations EL. 78' & 84', Rev.24
217149 A 8943, Number 1 & 2 Units – Auxiliary Building Hot Shutdown Station – Panel 213, Rev. 23
217150 B 9557, Number 1 & 2 Units – Auxiliary Building Hot Shutdown Station – Panel 213, Rev. 18
219456 A 8933, Number 1 & 2 Units – Auxiliary Building EL. 84' Hot-Shutdown Station, Rev. 30
231428 B 9645-5, Sh. 1, No. 1 Unit Auxiliary Building Ventilation Switchgear Room & Penetration Area Dampers, Rev. 5
247756 B 9753, Number 1 Unit – Containment & Penetration Area EL. 100', Rev.1
248118 A 1751, Number 1 & 2 Units – Reactor Head Ventilation Valves, Rev.3
248116 B 9676, Number 1 & 2 Units – Reactor Head Ventilation Valves, Rev.6
601526 B 9451, Number 1 Unit – Auxiliary Building EL. 84', Rev.4
605502 A-00, No. 2 Unit Electrical Penetration Area El. 78, Rev. 0
605502 A-00, S2FBW-2EP78C-02, Sh. 1, No.2 Unit – Electrical Penetration Area El.78 Isometric, Rev. 0
605502 A-00, Sh. 3-8, No. 2 Unit Electrical Penetration Area El 78, Rev. 0
605819 A-0, No. 1 & 2 Unit Auxiliary Bldg. Boundary Locations Floor Plan El 64-0", Rev. 0
605820 A-0, No. 1 & 2 Unit Auxiliary Bldg. Boundary Locations Floor Plan El 78-0" & El. 84-0", Rev 0

A-7

605821 A-0, No. 1 & 2 Unit Auxiliary Bldg. Boundary Locations Floor Plan El. 1000" & El. 110-10", Rev.0

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M-03, Halon 1301 Cylinder Foundation & Weighing Rack Unit 1, Rev. D

M-04, Halon 1301 Piping Unit 1, Rev. D

M-05, Halon 1301 Piping Unit 2, Rev. D

Piping and Instrumentation Diagrams

205201-SIMP-01, Sh.1-2, No. 1 Unit Reactor Coolant – Simplified PI&D, Rev. 1

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205248 A 8761, Sh. 1, No. 1 Aux Bldg Control Area Air Conditioning & Ventilation, Rev. 35

Vendor Manuals

3040608, NC.CC-AP.ZZ-0043, Viking Corporation Fire Protection, 10/31/06

Pre-Fire Plans

FRS-II-421, 4160 V Switchgear Rooms & Battery Rooms

FRS-II-431, 460V Switchgear Rooms and Corridor

FRS-II-441, Relay and Battery Rooms, and Corridor

FRS-II-511, Electrical Penetration Area, Elevation

Fire Drills and Critique

Dated:

01/31/07

07/26/07

08/04/08

11/11/08

03/06/07

02/11/08

09/07/08

12/18/08

Operator Training Documents

NTMCSAEOPSA, Assist with Implementating Salem EOP's and Salem AMG's Training, 12/16/2008

NOS05ABFIRE-02, Control Room Fire Response and Fire Damage Mitigation, 8/20/06

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Miscellaneous Documents

Fire Protection Drain System El. 84 & 78 Master Diagram

NFPA Chapter 6, Test Methods for Manufacturers Hose Certification

NFPA Chapter 7, Sampling, Inspection, and Tests

PSEG Supplier Requirements, Material Master: 1016451

S-1-FP-FEE-1984, Rev. 0, Fire Suppression System Performance Capability Evaluation – 1FA-AB-64A, 3/4/2008

S-1-FP-FEE-1985, Rev. 0, Fire Suppression System Performance Capability Evaluation – 1FA-EP-78C, 3/4/2008

S-1-FP-FEE-1986, Rev. 0 Fire Suppression System Performance Capability Evaluation – 1FA-AB-84A, 3/4/2008

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20268709	20378391	20395387	20399409
20268765	20378410	20396127	20399475
20268811	20378772	20397530	20399479
20270836	20378979	20397531	20399500
20272048	20386278	20397915	20399780
20272112	20386345	20398762	20399794
20315017	20388963	20398845	20399891
20316541	20388964	20398981	20400373
20335166	20388966	20398982	20400808
20336711	20388967	20398983	20401253
20345196	20388968	20398984	20401330
20353219	20388970	20398985	20401333
20354809	20394639	20398986	20401469
20362271	20394926	20399052	20401474
20378334	20394927	20399179	20401484
20378382	20394973	20399325	20402904

Condition Reports

70053366	70061473	70077852	70089930
70053794	70062041	70079337	70092905
70054167	70068117	70083120	70093992
70060947	70073828	70089875	70094126

Work Orders

30043626	30136041	30143759	30154288
30070896	30136961	30144189	30156086
30075164	30137928	30145194	30160579
30080843	30137990	30145244	30162329
30090761	30137991	30145888	30162972
30108656	30138333	30146552	30163526
30111884	30138499	30147366	30164226
30118164	30139330	30147780	30165998
30130043	30139331	30148388	30167782
30134048	30140303	30150605	30167865
30134095	30140691	30150761	30172746
30134839	30141821	30152268	30172862

30173280	60066104	60068403	60074122
30173781	60067092	60071610	60074922
60023148	60067560	60073510	60078942
60040631	60068388	60073511	

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agency Documents Access and Management System
CFR	Code of Federal Regulation
DRS	Division of Reactor Safety
DRP	Division of Reactor Projects
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
NCV	Non-cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
PSEG	PSEG Nuclear LLC
SDP	Significance Determination Process
SER	Safety Evaluation Report
UFSAR	Updated Final Safety Analysis Report