



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION I
2100 RENAISSANCE BLVD.
KING OF PRUSSIA, PA 19406-2713

May 4, 2017

Mr. Peter P. Sena, III
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 –
INTEGRATED INSPECTION REPORT 05000272/2017001 AND
05000311/2017001**

Dear Mr. Sena:

On March 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Salem Nuclear Generating Stations, Units 1 and 2. On April 13, 2017, the NRC inspectors discussed the results of this inspection with Mr. Kenneth Grover, Salem Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. Two of these findings involved violations of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating the violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCV's, 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; and the NRC Resident Inspector at Salem Nuclear Generating Station. In addition, if you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC, 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Salem Nuclear Generating Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Fred L. Bower, III, Chief
Reactor Projects Branch 3
Division of Reactor Projects

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

Enclosure:
Inspection Report 05000272/2017001 and
05000311/2017001
w/Attachment: Supplementary Information

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SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 –
 INTEGRATED INSPECTION REPORT 05000272/2017001 AND
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos. 50-272 and 50-311

License Nos. DPR-70 and DPR-75

Report Nos. 05000272/2017001 and 05000311/2017001

Licensee: PSEG Nuclear LLC (PSEG)

Facility: Salem Nuclear Generating Station, Units 1 and 2

Location: Hancocks Bridge, NJ 08038

Dates: January 01, 2017 through March 31, 2017

Inspectors: P. Finney, Senior Resident Inspector
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Approved By: Fred L. Bower, III, Chief
Reactor Projects Branch 3
Division of Reactor Projects

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SUMMARY

Inspection Report (IR) 05000272/2017001, 05000311/2017001; 01/01/2017 – 03/31/2017; Salem Nuclear Generating Station Units 1 and 2; Maintenance Risk Assessments and Emergent Work Control; Follow-up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. The inspectors identified two self-revealing findings and one NRC-identified finding, all of very low safety significance (Green), two of which were non-cited violations (NCVs). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Initiating Events

- Green. Inspectors identified a Green non-cited violation (NCV) of Title 10 of the Code of Federal Regulations (10 CFR) 50.65(a)(4) when PSEG did not adequately assess and manage the risk of online maintenance activities associated with the 13 and 23 charging (CV) positive displacement pumps (PDPs) and the 16 service water (SW) pump. Consequently, this resulted in the approval of hot work and the introduction of unaccounted for transient combustibles into a restricted fire area. PSEG wrote notifications (NOTFs) 20758370, 20759221, and 20761411 to document the observations and fire risk program gaps. On March 9, a roving fire watch was implemented as previously planned by PSEG.

The finding was more than minor given its similarity to IMC 0612, Appendix E, example 7.e, in that had an adequate risk assessment been performed, it procedurally would have required additional risk management actions (RMAs). Additionally, this finding was more than minor because it adversely impacted the protection against external factors (fire) attribute of the Initiating Events cornerstone objective to limit the likelihood of events that upset plan stability and challenge critical safety functions during shutdown as well as power operations. The inspectors evaluated the finding in accordance with IMC 0609, Attachment 4 and Appendix K, since it involved a maintenance rule (MR) risk assessment. Since the performance deficiency was related to maintenance activities affecting structures, systems, and components (SSCs) needed for fire mitigation, Appendix K directed the significance to be determined by an internal NRC management review using risk insights. A Senior Reactor Analyst used risk insights from IMC 0609, Appendix F and its Attachment 2, to inform the significance and determined the issue screened to Green given that the combustible conditions and quantities were predominantly representative of a Low degradation rating. [H.5] (Section 1R13)

Cornerstone: Mitigating Systems

- Green. A self-revealing Green finding (FIN) was identified when PSEG did not screen the risk associated with replacing the Unit 1C emergency diesel generator (EDG) output

breaker in accordance with WC-AA-105, "Work Activity Risk Management." Specifically, on December 14, 2016, the Unit 1C 4 kilovolt (kV) vital bus was inadvertently de-energized when the Unit 1 'C' EDG output breaker, which was removed without adequate risk mitigation actions, made contact with the switchgear (SWGR) cubicle door containing relays for bus differential current protection. PSEG entered this issue into their corrective action program (CAP) as NOTF 20751669 and performed apparent cause evaluation (ACE) 70191319. PSEG's corrective actions (CAs) included inspecting the involved relay and re-energizing the vital bus.

The finding was determined to be more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone's objective of ensuring the availability, reliability, and capability of systems relied upon to mitigate the consequences of an accident. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, Exhibit 2, and determined the finding was Green because it did not affect the design or qualification of a mitigating SSC, and did not represent an actual loss of function or system. The finding had a cross cutting aspect in the area of Human Performance, Work Management, because the work process did not include the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, PSEG did not identify the level of medium risk associated with the work activity, did not manage the level of risk commensurate with the work, and did not coordinate appropriate mitigating actions with different work groups. [H.5] (Section 1R13)

- Green. A self-revealing Green non-cited violation (NCV) of Technical Specification (TS) 6.8.1, "Procedures and Programs;" TS 3.6.2.3, "Containment Cooling Fans;" TS 3.6.1.1, "Primary Containment Integrity;" and TS 3.0.4, "Applicability," was identified. Specifically, PSEG did not perform a specified post-maintenance test (PMT) after replacing the air supply valve for service water (SW) system accumulator discharge valve 11SW535. As a result, valve 11SW535 failed its subsequent technical specification (TS) required stroke time to close surveillance, and rendered two of the five containment fan coil units (CFCUs) inoperable. PSEG entered this issue in the corrective action program (CAP) as NOTF 20736868 and completed corrective actions (CAs) included coaching the senior operator involved in closing the work order (WO) without ensuring the PMT was completed and a review of similar retest activities (no additional deficiencies identified).

This issue was more than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the incomplete PMT resulted in a delay in identifying a degraded stroke time and resultant inoperability of two CFCUs. The inspectors determined that this finding was Green in accordance with IMC 0609, Appendix A, Exhibit 2, because the finding did not result in an actual loss of function of a system or train. The finding had a cross-cutting aspect in the area of Human Performance, Work Management, because the organization did not implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Specifically, PSEG did not execute WO instructions to conduct the appropriate PMT following maintenance on an air supply valve for SW accumulator discharge valve 11SW535, which resulted in 11SW535 stroking closed too fast and required declaring two CFCUs inoperable. [H.5] (Section 4OA3)

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent rated thermal power (RTP). Power was reduced to 28 percent RTP on February 27 in support of troubleshooting reactor coolant system (RCS) unidentified leakage. Following visual identification of a leak on a chemistry sample line from the RCS 13 hot leg, PSEG shutdown the unit to Mode 3. Following repairs, a reactor startup was commenced on March 2 and 100 percent RTP was reached on March 4. The unit remained at or near 100 percent RTP for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent RTP. The unit remained at or near 100 percent RTP for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment

.1 Partial System Walkdown (71111.04Q – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1, Safety injection system following closure of discharge valves for unidentified leak rate investigation on January 30
- Unit 1, SW system and electrical support systems following emergent unavailability of the 14 SW vent fan while the 16 SW pump was unavailable due to planned maintenance on February 28
- Unit 1, 11 and 13 auxiliary feedwater (AFW) trains, including electrical support systems, while the 12 AFW pump was unavailable due to planned maintenance on March 7

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the Updated Final Safety Analysis Report (UFSAR), TSs, WOs, NOTFs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether PSEG staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

From February 28 through March 3, inspectors performed a complete system walkdown of accessible portions of the Unit 2 EDG fuel oil system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify as-built system configuration matched plant documentation, and that system components and support equipment remained operable. The inspectors confirmed that systems and components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified, and protected from external threats. The inspectors also examined the material condition of the components for degradation and observed operating parameters of equipment to verify that there were no deficiencies. For identified degradation the inspectors confirmed the degradation was appropriately managed by the applicable aging management program. Additionally, the inspectors reviewed a sample of related NOTFs and WOs to ensure PSEG appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 6 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that PSEG controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service (OOS), degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Unit 1, Residual heat removal (RHR) on January 31
- Unit 2, EDGs on January 23
- Unit 2, AFW pumps on February 6
- Unit 2, Auxiliary building ventilation on February 14
- Unit 2, 4kV SWGR room following loss of 2F208 lighting transformer on March 31
- Common, SW intake structure bays on January 23

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors evaluated specific attributes as follows:

The inspectors observed an unannounced fire brigade drill scenario conducted on March 10 that involved a fire in the Unit 1 circulating water SWGR building. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that PSEG personnel identified deficiencies, openly discussed them at the debrief in a self-critical manner, and took appropriate CAs as required. The inspectors evaluated specific attributes as follows:

- Proper wearing of turnout gear and self-contained breathing apparatus,
- Proper use and layout of fire hoses,
- Employment of appropriate fire-fighting techniques,
- Sufficient fire-fighting equipment brought to the scene,
- Effectiveness of command and control,
- Search for victims and propagation of the fire into other plant areas,
- Smoke removal operations,
- Utilization of pre-planned strategies,
- Adherence to the pre-planned drill scenario, and
- Drill objectives met.

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with PSEG's fire-fighting strategies.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

.1 Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed the CAP to determine if PSEG identified and corrected flooding problems and whether operator actions for coping with flooding were adequate. The inspectors focused on the Unit 2 4kV vital switchgear room, to verify the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. The inspectors also verified that PSEG's flooding mitigation plans and

equipment for the Unit 2, 4kV vital switchgear room were consistent with the design requirements and the risk analysis assumptions.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on February 21, which included an auxiliary building ventilation failure, flooding in the turbine building general area, a steam generator tube rupture, and a loss of offsite power (LOOP). The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed and reviewed the Unit 1 downpower and shutdown for RCS unidentified leakage on February 28. The inspectors observed operator performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 1 sample)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on SSC performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance WOs, and maintenance rule (MR) basis documents to ensure that PSEG was identifying and properly evaluating

performance problems within the scope of the MR. For each sample selected, the inspectors verified that the SSC was properly scoped into the MR in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by PSEG staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and CAs to return these SSCs to (a)(2). Additionally, the inspectors ensured that PSEG staff was identifying and addressing common cause failures that occurred within and across MR system boundaries.

- Common, Station air following multiple standby compressor automatic starts on low pressure on March 23

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 7 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that PSEG performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that PSEG personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When PSEG performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 1, 1C 4kV vital bus trip caused by bumped door on December 14
- Unit 2, Yellow Risk during 1A vital instrument bus inverter failure on January 26
- Unit 2, Yellow Risk during 21 component cooling heat exchanger (HX) unavailability on February 21
- Common, Yellow Risk during 12 spent fuel pool (SFP) unavailability and emergent 22 CFCU unavailability on January 10
- Common, Yellow Risk during 11 turbine auxiliary cooling HX leak and 2 SFP HX unavailability on January 23
- Common, Yellow Risk during Unit ABV maintenance on February 14
- Common, Fire risk with 13 and 23 CV pumps unavailable on March 7

b. Findings

.1 Loss of 1C 4 kV Vital Bus

Introduction. A self-revealing Green FIN was identified when PSEG did not screen the risk associated with replacing the Unit 1C EDG output breaker in accordance with

WC-AA-105, "Work Activity Risk Management." Specifically, on December 14, 2016, the Unit 1C 4kV Vital Bus was inadvertently de-energized when the Unit 1C EDG output breaker, which was removed without adequate risk mitigation actions, made contact with the SWGR cubicle door containing relays for bus differential current protection.

Description. Salem Unit 1's 4kV electrical system contains three 4kV vital buses. The 4kV vital buses receive power from the 13 and 14 station transformers and supply power to engineered safeguards equipment. The 4kV vital buses are powered by the associated EDG if their normal power sources are lost.

On December 14, 2016, technicians were removing the Unit 1C EDG output breaker for maintenance. While removing the breaker, it shifted and made contact with the SWGR cubicle door. Contact with the cubicle door caused electrical contacts inside the bus differential current relay, which was mounted on the inside of the door, to actuate. The bus differential relay actuation caused the SWGR infeed breaker, which supplied power to the bus, to open. This activity caused the Unit 1C 4kV Vital Bus to de-energize. PSEG inspected the differential current relay and restored power to the bus within 2 hours.

PSEG entered the loss of the Unit 1C 4kV bus into their CAP as NOTF 20751669 and performed an ACE. PSEG determined the work order operation to replace the 1C EDG output breaker was improperly classified as low risk, per WC-AA-105, "Work Activity Risk Management." WC-AA-105, Work Activity Risk Management, Exhibit 1, details pre-screened work activities. The Nuclear Safety Prescreen Risk table in Exhibit 1 identifies working over or near sensitive operating plant equipment as medium risk. Medium risk activities require the completion of WC-AA-105 Form 2, "Look Ahead Planning," which focuses on human performance and error prevention. WC-AA-105 Form 2 requires additional screening to eliminate the risks associated with tasks being performed in close proximity to electrical SWGR containing sensitive relays.

PSEG was aware of the potential for this event since a similar event occurred in 2003 when the Salem Unit 2B vital 4kV SWGR was inadvertently de-energized when a breaker being removed from the Unit 2B EDG output breaker cubicle made contact with the SWGR door. Based on past operating experience and the requirements of PSEG's Work Activity Risk Management procedure (WC-AA-105), PSEG did not take adequate actions to eliminate the risk associated with replacing the Unit 1C EDG output breaker. Maintenance technicians had discussed the internal operating experience from 2003, but the formal risk process in WC-AA-105 would have resulted in the documentation of the most likely undesirable outcomes of performing the activity and compensatory measures taken to prevent undesirable outcomes.

Analysis. Not adequately screening the risk associated with replacing the 1C EDG output breaker in accordance with WC-AA-105, "Work Activity Risk Management," was a performance deficiency that was within PSEG's ability to foresee and correct and should have been prevented. The finding was determined to be more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and affected the cornerstone's objective of ensuring the availability, reliability, and capability of systems relied upon to mitigate the consequences of an accident. Specifically, adequate risk mitigation action actions were not implemented when the 1C EDG output breaker was removed. The Unit 1 'C' EDG output breaker made contact with the 1C 4V vital bus causing it to inadvertently de-energize. The

inspectors evaluated the finding in accordance IMC 0609, Appendix A, Exhibit 2, and determined the finding was Green because it did not affect the design or qualification of a mitigating SSC, did not represent the loss of system and/or function, did not represent an actual loss of function of at least a single train for greater than its TS Allowed Outage Time, or two separate safety systems out-of-service for greater than its TS Allowed Outage Time, and did not represent an actual loss of function of one or more non-TS trains of equipment designated as high safety-significant in accordance with the PSEG's MR program for greater than 24 hours.

The finding had a cross cutting aspect in the area of Human Performance, Work Management, because the work process did not include the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, PSEG identified the work as low risk and did not identify the medium risk level associated with the work activity, did not manage the level of risk commensurate with the work, and did not coordinate appropriate mitigating actions with different work groups. (H.5)

Enforcement. The finding did not involve enforcement action because the inspectors did not identify a violation of regulatory requirements associated with this finding. PSEG entered this issue into their CAP as 20751669. Immediate CAs included inspecting the involved relay and re-energizing the vital bus. Because the issue did not involve a violation of regulatory requirements and had very low safety significance, it is identified as a finding. (FIN 05000272/2017001-01, Loss of 1C 4kV Vital Bus due to Inadequate Activity Risk Screening)

.2 Inadequate Fire Risk Assessment and Management

Introduction. Inspectors identified a Green NCV of 10 CFR 50.65(a)(4) when PSEG did not adequately assess and manage the risk of online maintenance activities associated with the 13 and 23 CV PDPs and the 16 SW pump. Consequently, this resulted in the approval of hot work and the introduction of unaccounted for transient combustibles into a restricted fire area.

Description. On February 26, 2017, the 16 SW pump was removed from service for maintenance. On the same day, based on their Maintenance Rule and Fire Safe Shutdown program, PSEG posted certain Unit 1 fire areas as restricted for hot work and transient combustibles to include the emergency core cooling system (ECCS) elevation of the Unit 1 auxiliary building where the Unit 1 CV pumps are located. On February 27, the 23 CV pump was also removed from service for maintenance. Again, certain Unit 1 fire areas were posted to include the same ECCS area that was posted for the 16 SW pump. On March 2, the 23 CV pump was made available, but was subsequently removed from service again on March 4 for a leak on its discharge pulsation dampener; PSEG re-posted the fire areas on the same day.

On March 7, inspectors performed a walkdown of the Unit 1 and 2 auxiliary buildings with a focus on those areas that were posted as 'fire in (a)(4)' given ongoing maintenance that also included the 13 CV pump. The inspectors discovered transient combustibles in the vicinity of the 13 CV pump that included approximately one gallon of oil, numerous pieces of untreated wood dunnage, numerous oily rags, and plastics. A Transient Combustible Permit (TCP) dated from February 22 was also located in the area that did not account for the wood and plastics and had not been reviewed by the

engineering department. Additionally, inspectors identified combustibles in the form of rags in the vicinity of many ECCS pumps. The inspectors also identified that two hot work permits had been approved on February 27 and March 2 for the 13 CV pump. Hot work had not occurred based on maintenance technician decisions in the field that it was not required to support their work. During the time that inspectors visited the area, there were no PSEG staff in the vicinity. The inspectors notified PSEG staff who responded by revising the TCP to reflect the additional transient combustibles. The total combustible loading revision was over triple that initially determined. PSEG also wrote NOTFs 20758370, 20759221, and 20761411 to document the observations and fire risk program gaps. The following day, inspectors questioned whether the TCP revision was an acceptable CA for the observed conditions. On March 9, a roving fire watch was implemented as previously planned by PSEG.

To understand how PSEG had assessed and managed the risk of work, the inspectors reviewed station procedure OP-SA-108-115-1001, "Operability Assessment and Equipment Control Program," Revision 10. Under post-fire safe shutdown controls, step 5.5.2.D directs completion of Attachment 3 for RMAs. Attachment 5 lists RMAs that "in all cases they should be implemented within 36 hours from the equipment unavailability for planned activities." Those include an RMA to minimize transient combustibles by performing "a log review of open permits for the fire areas of concern. If open, remove transient combustibles of concern from area. If objects cannot be removed, consult with the fire protection engineering and consider alternatives (i.e. fire watches, SIL-temp, etc.) to reduce the risk presented by the transient combustibles." Another RMA is housekeeping walkdowns of "fire areas of concern to ensure no unacceptable housekeeping conditions exist which could increase fire risk. This will consist of an initial specific fire area walk-down and will be supplemented thereafter by normal once-per-shift operator rounds."

In agreement with the Attachment 5 direction on alternatives, step 5.5.2.G states that "if alternative RMAs are required (i.e. transient combustibles of concern can't be removed) contact the Fire Protection Program Engineer/Safe Shutdown Program Engineer for alternative measures to reduce fire risk." These alternative measures are documented in Attachment 3, section 2, titled, "Additional RMAs," and Attachment 5 lists additional RMAs as roving and continuous fire watches and a risk analysis of courses of action.

Contrary to OP-SA-108-115-1001 guidance, RMAs had not been adequately performed, transient combustibles of concern had not been removed, Engineering had not been contacted, and alternative RMAs were not implemented both prior to and after inspectors identified the combustibles and notified PSEG staff. The issue was resolved when a roving fire watch was implemented on March 9 as previously planned by PSEG.

For certain Salem fire scenarios, the success path to support reactor coolant pump (RCP) seal injection, RCS inventory control, and decay heat removal is via the unaffected unit CV PDP. From SC.ER-PS.FP-0001-A4, "Fire Events in Maintenance Rule (a)(4) Risk Evaluations," Revision 0, "the PDP was identified to be one of the most risk significant components at Salem from a fire protection perspective." "It was also identified to be an unreliable component requiring frequent maintenance. Without availability of the PDP, there is no success path for supplying RCP seal injection in the event of a fire at numerous locations in the plant." The inspectors concluded that an adequate risk assessment would have identified additional RMAs were required and that adequate risk management would have implemented those additional RMAs.

Analysis. Inadequately assessing and managing risk, as required by 10 CFR 50.65(a)(4) to the PSEG standards in OP-SA-108-115-1001 for Hot Work and Transient Combustibles, was a performance deficiency within PSEG's ability to foresee and correct. The finding was more than minor given its similarity to IMC 0612, Appendix E, example 7.e in that had an adequate risk assessment been performed, it procedurally would have required additional RMAs. Additionally, this finding was more than minor because it adversely impacted the protection against External Factors (fire) attribute of the Initiating Events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, improperly assessing and managing risk resulted in the unmanaged approval of hot work and introduction of unaccounted transient combustibles into a restricted fire area that exposed this already elevated risk area to the likelihood of a fire. The inspectors evaluated the finding in accordance with IMC 0609, Attachment 4 and Appendix K, since it involved a maintenance rule risk assessment. Since the performance deficiency was related to maintenance activities affecting SSCs needed for fire mitigation, Appendix K directed the significance to be determined by an internal NRC management review using risk insights. A Senior Reactor Analyst used risk insights from IMC 0609, Appendix F and its Attachment 2, to inform the significance and determined the issue screened to Green given that the combustible conditions and quantities were predominantly representative of a low degradation rating.

The finding had a cross-cutting aspect in Human Performance, Work Management, in that the organization implements a process of planning, controlling, and executing work activities that includes identification and management of risk and the need for coordination with different groups. Specifically, PSEG staff did not coordinate work activities and ensure awareness amongst operations, maintenance, and engineering groups to address the conflicts between 13 and 23 CV PDP work and parallel combustible restrictions in the same area. (H.5)

Enforcement. Title 10 CFR 50.65(a)(4) states, in part, that before performing maintenance activities, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to this, from February 22 to March 9, 2017, PSEG did not adequately assess and manage the increase in risk of maintenance activities involving the 13 and 23 CV pumps and the 16 SW pump. Consequently, this resulted in the approval of hot work and introduction of unaccounted transient combustibles into a restricted fire area. This condition was ultimately overcome by PSEG's implementation of an hourly fire watch on March 9. PSEG entered this in their CAP as NOTFs 20758370, 20759221, and 20761411. Because this issue was of very low safety significance and entered in PSEG's CAP, this issue is being treated as an NCV in accordance with the Section 2.3.2 of the Enforcement Policy. (NCV 05000272/2017001-02, Inadequate Fire Risk Assessment and Management)

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Unit 1, 13 CV alert range vibrations on January 31
- Unit 1, 1C EDG SW outlet controller failure on February 15
- Unit 1, Containment radiation monitor back-up sample isolation valves on March 9
- Unit 1, Component cooling water HX bypass leakage on March 17
- Unit 2, AFW storage tank with isolation valve leakage on March 6
- Common, Containment gaseous radiation monitoring sensitivity on January 24

The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to PSEG's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary modifications listed below to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

- Unit 2, Temporary blanks on 22 CFCU cooling coils on January 11

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 samples)

a. Inspection Scope

The inspectors reviewed the PMT for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality

control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- Unit 1, 1A Vital instrument bus inverter following capacitor failure on January 26
- Unit 1, 11AF21 and 12AF21 steam generator inlet valves following preventive maintenance on March 7
- Unit 1, 13 CV and associated pipe welds following power frame replacement on March 15
- Unit 1, 11SW122 and 11SW127 flow controller repairs on March 17
- Unit 1, Weld repair of tee on 13 RCS hot leg sample line on March 22
- Unit 2, Diesel driven fire pump six-month maintenance on February 6
- Common, Non-safety related AFW pump modification acceptance testing on March 15

b. Findings

No findings were identified.

1R20 Unit 1 Forced Outages (71111.20 – 1 sample)

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk for the Unit 1 forced outage, between February 27 and March 2, 2017, due to elevated reactor coolant system leakage. The inspectors reviewed PSEG's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown process, repair activities, and immediate CAs, and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable TSs when taking equipment OOS
- Status and configuration of electrical systems to ensure that TSs were met
- Monitoring of decay heat removal operations or operations at low power
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Tracking of startup prerequisites, walkdown of the containment to verify that debris had not been left which could block the ECCS suction strainers, and startup and ascension to full power operation
- Identification and resolution of problems related to outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 5 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied TSs, the UFSAR, and PSEG procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- Unit 1, Fission product gas sampling on January 9
- Unit 1, Elevated unidentified leak rate (RCS) on February 24
- Unit 1, 1B EDG monthly surveillance run on March 6
- Unit 2, 22 RHR pump differential pressure decline (IST) on February 8
- Unit 2, SW CFCU and accumulator check valves (IST) on February 23

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06 – 1 sample)

Emergency Preparedness Training Observations

a. Inspection Scope

The inspectors observed simulator training evolutions for licensed operators on February 21, which required emergency plan implementation by an operations crew. PSEG planned these evolutions to be evaluated and included in performance indicator (PI) data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that PSEG evaluators noted the same issues and entered them into the CAP.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational and Public Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 - 1 sample)

a. Inspection Scope

The inspectors reviewed PSEG's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR Part 20, TSs, Regulatory Guide (RG) 8.38, and the procedures required by TSs as criteria for determining compliance.

Radiological Hazard Assessment (1 sample)

The inspectors conducted independent radiation measurements during walkdowns of the facility and reviewed the radiological survey program, air sampling and analysis, continuous air monitor use, recent plant radiation surveys for radiological work activities, and any changes to plant operations since the last inspection to verify survey adequacy of any new radiological hazards for onsite workers or members of the public.

b. Findings

No findings were identified.

2RS2 Occupational As Low As is Reasonably Achievable Planning and Controls (71124.02 - 1 sample)

a. Inspection Scope

The inspectors assessed PSEG's performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements contained in 10 CFR Part 20, RGs 8.8 and 8.10, TSs, and procedures required by TSs as criteria for determining compliance.

Source Term Reduction and Control (1 sample)

The inspectors reviewed the current plant radiological source term and historical trend, plans for plant source term reduction, and contingency plans for changes in the source term as the result of changes in plant fuel performance or changes in plant primary chemistry.

The inspectors observed radiological work activities and evaluated the use of shielding and other engineering work controls based on the radiological controls and ALARA plans for those activities.

b. Findings

No findings were identified.

2RS3 In-Plant Airborne Radioactivity Control and Mitigation (71124.03 - 1 sample)

a. Inspection Scope

The inspectors reviewed the control of in-plant airborne radioactivity and the use of respiratory protection devices in these areas. The inspectors used the requirements in 10 CFR Part 20, RG 8.15, RG 8.25, NUREG/CR-0041, TS, and procedures required by TS as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the UFSAR to identify ventilation and radiation monitoring systems associated with airborne radioactivity controls and respiratory protection equipment staged for emergency use. The inspectors also reviewed respiratory protection program procedures and current performance indicators for unintended internal exposure incidents.

Self-Contained Breathing Apparatus for Emergency Use (1 sample)

The inspectors reviewed the following: the status and surveillance records for three Self-Contained Breathing Apparatus (SCBAs) staged in-plant for use during emergencies, PSEG's SCBA procedures, maintenance and test records, the refilling and transporting of SCBA air bottles, SCBA mask size availability, and the qualifications of personnel performing service and repair of this equipment.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05 - 2 samples)

a. Inspection Scope

The inspectors reviewed performance in assuring the accuracy and operability of radiation monitoring instruments used to protect occupational workers during plant operations and from postulated accidents. The inspectors used the requirements in 10 CFR Part 20, RGs, American National Standards Institute (ANSI) 323A, N323D, and N42.14, and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed Salem's UFSAR, Radiation Protection audits, records of in-service survey instrumentation, and procedures for instrument source checks and calibrations.

Walkdowns and Observations (1 sample)

The inspectors conducted walkdowns of plant area radiation monitors and continuous air monitors. The inspectors assessed material condition of these instruments and that the monitor configurations aligned with the UFSAR. The inspectors checked the calibration

and source check status of various portable radiation survey instruments and contamination detection monitors for personnel and equipment.

Calibration and Testing Program (1 sample)

For the following radiation detection instrumentation, the inspectors reviewed the current detector and electronic channel calibration, functional testing results alarm set-points and the use of scaling factors: laboratory analytical instruments, whole body counter, containment high-range monitors, portal monitors, personnel contamination monitors, small article monitors, portable survey instruments, area radiation monitors, electronic dosimetry, air samplers and continuous air monitors. The inspectors reviewed the calibration standards used for portable instrument calibrations and response checks to verify that instruments were calibrated by a facility that used National Institute of Science and Technology traceable sources.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures (2 samples)

a. Inspection Scope

The inspectors sampled PSEG's submittals for the Safety System Functional Failures performance indicator for both Unit 1 and Unit 2 for the period of January 1, 2016, through December 31, 2016. To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed PSEG's operator narrative logs, operability assessments, MR records, maintenance WOs, NOTFs, event reports and NRC integrated IRs to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Reactor Coolant System Specific Activity and Reactor Coolant System Leak Rate (4 samples)

a. Inspection Scope

The inspectors reviewed PSEG's submittal for the RCS specific activity and RCS leak rate performance indicators for both Unit 1 and Unit 2 for the period of January 1, 2016, through December 31, 2016. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator

Guideline,” Revision 7. The inspectors also reviewed RCS sample analysis and CR logs of daily measurements of RCS leakage, and compared that information to the data reported by the performance indicator. Additionally, the inspectors observed surveillance activities that determined the RCS identified leakage rate, and chemistry personnel taking and analyzing a RCS sample.

b. Inspection Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 2 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, “Problem Identification and Resolution,” the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify PSEG entered issues into their CAP at an appropriate threshold, gave adequate attention to timely CAs, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into their CAP and periodically attended condition report screening meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, PSEG performed an evaluation in accordance with 10 CFR Part 21.

b. Findings

No findings were identified.

.2 Annual Sample: Both Trains of High Head Safety Injection Inoperable Due to a Relief Valve Failure

a. Inspection Scope

Inspectors reviewed the event described in Section 4OA3.1 of this report. In addition to the scope mentioned in that section, inspectors also reviewed related causal evaluations for a similar event in July 2011. During a spring 2011 refueling outage, the 2SJ10 failed its as-found lift test, had a setpoint adjustment, and was reinstalled. Subsequently, on July 14 of that year, during a fill and vent, the 2SJ10 leaked by, lifted, and resulted in declaration of an Unusual Event (UE) and submission of Licensee Event Report (LER) 05000311/2011-005. Inspectors reviewed these causal evaluations, those mentioned in Section 4OA3.1, associated CAs, interviewed station personnel, and walked down associated plant equipment and areas.

b. Findings and Observations

A self-revealing Green NCV associated with this issue was documented in IR 05000311/2017009 (ML17060A399).

Inspectors reviewed PSEG's root cause analysis (RCA) (70126271) and two ACEs (70126272 and 70128332) for the July 2011 event. PSEG determined the root cause was a design application deficiency and an apparent cause was insufficient margin between the relief valve (RV) setpoint and system operating pressure. CAs for the root cause included a design change to raise the SJ10 setpoint from 2735 psig to 2825 psig which was completed in April 2013 for 1SJ10 and November 2012 for 2SJ10.

In PSEG's extent of cause review, PSEG stated that the charging system PDP discharge RV, CV141, which uses the same valve type, lifted frequently since system operating pressure was greater than 90 percent of the RV setpoint. Normal operating pressure had been observed to spike to 2735-2827 psig during CV pump swaps in excess of the RV setpoint and resulted in valve chatter, seat damage, and consequent leakage and setpoint degradation. Supporting data showed that the CV141 valves were not lasting a full operating cycle as evidenced by a history of failing low during lift tests, leaking by from 2011 through 2015, and an August 2012 preventive maintenance change to replace them every refueling outage. Additionally, PSEG's ACE on the 2015 event (IR Section 4OA3.1) acknowledged that CV141s had been operating close to system operating pressure and were subject to discharge pressure oscillations. Thus PSEG had sufficient awareness of the simmering CV141s and the 2SJ10 RV installed in the fall 2015 outage had been removed from the 2CV141 location after a full cycle with a setpoint adjustment, but without refurbishment.

Interim and final effectiveness reviews (EFFRs) for the 2011 RCA were completed in May 2014 and December 2014 respectively. PSEG concluded that CAs had been effective given that the SJ10s passed their lift tests in outages 1R22 (spring 2013) and 2R19 (fall 2013) and that the RVs had not lifted since the setpoints had been raised. The inspectors observed that this conclusion was narrow in perspective given that the EFFRs focused on the lack of lifts during operation and passing lift tests during outages without considering RV leakage following installation. Specifically, the 2015 (2SJ10) event ACE (70182626) stated that "there has not been enough experience to demonstrate the success of" the SJ10 setpoint change.

Inspectors reviewed the RCA (70182590) and ACE (70182626) for the 2015 (2SJ10) event. The following additional observations were made:

- An action tracking item (ACIT) (70182590-210) to revise pre-job brief checklists to reinforce risk recognition and decision making was originally due to be completed in March 2016, but was rescheduled several times and is still open pending alignment with other industry initiatives. PSEG had assessed the planned ACIT as a durable action to help address the root cause. This was in addition to corrective actions to prevent recurrence.
- PSEG determined the direct cause, the action that directly produced the problem immediately prior to the event, was less than adequate procedure use and adherence. Inspectors observed that there was an absence of actions to address the direct cause.
- PSEG identified two Organizational and Programmatic issues in the RCA, both within an organizational breakdown: inadequate work practices and decision making and inadequate communication within the organization. The inspectors noted the absence of corrective actions to address these issues. LS-AA-125-1001, "Cause

Analysis,” Revision 10, Attachment 18, step 2.5 states that, for the results of evaluating organizational and programmatic contributors, “appropriate corrective actions are created for resolution.” Additionally, ACITs to address the behavioral aspects of the RCA were not repetitive which the inspectors’ concluded are more effective at changing organizational aspects.

Overall, the inspectors determined that these observations were minor given that the exhibited RV leakage did not result in inoperability or unavailability. The human performance aspects of the 2015 event were addressed in a Green NCV in IR 2017009.

.3 Annual Sample: Unit 1 Service Water Accumulator Discharge Valve Stroke Time

a. Inspection Scope

The inspectors performed an in-depth review of PSEG's evaluation and CAs associated with an IST during which a SW accumulator discharge valve stroked too fast in the closed direction. The valve, 11SW535, failed to meet the IST stroke time to close acceptance criterion during a routine quarterly test; and was due to a prior failure to perform a specified PMT after the replacement of the 11 SW 535's associated air supply valve. The accumulator discharge valve is designed to function (open) to inject stored SW from the associated nitrogen-pressurized accumulator into the CFCU cooling water supply to prevent a water hammer event during postulated LOOP scenarios. The valve also must close after the SW injection in order to prevent the injection of nitrogen from the SW accumulator into the SW system.

The inspectors assessed PSEG's problem identification threshold, problem analysis, extent of condition reviews, compensatory actions, and the prioritization and timeliness of their CAs to determine whether they were appropriately identifying, characterizing, and correcting problems associated with this issue and whether the planned or completed CAs were appropriate. The inspectors compared the actions taken to the requirements of PSEG's CAP and 10 CFR Part 50, Appendix B. The inspectors reviewed associated documents and interviewed engineering personnel to assess the reasonableness of PSEG's evaluations and of the planned and completed CAs.

b. Findings and Observations

The inspectors determined there was a Green self-revealing finding involving an NCV of TSs. Specifically, PSEG did not perform a specified PMT after replacing the air supply valve for SW accumulator discharge valve 11SW535. As a result, valve 11SW535 failed its subsequent TS required surveillance, and rendered two of the five CFCUs inoperable. This finding is discussed in detail in Section 4OA3.2 of this report.

The inspectors found PSEG's actions in response to this event to be acceptable. However, some deficiencies were identified as detailed below.

PSEG conducted a detailed evaluation to determine past operability and the significance of having the No. 11 and 12 CFCUs in a degraded condition after the 11SW535's first failure was identified. The evaluation considered certain postulated LOOP scenarios and actual valve stroke times (including the fast closure stroke time for 11SW535). The evaluation concluded that the CFCU/SW discharge piping water volume would have remained pressurized above saturation, thereby preventing void formation; and the

CFCUs remained capable of performing their safety function. However, the inspectors noted that PSEG staff identified a timing deficiency in one of the scenarios. Specifically, in the LOOP-only scenario (i.e., no concurrent loss-of-coolant accident), PSEG staff identified the SW535 and SW534 (the parallel valve) must remain open for a minimum of seven seconds (vs. the previously assumed five seconds) to ensure proper CFCU protection from water hammer. In their evaluation, PSEG confirmed that the overall scenario timing results (using actual valve stroke times) were historically conservative and acceptable for CFCU performance. They also corrected the timing deficiency by adjusting the stroke time acceptance criteria of other SW valves in the sequence. This addressed the concern; however, the inspectors identified that PSEG did not initiate a CAP document to formally identify, evaluate (including potential extent-of-condition implications), and correct this issue. In response to this observation, PSEG staff initiated NOTF 20759461.

Procedure LS-AA-125, "Corrective Action Program", states in part, if at any time, a condition adverse to quality or any question of operability arises, then initiate a notification. The inspectors determined that the failure to initiate a notification for this condition adverse to quality was a performance deficiency, and was a violation of procedure LS-AA-125. The inspectors evaluated this issue for significance in accordance with IMC 0612, Appendix B, "Issue Screening," and IMC 0612, Appendix E, "Examples of Minor Issues." The inspectors determined this issue was minor, and, as a result, was not subject to enforcement action in accordance with NRC's Enforcement Policy.

In addition, during the review of documents associated with the missed PMT, the inspectors noted that the valve stroke PMT that was specified on the WO (60129204) stated to perform the applicable portions of the IST procedure for stroking 11SW535 in the open position. However, the inspectors observed it is the closed direction timing that could potentially have been affected by the air supply valve maintenance. PSEG staff indicated that, while incorrectly specified in the WO, the portion of the IST that is used for the PMT measures and records valve stroke in both directions. In response, they initiated NOTF 20758975 to identify and correct the WO/PMT discrepancy.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 3 samples)

.1 (Closed) LER 05000311/2015-003-00: Both Trains of High Head Safety Injection Inoperable Due to a Relief Valve Failure

a. Inspection Scope

On November 23, 2015, during preparations for a reactor startup, the boron injection tank (BIT) RV - 2SJ10 exhibited seat leakage. During troubleshooting, PSEG staff mechanically agitated the RV, which resulted in it lifting, and an RCS leak greater than 10 gallons per minute (GPM) as well as the TS 3.4.7.2 requirement of less than 1 GPM. In response, PSEG isolated the BIT and declared a notice of unusual event (NOUE). In addition, PSEG conducted both root and apparent cause analyses to address the human and equipment performance aspects respectively. PSEG determined that the root cause of the event was failure to maintain pre-established roles and responsibilities during troubleshooting and the apparent cause of the relief valve leaking was ineffective use of internal operating experience. Inspectors reviewed these causal evaluations, associated

CAs, interviewed station personnel, and walked down associated plant equipment and areas. This LER is closed.

b. Findings

A self-revealing Green NCV associated with this issue was documented in IR 05000311/2017009.

.2 (Closed) LER 05000272/2016-004-00: Containment Fan Coil Units Inoperable for Longer than Allowed by Technical Specifications

a. Inspection Scope

While performing quarterly stroke time testing of the No. 11 SW accumulator discharge valves, one of the two valves, 11SW535, closed faster than the five second minimum stroke time acceptance criterion. The test failure was due to not performing a specified PMT after the replacement of the valve's associated air supply valve. The inspectors reviewed PSEG's investigation, reviewed documents, interviewed PSEG staff, and walked down associated equipment. This condition was reportable under 10 CFR 50.73(a)(2)(i)(B) as any operation or condition which was prohibited by the plant's TSs. This LER is closed.

b. Findings

Introduction. The inspectors determined there was a Green self-revealing FIN involving an NCV of TS 6.8.1, "Procedures and Programs;" TS 3.6.2.3, "Containment Cooling Fans;" TS 3.6.1.1, "Primary Containment Integrity;" and TS 3.0.4, "Applicability." Specifically, PSEG did not perform a required PMT after replacing the air supply valve for SW accumulator discharge valve 11SW535. As a result, valve 11SW535 failed its subsequent TS required stroke time to close surveillance, and two of the five CFCUs were declared inoperable.

Description. On August 5, 2016, while performing a routine quarterly IST of both 11 SW accumulator discharge valves, the 11SW535 valve failed to meet its close stroke time acceptance criterion. It closed in 3.17 seconds, faster than the 5 - 15 second limiting value.

PSEG's investigation determined that the valve's associated air supply valve, which is adjusted to control the stroke time of 11SW535, had been replaced on May 11, 2016, because it was the cause for an upstream containment air supply check valve leak test failure. The PMT specified in the associated WO (60129204) listed both a leak rate test of the containment air supply check valve and completion of surveillance procedure S1.OP-ST.SW-0016(Q), "Inservice Testing, Service Water Accumulator Discharge Valves," to stroke test 11SW535. However, the specified stroke test portion of the PMT had not been performed; only the check valve leak test was completed. As a result, the air supply valve was not properly adjusted, and the stroke time of 11SW535 was not verified.

The accumulator discharge valves are designed to function (open) to inject stored SW from the associated nitrogen-pressurized accumulator into the CFCUs to prevent a water hammer event during postulated LOOP scenarios. The valves also must close after the

SW injection in order to prevent the injection of nitrogen from the SW accumulator into the SW system. There are two such accumulators, each associated with two CFCUs (and either train can provide the fifth CFCU). There are two SW accumulator discharge valves (in parallel) associated with each of the two accumulators.

PSEG determined that a senior reactor operator inappropriately closed out the PMT due to inadequate technical rigor and not ensuring that the appropriate retest requirements specified in the WO were satisfied. The senior reactor operator was an operations representative in the work control center who was processing (reviewing, assigning, forwarding, closing, etc.) outage work activities during the Salem Unit 1 spring 2016 refueling outage. In reviewing the WO, PSEG determined the senior reactor operator apparently noted that the leak rate test PMT had been completed; and being aware that the initial problem was a leaking air check valve, he failed to notice or question that the 11SW535 stroke test PMT was specified but not completed.

Upon identification on August 5, 2016, PSEG declared the two affected CFCUs (Nos. 11 and 12) inoperable and subsequently adjusted the air supply valve and satisfactorily stroke time tested 11SW535. PSEG then conducted a detailed evaluation of the affected CFCUs, including actual stroke times of related valves (e.g., other SW isolation valves that isolate the turbine building loads). It determined that the CFCU/SW discharge piping would have remain pressurized above saturation to prevent a void from occurring and the CFCUs would have been able to perform their safety function.

PSEG's CAs included coaching the staff involved in closing the WO without ensuring the specified PMT was completed and conducting an extent of condition review of approximately 350 similar retest activities (no further deficiencies were identified). PSEG is also planning an action to ensure that all WOs with PMTs requiring coordination/scheduling are included in the outage scope and/or mode hold reports. The inspectors reviewed PSEG's CAs and related evaluations and found them to be appropriate.

Analysis. The inspectors determined that PSEG's failure to perform the required PMT in accordance with station procedures following maintenance was a performance deficiency. This issue was more than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the incomplete PMT resulted in a delay in identifying a degraded stroke time and resultant inoperability of two CFCUs. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, Exhibit 2, and determined that the finding was Green because the finding did not result in an actual loss of function of a system or train. Specifically, PSEG conducted a detailed evaluation to determine past operability for the No. 11 and 12 CFCUs, which considered the postulated LOOP scenarios and actual valve stroke times (including the fast closure stroke time for 11SW535). The evaluation concluded that the CFCU/SW discharge piping water volume would have remained pressurized above saturation, thereby preventing void formation, and the CFCUs remained capable of performing their safety function.

The finding has a cross-cutting aspect in the area of Human Performance, Work Management, because the organization did not implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding

priority. Specifically, PSEG did not execute WO instructions to conduct the appropriate PMT following maintenance on an air supply valve for SW accumulator discharge valve 11SW535, which resulted in 11SW535 stroking closed too fast and required declaring two CFCUs inoperable. (H.5)

Enforcement. Technical Specification 6.8.1, "Procedures and Programs," requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of RG 1.33, Revision 2. Regulatory Guide, Appendix A, Section 9 requires, in part, that procedures for maintenance that can affect the performance of safety-related equipment be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Station procedure MA-AA- 1000, "Conduct of Maintenance Manual," Section 3.0, Item 28, requires that personnel thoroughly test equipment to ensure component and system operability prior to returning a component to service, and that the coordination of activities with Operations may be required for PMT which requires Operations involvement (i.e., surveillance tests).

Technical Specification 3.6.2.3, "Containment Cooling Fans," states, in part, that five containment cooling fans shall be operable; and if more than one or two are inoperable, then bring the unit to at least Hot Standby in six hours and Cold Shutdown in the next 30 hours if the fans are not restored to an operable status within seven days. Technical Specification 3.6.1.1, "Primary Containment Integrity," states, in part, that without primary containment integrity maintained (by verifying that each SW accumulator discharge valve response time is within limits), restore containment integrity within one hour or be in at least Hot Standby within the next six hours and in Cold Shutdown within the following 30 hours.

Additionally, TS 3.0.4, "Applicability," states, in part, that when a limiting condition for operation is not met, entry into a Mode or other specified condition in the Applicability shall only be made when the associated Actions to be entered permit continued operation in the Mode or other specified condition in the Applicability for an unlimited period of time; or after performance of a risk assessment addressing inoperable systems and components and establishment of RMAs.

Contrary to the above, on May 11, 2016, PSEG did not thoroughly test equipment to ensure component operability prior to returning a component to service after maintenance. Specifically, PSEG did not perform a required PMT after replacing the air supply valve for SW accumulator discharge valve 11SW535. The failure to perform the specified PMT resulted in the valve closing too fast during a subsequent routine surveillance, and two CFCUs were therefore considered inoperable for greater than the TS allowed outage time of seven days (from May 11, 2016, to August 5, 2016). Also, PSEG staff entered Mode 4 on July 24, 2016, following the completion of the Unit 1 refueling outage, and the No. 11 and 12 CFCUs were inoperable (i.e., limiting condition for operation not met) and a risk assessment addressing the inoperable systems was not completed.

PSEG entered the issue into the CAP as NOTF 20736868. PSEG's completed CAs included coaching the senior operator involved in closing the WO without ensuring the PMT was completed and a review of similar retest activities (no additional deficiencies identified). Because the finding was of very low safety significance (Green) and was entered into PSEG's CAP, this issue is being treated as an NCV consistent with

Section 2.3.2.a of the NRC's Enforcement Policy. (NCV 05000272/2017001-03, Failure to Conduct Post-Maintenance Testing Required by Procedure and Work Order Resulting in Inoperable Containment Fan Coil Units)

.3 (Closed) LER 05000272/2016-005-00: Instrumentation Channels Inoperable for longer than allowed by Technical Specifications

a. Inspection Scope

On August 11, 2016, an instrument channel check of the 13 over-temperature delta temperature (OTDT) instrument loop was unsatisfactory, and the 13 instrument loop was declared inoperable. PSEG subsequently determined that the pressurizer pressure channel 3 input to 13 OTDT had not been calibrated to the correct acceptance criteria during a refueling outage on April 21, 2016. The pressurizer pressure channel 3 instrument loop also provided input to the 1PR1 power operated relief valve (PORV). The unit was returned to Mode 3 on July 26, 2016, and Mode 1 on July 29, 2016, without the channel recalibration being performed. PSEG determined that the pressurizer pressure channel 3 instrument was inoperable when the unit was returned to service, which also rendered the 13 OTDT and 1PR1 PORV inoperable, and submitted this LER in accordance with 10 CFR 50.73 (a)(2)(i)(B), which states, in part, "Any operation or condition which was prohibited by the Plant's Technical Specifications." The inspectors reviewed the LER, the associated cause evaluation, and interviewed PSEG staff. This LER is closed.

b. Findings

A PSEG-identified NCV is documented in Section 4OA7 of this report. This LER is closed.

4OA5 Other Activities

.1 Institute of Nuclear Power Operations Report Review

a. Inspection Scope

The inspectors reviewed the final report for the Institute of Nuclear Power Operations (INPO) plant assessment of Salem Nuclear Generating Station conducted in August 2016. The inspectors evaluated this reports to ensure that NRC perspectives of PSEG performance were consistent with any issues identified during the assessments. The inspectors also reviewed these reports to determine whether INPO identified any significant safety issues that required further NRC follow-up.

b. Findings

No findings were identified.

.2 Other Inspection

Temporary Instruction (TI) 2515/192, "Inspection of the Licensee's Interim Compensatory Measures Associated with the Open Phase Condition Design Vulnerabilities in Electric Power Systems."

a. Inspection Scope

The objective of this performance based TI is to verify implementation of interim compensatory measures associated with an open phase condition (OPC) design vulnerability in electric power system for operating reactors. The inspectors conducted an inspection to determine if PSEG had implemented the following or equivalent interim compensatory measures. These compensatory measures are to remain in place until permanent automatic detection and protection schemes are installed and declared operable for OPC design vulnerability. The inspectors verified the following:

- PSEG had identified and discussed with plant staff the lessons-learned from the OPC events at the US operating plants including the Byron station OPC event and its consequences. This includes conducting operator training for promptly diagnosing, recognizing consequences, and responding to an OPC event.
- PSEG had updated plant operating procedures to help operators promptly diagnose and respond to OPC events on off-site power sources credited for safe shutdown of the plant.
- PSEG had established and continue to implement periodic walkdown activities to inspect switchyard equipment such as insulators, disconnect switches, and transmission line and transformer connections associated with the offsite power circuits to detect a visible OPC.
- PSEG had ensured that routine maintenance and testing activities on switchyard components have been implemented and maintained. As part of the maintenance and testing activities, PSEG assessed and managed plant risk in accordance with 10 CFR 50.65(a)(4) requirements.

b. Findings and Observations

No findings were identified.

The inspectors noted the following deviations from the prescribed expectations in the TI:

- PSEG had not conducted operator classroom or simulator training directly related to this TI regarding the lessons learned, diagnosing, recognizing consequences, and responding to an OPC event. There is no current plan to conduct such training or develop recurring training in this matter.

- While PSEG action items (70135245-080(1), -090(1)) to update plant operating procedures to diagnose and respond to OPC events were marked as complete, actions to incorporate additional electrical monitoring when prompted by rotating equipment trips that were documented as complete in CAP were not identifiable in the associated procedures.
- PSEG actions to inspect equipment in the 500kV switchyard were accomplished by equipment operators conducting visual inspections of the 500kV switchyard from the nearby turbine building roof with binoculars.

The TI contacts in the Office of Nuclear Reactor Regulation (NRR) were informed of the inspectors' observations for further agency evaluation.

40A6 Meetings, Including Exit

On April 13, 2017, the inspectors presented the inspection results to Mr. Kenneth Grover, Salem Plant Manager, and other members of the PSEG staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report. PSEG management acknowledged and did not dispute the findings.

40A7 Licensee-Identified Violations (IP9940A7)

The following PSEG-identified violations of NRC requirements was determined to be of very low safety significance (Green) and meet the NRC Enforcement Policy criteria for being dispositioned as an NCV. Specifically, PSEG identified that the 13 OTDT instrument loop was inoperable, performed a CAP evaluation, and determined multiple TS instruments which received inputs from 13 OTDT were also inoperable during the same time period. As a result, PSEG reported these conditions in LER 2016-005-00 (see Section 40A3 above) in accordance with 10 CFR 50.73 (a)(2)(i)(B), which requires, in part, reporting "Any operation or condition which was prohibited by the Plant's Technical Specifications."

- TS LCO 3.3.2.1 requires the ESFAS instrumentation channels and interlocks shown in Table 3.3-3 shall be operable. Table 3.3-3, Function 1.d, pressurizer pressure-low, requires that with the number of operable channels one less than the total number of operable channels in Modes 1, 2, and 3 (at and above the P-11 setpoint, or 1925 psig), startup and/or power operation may proceed provided that the inoperable channel is placed in the tripped condition within 6 hours.
- TS LCO 3.3.3.1 requires the reactor trip system instrumentation channels and interlocks of Table 3.3-1 shall be operable. Table 3.3-1, Functions 7 (OTDT), 8 (pressurizer pressure – low), and 9 (pressurizer pressure – high), require that with the number of operable channels one less than the total number of operable channels in Modes 1 and 2, startup and/or power operation may proceed provided that the inoperable channel is placed in the tripped condition within 6 hours.

- TS LCO 3.4.3 requires, in part, that two PORVs shall be operable in Modes 1, 2, and 3. Action b requires, in part, that with one PORV inoperable, within 1 hour either restore the PORV to operable status or close its associated block valve and remove power from the block valve; restore the PORV to operable status within the following 72 hours or be in hot standby within the next 6 hours and in hot shutdown within the following 6 hours.
- TS 3.0.4, "Applicability," states, in part, that when a limiting condition for operation is not met, entry into a Mode or other specified condition in the Applicability shall only be made when the associated Actions to be entered permit continued operation in the Mode or other specified condition in the Applicability for an unlimited period of time; or after performance of a risk assessment addressing inoperable systems and components and establishment of risk management actions.

Contrary to the requirements above, the conditions and associated action statements were not met following entry into Mode 1 on July 30, 2016, without a risk assessment, per TS 3.0.4, until the condition was corrected on August 12, 2016. These violations were more than minor because they were associated with the human performance attribute of the Mitigating System cornerstone, and adversely affected the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined that the finding was of very low safety significance (Green) IAW the screening criteria found in IMC 0609, Attachment 4 and Appendix A, Exhibit 3. PSEG entered this issue into the CAP under NOTF 20738126. Because the finding was of very low safety significance (Green) and was entered into PSEG's CAP, this issue is being treated as an NCV consistent with Section 2.3.2.a of the NRC's Enforcement Policy.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION**KEY POINTS OF CONTACT**

Licensee Personnel

C. McFeaters, Site Vice President
 K. Grover, Plant Manager, Salem
 M. Ambrosino, Engineering Programs Manager
 T. Cachaza, Senior Regulatory Compliance Engineer
 L. Clark, Instrument Supervisor, Hope Creek
 A. Douthwaite, ALARA Engineer
 K. Down, Air-Operated Valve Engineer
 M. Hassler, Salem Radiation Protection Manager
 L. Martino, Radiation Protection Supervisor
 P. Martitz, Radiation Protection Superintendent
 T. Mulholland, Shift Operations Manager
 M. Phillips, Regulatory Compliance Assurance
 G. Toft, ALARA Specialist

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Open and Closed

05000272/2017001-01	FIN	Loss of Unit 1C 4kV Vital Bus due to Inadequate Activity Risk Screening (Section 1R13.1)
05000272/2017001-02	NCV	Inadequate Fire Risk Assessment and Management (Section 1R13.2)
05000272/2017001-03	NCV	Failure to Conduct Post-Maintenance Testing Required by Procedure and Work Order Resulting in Inoperable Containment Fan Coil Units (Section 4OA3.2)
Closed		
05000311/2015-003-00	LER	Both Trains of High Head Safety Injection Inoperable Due to a Relief Valve Failure (Section 4OA3.1)
05000272/2016-004-00	LER	Containment Fan Coil Units Inoperable for Longer than Allowed by Technical Specifications (Section 4OA3.2)
05000272/2016-005-00	LER	Instrumentation Channels Inoperable for Longer Than Allowed by Technical Specification (Section 4OA3.3)

LIST OF DOCUMENTS REVIEWED

* Indicates NRC-identified

Section 1R04: Equipment Alignment

Procedures

S1.OP-SO.AF-0001, Auxiliary Feedwater System Operation, Revision 34
 S1.OP-SO.SW-0001, Service Water Pump Operation, Revision 28
 S1.OP-SO.SW-0005, Service Water System Operation, Revision 39
 S1.OP-ST.SW-0013, Service Water Valve Verification Modes 1 - 4, Revision 2
 S2.OP-SO.FO-0001, Emergency Diesel Fuel Oil System Operation, Revision 13
 S2.OP-SO.DG-0001, 2A Diesel Generator Operation, Revision 39
 S2.OP-ST.DG-0004, 21 Fuel Oil Transfer System Operability Test, Revision 24
 S2.OP-TM.ZZ-0002, Tank Capacity Data, Revision 8
 S2.RA-ST.DG-0004, Diesel Generator Auxiliaries 21 Fuel Oil Transfer System Operability Test Acceptance Criteria, Revision 10

Notifications

20675842	20677011	20683421	20696796	20699313	20700162
20704256	20710236	20715499	20724740	20743252	20757765
20757795*	20758004*	20758088*			

Drawings

ECCS-1: ECCS System, Revision 4
 205236 Sh. 1, No. 1 Auxiliary Feedwater, Revision 62
 205242 Shs. 1, 2 & 3, No. 1 Unit Service Water Nuclear Area, Revisions 97 & 91
 205249 Sh. 3, Fuel Oil, Revision 32
 211306, No.1 & 2 Units Diesel Generators Fuel Oil Instrument Schematic, Revision 11

Work Orders

30220277	30220278	30222900	30242847	50157219	50188800
60125339					

Calculations

S-C-DF-MDC-0852, Fuel Oil System – Design Calculation of System Parameters, Revision 0
 S-C-DF-MDC-1316, Salem 1 & 2 EDG Fuel Oil Storage Basis, Revision 2

Completed Surveillance Tests

S1.OP-ST.SW-0013, Service Water Valve Verification Modes 1 - 4, performed 11/17/16
 S2.OP-ST.DG-0004, 21 Fuel Oil Transfer System Operability Test, performed 9/27/16, 10/27/16 & 12/2/16
 S2.OP-ST.DG-0005, 22 Fuel Oil Transfer System Operability Test, performed 10/7/16, 11/4/16 & 12/11/16

Other Documents

DE-CB.DG-0024, Emergency Diesel Generator System Configuration Baseline Document, Revision 4

Evaluations: 70175060, 70180330, 70181856, 70185753

NRC Information Notice No. 89-50: Inadequate Emergency Diesel Generator Fuel Supply, dated 5/30/89

TRXN No. 7075, SAP Lineup 837, dated 11/15/16

Unit 2 Off Normal report, dated 3/1/17

WCDs: 4170921, 4407144, & 4408868

Section 1R05: Fire Protection

Procedures

FP-AA-024, Fire Drill Record, Salem Circ Water Switchgear House, dated 03/10/2016
 FP-SA-1511, Pre-Fire Plan Unit 1 Auxiliary Equipment Area RHR, Revision 0
 FP-SA-1651, Pre-Fire Plan Unit 1 Service Water Intake Structure, Revision 0
 FP-SA-1852, Pre-Fire Plan Unit 1 Circ Water Switchgear, Revision 0
 FP-SA-2543, Pre-Fire Plan Unit 2 Auxiliary Feedwater Pumps Area, Revision 0
 FP-SA-2555, Pre-Fire Plan Unit 2 Diesel Generator Area, EL.100, Revision 0
 FP-SA-2562, Pre-Fire Plan Unit 2 Auxiliary Building Ventilation Units, Revision 0
 FP-SA-2651, Pre-Fire Plan Unit 2 Service Water Intake Structure, Revision 0
 S1.OB-AB.Fire-0001, Control Room Fire Response, Revision 7
 S1.OP-AR.ZZ-0010, Salem CW Switchgear Trouble,
 SH.FP-EO.ZZ-0002, Fire Department Fire Response, Alarm K-42, Revision 44

Notifications

20578222	20753593*	20753900*	20753905*	20753925*	20754289*
20754493*	20755475*	20755492	20755496*	20757638*	20757784*

Other Documents

Drill Scenario 54264229, Salem Circulating Water Switchgear House, dated 03/10/2017

Section 1R06: Flood Protection Measures

Procedures

S2.OP-AB.ZZ-0002, Flooding, Revision 4
 SC.FP-SV.FBR-0026, Flood and Fire Barrier Penetration Seal Inspection, Revision 6
 SC.OP-SO.BD-0001, Station Sumps, Revision 10

Drawings

205323 Sheet 3, No. 2 Unit Building & Equipment Drains - Conventional, Revision 47
 602103, Unit 1 & 2 Penetration Seal Locations EL 64' Room Numbering Floor Plan, Revision 1
 602105, Unit 1 & 2 Penetration Seal Locations EL 84' Room Numbering Floor Plan, Revision 1
 602141, Unit 1 Penetration Seal Locations Room 15401 EL 84' North-South Corridor Unit 1 & 2
 Common - East Wall, Revision 2
 605819, No. 1 & 2 Unit Auxiliary Bldg Boundary Locations Floor Plan EL 64', Revision 0

Other Documents

NLR-N93109, Generic Letter 88-20: Individual Plant Examination (IPE) Report for Salem
 Generating Station Unit Nos. 1 and 2, dated 7/30/93
 SA-PRA-012, Salem Generating Station Probabilistic Risk Assessment – Internal Flood
 Evaluation Summary Notebook, Revision 1
 SC.FP-SV.FBR-0026, Flood and Fire Barrier Penetration Seal Inspection, performed 1/16/15
 and 7/3/16
 S-C-ZZ-SDC-1203, Moderate Energy Break Analysis (Reconstitution), Revision 3
 VTD 327742, Penetration Seal Inspection List SC10, Revision 2

Section 1R11: Licensed Operator Requalification Program

Procedures

2-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 32
 TQ-AA-106-0204, PSEG Licensed Operator Requal Training Simulator Exercise Template,
 Revision 2

Other Documents

S-ESG-1701, Simulator Training Scenario, Revision 0

Section 1R12: Maintenance Effectiveness

Procedures

ER-AA-310-1005, Maintenance Rule – Dispositioning Between (A)(1) and (A)(2), Revision 10
 SC.MD-PM.ZZ-0092, Disassembly, Inspection, and Reassembly of Rockwell-Edward Piston
 Check Valves, Revision 10

Notifications

20755953*	20759382	20759421	20759542	20759543	20761347*
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Work Orders

30295154	70171811	70189597
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Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

WC-AA-105, Work Activity Risk Management, Revision 6
 WC-AA-101-1002, On Line Scheduling Process, Revision 22
 OP-AA-108-116, Protected Equipment Program, Revision 12
 SC.MD-PM.CBV-0002, Containment Fan Coil Unit Motor Heat Exchangers Internal Inspection,
 Revision 20
 SC.MD-PM.CBV-0004, Containment Fan Coil Unit Heat Exchangers Internal Inspection,
 Revision 21
 S2.OP-AB.SF-0001, Loss of Spent Fuel Pool Cooling, Revision 41
 S1.OP-AR.ZZ-0002, B-3 Alarm Response
 S1.OP-SO.115-0011, 1A Vital Instrument Bus UPS System Operation, Revision 15
 S1.OP-SO-DG-0005, Preparation for Removing a Diesel Generator from Service, Revision 8

Notifications

20127985	20128140	20751669	20753593*	20753596	20753978
20754217*	20754261	20754290*	20754585	20755728*	20756145*
20758370*	20754435				

Drawings

SF-1, Spent Fuel Pool Cooling, Revision 1
 VC-1, Control Area HVAC, Revision 1
 ELE-4, Vital Instrument Bus Inverter, Revision 1
 ELE-5, MISC. 115 VAC Distribution, Revision 1

Work Orders

30292355
 60127051

Other Documents

Salem Units 1 and 2 Risk Assessments for Work Week 702, Revisions 1 and 2
 Salem Units 1 and 2 Risk Assessments for Work Week 704, Revisions 1 and 2 Apparent Cause
 Evaluation, "1C" 4kV Vital Bus Trip Caused by Bumped Door, Revision 3.
 TARP Investigation Report, Salem Unit 2 B. 4kV Vital Bus De-energized
 NOS054KVAC0-08, 4160 Electrical System

Section 1R15: Operability Determinations and Functionality Assessments

Procedures

S1.OP-SO.CC-0002, 11 and 12 Component Cooling Heat Exchanger Operation, Revision 31

Notifications

20722132	20754170*	20754387	20754454*	20754529	20756147*
20761433*	20761451*	20751458	20734847	20748691	20713684
20713553	20751413*	20751688*	20750661	20751593	

Work Orders

70049849	70190734	70183089	30306253	70091135
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Other Documents

UFSAR 5.2.7.1.1, 8.3, 9.5.5 through 9.5.7

RG 1.45, Reactor Coolant Pressure Boundary Leakage Detection Systems, 1973

DE.CB.SW-0047, Configuration Baseline Documentation for Service Water System, Revision 7

1PT- S1CVC-1CVE22, 13 Charging Pump Vibrations Data

Section 1R18: Plant Modifications

Notifications

20752493	20752502	20753194	20755831*	20755836*	20756203*
20757828*	20758081*				

Work Orders

30166752
60133152

Other Documents

10 CFR 50.59 Review (80119416)

Section 1R19: Post-Maintenance Testing

Procedures

MA-AA-716-012, Post Maintenance Testing, Revision 20

SH.MD-GP.ZZ-0240, System Pressure Test at Normal Operating Pressure and Temperature,
Revision 10

Notifications

20752779*	20754390*	20755206*	20755728*	20751454	20752092
20752112	20752913	20752506	20753475	20759233	20761897
20759581	20754604*				

Drawings

205201, Sh. 2, Reactor Coolant, Revision 39

228262, Sh. 23, Reactor Containment, RC Pressurizer and Pressure Related Tank Piping,
Revision 0

238208, Sh.72, Sampling System, Revision 28

Work Orders

30197930	30197975	30295116	30295117	30300875	60073149
60128079	60130293	60132891	60133303	60133846	60120049
80111545	80106028				

Completed Surveillance Tests

S1.OP-ST.AF-0002, Inservice Testing - 12 Auxiliary Feedwater Pump, performed 3/7/17
S1.OP-ST.AF-0004, Inservice Testing - Auxiliary Feedwater Valves, performed 3/7/17
S1.OP-ST.RPI-0001, IST - Remote Position Verification - Aux Bldg, performed 3/7/17

Other Documents

S-C-AF-MDC-0445, Auxiliary Feedwater System Hydraulic Analysis, Revision 3
UFSAR Section 3.2.1.2

Section 1R20: Refueling and Other Outage Activities

Procedures

S1.OP-IO.ZZ-0004, Power Operation, Revision 64
S1.OP-IO.ZZ-0005, Minimum Load to Hot Standby, Revision 23
S1.OP-IO.ZZ-0008, Maintaining Hot Standby, Revision 15

Notifications

20757944* 20757945* 20758041* 20758042*

Work Orders

60119569
60122645
60122646

Other Documents

CR980801173
Evaluations: 70062527, 70163272

Section 1R22: Surveillance Testing

Procedures

SC.MD-CM.115-0001, 10/12 KVA Uninterruptible Power Supply Troubleshooting and Repair, Revision 18
SC.MD-PM.115-0002, 10/12 KVA Vital Instrument Bus Inverter Parts Replacement, Revision 2
S1.OP-ST.4KV-0002, Electrical Power Systems AC Distribution, Revision 25
CC-AA-201, Plant Barrier Control Program, Revision 6
S2.OP-ST.SW-0015, Inservice Testing Service Water System CFCU and Accumulator Check Valves, Revision 9
S1.OP-SO.SW-0005, Service Water System Operation, Revision 39
S1.OP-SO.RC-0004, Identifying and Measuring Leakage, Revision 15
S1.OP-ST.RC-0008, Reactor Coolant System Water Inventory Balance, Revision 27
S1.OP-AR.DG-0002, 1B Diesel Generator Alarm Response, Revision 14
S1.OP-ST.DG-0002, 1B Diesel Generator Surveillance Test, Revision 49

Notifications

20719245	20720422	20720884	20721414	20727719	20735565
20737255	20740708	20748270	20751190	20752547	20752548
20753168*	20753279*	20753978	20755229*	20755233*	20755486*
20756014*	20756171	20756173	20756191	20756194	20756198
20756457	20756458	20756459	20756460	20756461	20756461
20757842*	20757842*	20758410*			

Work Orders

50183443	50189273	50190649	50191250	60132403
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Completed Surveillance Tests

S1.OP-ST.DG-0002, 1B Diesel Generator Surveillance Test, performed 3/6/17

Other Documents

70189930-0100, Determine if Unit 1 Service Water Piping Room Door C12-1 was in an Unanalyzed Condition
 30153966 – 0270 – 0020, Evaluation of Unit 2 Service Water Pipe Room Doors Being Open to Support CFCU Maintenance Windows
 DE-CB.DG-0024, Emergency Diesel Generator System Configuration Baseline Document, Revision 4
 NRC Regulatory Guide 1.9, Application and Testing of Safety-Related Diesel Generators in Nuclear Power Plants, Revision 4

Section 1EP6: Drill Evaluation

Procedures

2-EOP-TRIP-1, Reactor Trip or Safety Injection, Revision 32
 TQ-AA-106-0204, PSEG Licensed Operator Requal Training Simulator Exercise Template, Revision 2

Other Documents

S-ESG-1701, Simulator Training Scenario, Revision 0

Section 2RS1: Access Control to Radiologically Significant Areas

Procedures

RP-AA-460, Control for High and Very High Radiation Areas, Revision 17
 RP-AA-463, High Radiation Area Key Control, Revision 4

Notifications

20748900

Section 2RS2: Occupational ALARA Planning and Controls

Notifications

20749275

Work Orders

70189528

Section 2RS3: In-plant Airborne Radioactivity Control and Mitigation

Notifications
20745910

Other Documents

Tri Air Testing, Inc. Laboratory Report: Compressed Air/Gas Quality Testing for PSEG-Sael Eagleair System

Section 2RS5: Radiation Monitoring Instrumentation

Notifications
20746900

Other Documents

K&S Associates Calibration Report for PSEG Nuclear Transfer Standards, December 2016

Section 4OA1: Performance Indicator Verification

Notifications
20756175*

Other Documents

Salem Units 1 and 2 Chemistry DEI data

Section 4OA2: Problem Identification and Resolution

Procedures

LS-AA-120, Issue Identification and Screening Process, Revision 14

MA-AA-1000, Conduct of Maintenance Manual, Revision 17

MA-AA-716-012, Post Maintenance Testing, Revision 20

S1.OP-SO.CBV-0003(Q), Filling and Venting Containment Fan Coil Units, Revision 9

S1.OP-ST.SW-0016(Q), IST, Service Water Accumulator Discharge Valves, Revision 8

S1.RA-ST.SW-0016(Q), IST, Service Water Accumulator Discharge Valves Acceptance Criteria, Revision 15

Notifications

20734692	20736868	20737822	20751904*	20752512*	20752570*
20753336*	20753583*	20755464*	20756041	20758004*	20758088*
20758410*	20758733*	20758975*	20759276*	20759296*	20759414*
20759461*	20760238*	20763007*			

Drawings

205242, Unit 1 Service Water Nuclear Area, Sheet 3, Revision 100

205242, Unit 1 Service Water Nuclear Area, Sheet 6, Revision 94

205242, Unit 1 Service Water Nuclear Area, Sheet 7, Revision 5

205242-SIMP, Unit 1 Service Water Simplified, Sheet 2, Revision 5

Work Orders

60129204

Miscellaneous

20734692, Quick Human Performance Investigation, Improper Retest of 11SW535 Following Replacement of its Control Air Throttle Valve, Revision 0
70188548, Technical Evaluation, 11SW535 Review for Past Operability due to Fast Stroke Time in Closed Direction, Revision 0
S1.OP-ST.SW-0016(Q), IST, Service Water Accumulator Discharge Valves, performed 8/5/16

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures

LS-AA-120, Issue Identification and Screening Process, Revision 14
MA-AA-1000, Conduct of Maintenance Manual, Revision 17
MA-AA-716-012, Post Maintenance Testing, Revision 20
S1.OP-SO.CBV-0003(Q), Filling and Venting Containment Fan Coil Units, Revision 9
S1.OP-ST.SW-0016(Q), IST, Service Water Accumulator Discharge Valves, Revision 8
S1.RA-ST.SW-0016(Q), IST, Service Water Accumulator Discharge Valves Acceptance Criteria, Revision 15

Notifications

20734692	20736868	20737822	20756041	20758975*	20759461*
20738126	29748894				

Drawings

205242, Unit 1 Service Water Nuclear Area, Sheet 3, Revision 100
205242, Unit 1 Service Water Nuclear Area, Sheet 6, Revision 94
205242, Unit 1 Service Water Nuclear Area, Sheet 7, Revision 5
205242-SIMP, Unit 1 Service Water Simplified, Sheet 2, Revision 5

Work Orders

60129204	70188332	70188798	70173371
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Miscellaneous

20734692, Quick Human Performance Investigation, Improper Retest of 11SW535 Following Replacement of its Control Air Throttle Valve, Revision 0
70188548, Technical Evaluation, 11SW535 Review for Past Operability due to Fast Stroke Time in Closed Direction, Revision 0
S1.OP-ST.SW-0016(Q), IST, Service Water Accumulator Discharge Valves, performed 8/5/16

Section 4OA5: Other Activities

Notifications

20556774	20569211	20749314	20749468	20751879*	20753293*
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Work Orders

70135245
70190645

Other Documents

ML12312A062
ML14030A478

LIST OF ACRONYMS

10 CFR	Title 10 of the Code of Federal Regulations
ADAMS	Agencywide Documents Access and Management System
ACE	apparent cause evaluation
ACIT	action tracking item
AFW	auxiliary feedwater
ALARA	as low as is reasonably achievable
ANSI	American National Standards Institute
BIT	boron injection tank
CA	corrective action
CAP	corrective action program
CFCU	containment fan coil unit
CFR	Code of Federal Regulations
CV	charging
ECCS	emergency core cooling system
EDG	emergency diesel generator
EFFR	effectiveness review
FIN	finding
GPM	gallons per minute
HX	heat exchanger
IMC	inspection manual chapter
INPO	Institute of Nuclear Power Operations
IPE	individual plant examination
IR	inspection report
IST	inservice test
kV	kilovolt
LER	licensee event report
LOOP	loss of offsite power
MR	maintenance rule
NCV	non-cited violation
NOUE	notice of unusual event
NOTF	notification(s)
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OOS	out of service
OPC	open phase condition
OTDT	over-temperature delta temperature
PDP	positive displacement pump
PI	performance indicator
PMT	post-maintenance testing
PORV	power operated relief valve
PSEG	Public Service Enterprise Group Nuclear LLC
RCA	root cause analysis
RCP	reactor coolant pump
RCS	reactor coolant system
RG	regulatory guide
RHR	residual heat removal
RMA	risk management action
RTP	rated thermal power
RV	relief valve
SCBA	self-contained breathing apparatus
SDP	significance determination process

SFP	spent fuel pool
SSC	structure, system, and component(s)
SW	service water
SWGR	switchgear
TCP	transient combustible permit
TI	temporary instruction
TS	technical specification
UE	unusual event
UFSAR	Updated Final Safety Analysis Report
WO	work order