

Salem 1

1Q/2013 Plant Inspection Findings

Initiating Events

Significance: G Mar 31, 2013

Identified By: NRC

Item Type: FIN Finding

Inadequate Relay Testing Instructions Cause Loss of One Offsite Power Source

(Green) A self-revealing finding was identified because the work instructions used to perform relay testing on January 21, 2013, did not include the level of detail required by site work planning standards. Specifically, they did not specify the test switches that needed to be open to isolate the transformer for the testing. This caused the loss of #4 station power transformer (SPT), which caused both units to align the 4160 Vac vital buses to a single source of offsite power and Unit 2 to reduce power to 95 percent when it lost half of its running circulating water pumps. Planned corrective actions include updating relay procedures and reevaluating the risk assignment of relay work.

The performance deficiency was determined to be more than minor because it is associated with the procedure quality attribute of the Initiating Events cornerstone and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shut-down as well as power operations. Specifically, PSEG work instructions did not include which test switches were required to be opened prior to testing, which led to the loss of one source of offsite power at each unit and Unit 2 down-powering due to the loss of circulating water pumps. In accordance with IMC 0609.04, "Initial Screening and Characterization," and Exhibit 1 of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. This finding had a cross-cutting aspect in the area of Human Performance, Work Control, because PSEG did not plan and coordinate work activities consistent with nuclear safety. Specifically, PSEG did not incorporate risk insights on the potential impact on offsite power during #4 SPT maintenance. As a result, PSEG did not plan and coordinate work activities to minimize the probability or consequences of the loss of off-site power. [H.3(a)]

Inspection Report# : [2013002](#) (*pdf*)

Mitigating Systems

Significance: G Mar 31, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Install the Correct Size Zinc Anode in 11 Service Water Strainer Results in Strainer Trip

(Green) The inspectors identified an NCV of 10 CFR Part 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," because PSEG did not assure that replacement zinc anodes procured for the service water (SW) strainers conformed to procurement documents. Specifically, PSEG did not confirm the critical characteristics of the SW replacement zinc anodes before they were installed in the SW system. As a result, a zinc anode that did not meet procurement standards, which was installed in the 11 SW strainer, degraded over time, fell

into the strainer and stopped it from rotating. PSEG repaired the strainer and corrected the part procurement code as immediate corrective actions.

The performance deficiency was determined to be more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The issue was also similar to IMC 0612, Appendix E, Example 5.c, in that an incorrect and inadequate part was installed in 11 SW strainer and the strainer was returned to service. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," and determined that the finding was of very low safety significance (Green) because the deficiency did not affect the design or qualification of the SW system, did not represent a loss of system safety function and did not represent an actual loss of function of a single train for greater than its TS allowed outage time. This finding has a cross-cutting aspect in the area of Human Performance, Resources, because PSEG did not ensure that complete, accurate and up-to-date design documentation, procedures, and work packages, and correct labeling of components. Specifically, neither the SW strainer maintenance procedure, the strainer design drawing, nor the material master for the SW strainer zinc anode part identified critical dimensions or physical characteristics for the zinc anode that could have been used by technicians to ensure the correct replacement anode was installed in the 11 SW strainer. [H.2(c)]

Inspection Report# : [2013002](#) (pdf)

Significance: G Dec 31, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Maintain Adequate Liquid CO2 Inventory for Fire Suppression

The inspectors identified a Green NCV of the Unit 1 Operating License Condition 2.C because PSEG did not maintain an adequate CO2 inventory to ensure the operability of the installed deluge fire suppression system in accordance with the approved Fire Protection Plan. Specifically, the CO2 tank liquid level gage was not calibrated periodically, the gage was stuck at 72 percent level for a period of five months, and the tank lost pressure and was inoperable because it was empty on September 1, 2012. This issue was entered into PSEG's corrective action program (CAP) as notification 20573227. PSEG's immediate corrective actions were to establish compensatory measures to restore fire protection system operability of the affected spaces on September 2, 2012, and then to complete replacement of the failed tank liquid level gage, leak check the tank and associated piping, and refill the liquid CO2 tank to restore the CO2 tank to operable status on October 23, 2012.

The performance deficiency was determined to be more than minor because it affected the protection against external factors attribute of the Mitigating Systems cornerstone, in that it impacted automatic fire suppression capability, and affected the cornerstone objective of ensuring the availability of systems that respond to external events. The finding was evaluated under IMC 0609, Appendix F, "Fire Protection Significance Determination Process." The conditional core damage probability was calculated utilizing SAPHIRE 8 for Salem Unit 1. Since the delta core damage frequency calculated in step 2.1.4 of Appendix F was less than the value specified in table 2.1.3, "Phase 2 Screening Step 1 Quantitative Screening Criteria," the finding was determined to be of very low safety significance (Green). This finding has a cross-cutting aspect in the area of human performance, work control component. PSEG did not appropriately coordinate work activities by incorporating actions to plan work activities to support long-term equipment reliability by limiting safety system unavailability and reliance on manual actions. Specifically, a liquid level gage calibration preventive maintenance (PM) to maintain operability of the ten ton CO2 tank was created in accordance with vendor guidance in 2008, but the PM had not been implemented as of September 1, 2012.

Inspection Report# : [2012005](#) (pdf)

Significance: G Jun 30, 2012

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

13 Service Water Strainer Unavailability due to Inadequate Post Maintenance Test

A self-revealing NCV of Technical Specification (TS) 6.8.1.a, "Procedures and Programs," was identified because the 13 service water (SW) strainer failed while in-service on March 13, 2012. PSEG failed to perform adequate post-maintenance testing (PMT) on the 13 SW strainer before declaring it operable on January 13, 2012, and therefore did not find adequate clearance between the strainer drum and body. This issue was entered into PSEG's CAP as notification 20550115. PSEG's immediate corrective actions were to replace the strainer drum o-ring, adjust the strainer clearances, and perform a PMT of the strainer.

The inspectors determined that the performance deficiency was more than minor because it was associated with the human performance attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the trip of the 13 SW strainer while the 14 SW pump was inoperable for planned maintenance resulted in Salem Unit 1 entering a 72 hour unplanned limiting condition of operation (LCO) for 11.5 hours. The finding was evaluated in accordance with IMC 0609, Attachment 4, "Initial Screening and Characterization of Findings," and was determined to require additional evaluation. The finding was subsequently evaluated in IMC 0609, Phase 3 utilizing the NRC's SAPHIRE 8 risk analysis SDP interface tool using the Salem specific standardized plant analysis review model, and confirmed to be of very low safety significance. This finding has a cross-cutting aspect in the area of human performance, work practices, because PSEG personnel did not follow procedures. Specifically, PSEG personnel failed to comply with procedure "Service Water Auto Strainer Adjustment, Inspection, Repair and Replacement," which required an evaluation of a torque curve generated by a baker box.

Inspection Report# : [2012003](#) (*pdf*)

Significance: G Jun 30, 2012

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Correct Repeat Failures in Safety-Related Solenoid Valves in a Timely Manner

A self-revealing NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified because PSEG did not correct a condition adverse to quality. Specifically, repeat failures of solenoid operated valves (SOVs) with voltage applied greater than design voltage has not been corrected in a timely manner and caused a failure of the 11 control area chiller (CAC).

The performance deficiency 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 objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using IMC 0609, Attachment 4, "Initial Screening and Characterization of Findings," the inspectors determined that a single train of a safety-related system was unavailable for eight hours, less than the TS allowed outage time. Therefore, the issue was of very low safety significance (Green) because it did not result in a loss of system safety function, loss of a single train for greater than TS allowed outage time, or potentially risk-significant due to a fire, flooding, or severe weather initiating event. Immediate corrective actions taken included replacement of the failed SOV, and compensatory measures include periodic temperature monitoring of similar energized SOVs. This finding has a cross-cutting aspect in the area of problem identification and resolution, corrective action program, because PSEG did not take appropriate corrective actions to address a safety issue in a timely manner, commensurate with the safety significance and complexity. Specifically, the premature failure of SOVs, due to a higher than design voltage that created higher than design heat in the coil and insulation, was a known issue that was not corrected in a timely manner.

Inspection Report# : [2012003](#) (*pdf*)

Significance:  Jun 30, 2012

Identified By: NRC

Item Type: NCV NonCited Violation

Deficient Control of Transient Equipment in Seismic Class Auxiliary Building

The inspectors identified a NCV of TS 6.8.1.a, "Procedures and Programs," because PSEG failed to properly control and store transient material within seismic class I buildings such that the equipment did not pose a hazard to safe plant operation. Specifically, two large tool gang boxes were stored unrestrained in the vicinity of the sodium hydroxide storage tank and associated containment spray valves and two full 55 gallon SW maintenance drums were stored unrestrained next to the 11, 12, and 15 containment fan cooler unit SW flow transmitters. This issue was entered into PSEG's CAP as notification 20559092. PSEG's immediate corrective actions were to restrain the subject material in accordance with the PSEG procedure CC-AA-320-011, "Transient Loads."

The performance deficiency 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 objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The issue was also similar to IMC 0612, Appendix E, "Examples of Minor Issues," example 4.a, which stated the issue was more than minor if the licensee routinely failed to follow their procedure and safety-related equipment was adversely impacted. Specifically, PSEG was not following the requirements of procedure CC-AA-320-011, "Transient Loads," and equipment had been stowed in close vicinity of safety-related equipment. The finding was evaluated under IMC 0609, Attachment 4, "Initial Screening and Characterization of Findings." The inspectors determined that the finding is of very low safety significance (Green) because it did not involve loss or degradation of equipment specifically designed to mitigate a seismic event, and did not involve total loss of a safety function that contributes to external event initiated core damage sequences. The finding has a cross-cutting aspect in the area of human performance, work practices, in that PSEG did not define and effectively communicate expectations regarding procedural compliance and personnel did not follow procedures. Specifically, station personnel did not follow procedures for the storage of transient loads in the auxiliary building.

Inspection Report# : [2012003](#) (*pdf*)

Barrier Integrity

Significance:  Mar 31, 2013

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Correct Condition Adverse to Quality in Service Water Check Valve

(Green) A self-revealing NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified because PSEG did not complete corrective actions to address degraded valve bearings (i.e., installing new bearings) identified by technicians during SW check valve maintenance in 2010. As a result, binding of the valve disk occurred, which allowed silt accumulation to occur on the valve seat, which prevented the check valve from closing during testing on October 23, 2012. Corrective actions included updating the procedure and ensuring detailed explanations of unsatisfactory conditions that will result in the appropriate use of "mode holds" during outages that ensures completion of significant corrective action items.

The performance deficiency was determined to be more than minor because it affected the containment configuration control attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure of the check valve to fully close due to silt accumulation, impacted operability of a service water containment fan cooling unit (CFCU) SW accumulator, which degraded the affected CFCU's cooling water flow, reducing their containment heat removal capacity, which could affect containment integrity if the affected CFCUs were relied upon for containment cooling during an event. In accordance with IMC 0609.04, "Initial Screening and Characterization," and Exhibit 3 of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency did not represent an actual pathway in the physical integrity of the reactor containment, containment isolation system, or heat removal components. This finding has a cross-cutting aspect in the area of Human Performance, Work Practices, because PSEG did not effectively communicate expectations regarding compliance with procedures. Specifically, PSEG failed to install parts required by the internal inspection procedure that led to the check valve being inoperable [H.4(b)].

Inspection Report# : [2013002](#) (*pdf*)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

Miscellaneous

Last modified : June 04, 2013