

# Salem 1

## 3Q/2011 Plant Inspection Findings

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### Initiating Events

**Significance:** G Jul 21, 2011

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

#### **Untimely Completion of Corrective Actions Results in No. 11 Service Water Strainer Trip Due To Grassing**

The inspectors identified a self-revealing Green non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because the 11 service water strainer overloads tripped on February 9, 2011, due to binding of the strainer rotating drum, which rendered the 11 service water pump inoperable and unavailable. The binding occurred because PSEG did not complete timely corrective actions for a condition adverse to quality identified following an April 4, 2010, 11 service water strainer trip. Specifically, PSEG did not repair excessive grooves on the strainer body wear surface by taking the actions specified in the corrective action program in January 2011. The grooves caused river grass to become trapped between the rotating strainer drum and body wear surface, which eventually bound and tripped the strainer overloads. (4OA2.1c(3))

This performance deficiency was more than minor because PSEG did not complete timely corrective actions for excessive grooving identified on 11 strainer's body wear ring in January 2011, which degraded the availability and reliability of the 11 service water pump. The finding was determined to be of very low safety significance in accordance with IMC 0609, Appendix A. A Phase 3 analysis was required because the Salem Pre-solved Risk-Informed Inspection Notebook does not address the loss of one train of SW. An external event evaluation was also conducted, because the internal event increase in core damage frequency (?CDF) was in the E-7 range. This finding has a cross-cutting aspect in the area of problem identification and resolution, corrective action program, because PSEG did not implement timely actions to repair excessive grooves identified in the 11 service water strainer body wear ring in January 2011 because work control documents were not correctly coded in July 2010 (P.1(d)).

Inspection Report# : [2011004](#) (pdf)

Inspection Report# : [2011009](#) (pdf)

**Significance:** G Jun 30, 2011

Identified By: Self-Revealing

Item Type: FIN Finding

#### **INADEQUATE CONTROL OF SWITCHYARD MAINTENANCE**

A self-revealing finding of very low safety significance was identified on April 1, 2011, because a 500 KV load break disconnect 3T60 failed to operate upon the restoration of switchyard maintenance. This caused a four-hour delay in the restoration from a single source of offsite power, the exit from a 72-hour limiting condition for operation (LCO), and the extension of a yellow probability risk assessment condition. PSEG investigation revealed that the vendor, who was conducting maintenance on the 3T60 disconnect, removed the motor control fuse holder that was not a part of the tagout for the maintenance. PSEG determined that the cause of the disconnect not closing was that PSEG did not adequately brief and control the maintenance evolution. PSEG entered this event into their CAP as notification 20503254. PSEG's immediate corrective actions were to reinstall the fuses and close the 3T60 disconnect.

The inspectors determined that the failure of PSEG to assign a supplemental workforce supervisor or task manager to provide in-field supervision of the 3T60 disconnect maintenance in accordance with AD-AA-2001, "Management and Oversight of Supplemental Workforce", was a performance deficiency. The inspectors determined that the performance deficiency was more than minor because it is associated with the human performance attribute of the Initiating Events cornerstone and it adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions. The finding was evaluated under IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings", and the inspectors concluded that a Phase 2 evaluation was required since the finding contributed to both the likelihood of a reactor trip and the likelihood that mitigating systems would not have been available. This conclusion was based upon the potential for emergency diesel generator

(EDG) operation to be challenged upon the loss of all offsite power. A regional Senior Reactor Analyst completed a Phase 3 evaluation under the SDP. The performance deficiency was characterized as of very low safety significance (Green) based upon the results of this evaluation. The inspectors determined that this finding has a cross-cutting aspect in the area of human performance, because PSEG did not ensure supervisory and management oversight of the vendor work activity. Specifically, PSEG personnel did not assign a supervisor to provide in-field supervision, conduct an adequate pre-job brief with the vendor, and did not conduct an adequate post-maintenance restoration walkdown of the 3T60 switchyard maintenance. (H.4(c))

Inspection Report# : [2011003](#) (pdf)

**Significance:**  Mar 31, 2011

Identified By: Self-Revealing

Item Type: FIN Finding

### **UNIT 1 MAIN GENERATOR VOLTAGE REGULATOR**

A self-revealing finding of very low safety significance was identified for the failure of PSEG to resolve a long standing issue with the reliability of the Unit 1 main generator voltage regulator (VR). A failure in the Unit 1 main generator VR resulted in an automatic reactor trip due to a turbine trip above 50 percent power. Corrective actions include the planned replacement of the VR with a nuclear industry proven design during the October 2011 refueling outage. PSEG entered this issue into their CAP as notification 20481250.

The performance deficiency was more than minor because it is associated with the equipment performance attribute of the Initiating Events cornerstone and it adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. The finding was evaluated under IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings". The inspectors determined that the finding is of very low safety significance (Green) because it does not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. The inspectors determined that this finding has a cross-cutting aspect in the area of human performance, because PSEG affected long term plant safety by not minimizing long-standing equipment issues. Specifically, considering the increase in the number of Unit 1 main generator VR failures since 2007, PSEG did not resolve the lack of vendor and part support for the Unit 1 main generator VR in a timely manner. (H.2(a))

Inspection Report# : [2011002](#) (pdf)

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## **Mitigating Systems**

**Significance:**  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

### **IMPROPER CONTROL OF TRANSIENT COMBUSTIBLE MATERIAL**

The inspectors identified a NCV of Salem Operating License condition 2.C.5, that requires PSEG implement all provisions of the Fire Protection Program as described in the Updated Final Safety Analysis Report (UFSAR). Specifically, PSEG stored a rod drive motor generator (MG) set in a CCZ without an engineering evaluation that assessed risk and established compensatory measures. This finding was determined to be of very low safety significance (Green). This issue was entered into PSEG's CAP as notification 20509419. PSEG's immediate corrective actions were to issue a valid TCP and remove the transient combustibles from the CCZ within the next three days.

PSEG procedure MA-AA-716-010, "Maintenance Planning Process", required that TCPs necessary to complete work be identified by maintenance planning and procedure FP-AA-011, "Control of Transient Combustible Material", required a TCP for transient combustibles be staged in a CCZ. The inspectors determined that this was a performance deficiency because PSEG procedure FP-AA-011 stated that transient combustible material was prohibited in a CCZ when not constantly attended or approved by a TCP. This finding was more than minor because it is associated with the external factors attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to

ensure the availability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the identified transient combustibles were located in a CCZ that was required to limit challenges to physical separation afforded by steel floor hatches above the CCZ. Using IMC 0609, Appendix F, "Fire Protection SDP", the inspectors determined that this issue involved the finding category, "Fire Prevention and Administrative Controls". Referencing IMC 0609, Appendix F, Attachment 2, "Degradation Rating Guidance Specific to Various Fire Protection Program Elements", the inspectors assigned a low degradation rating to the issues involving the failure to comply with PSEG's transient combustible program. The inspectors' conclusions were based on the fact that none of the items found in the combustible free zone could be considered transient combustibles of significance, as described in IMC 0609, Appendix F, Attachment 2. This attachment defined transient combustibles of significance as low flash point liquids (below 200°F) and self-igniting combustibles (oily rags). Because this item was assigned a "low degradation" rating this issue was of very low safety significance (Green) in accordance with IMC 0609, Appendix F, Task 1.3.1. This finding had a cross-cutting aspect in human performance in the area of work control, because PSEG personnel did not coordinate work activities consistent with nuclear safety. Specifically, work groups did not communicate, coordinate, and cooperate with each other during the replacement and removal of the 22 rod drive MG set in order to minimize fire risk and comply with the plant operating license. (H.3(b))

Inspection Report# : [2011003](#) (pdf)

**Significance:**  Feb 18, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

#### **INADEQUATE CALCULATIONS FOR DEGRADED VOLTAGE RELAY VOLTAGE SETPOINT**

The team identified a finding of very low safety significance involving a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control", because PSEG had not verified the adequacy of the design for the DVR voltage setpoint. Specifically, PSEG had not performed calculations for motor starting and running conditions, and for operation of other safety-related equipment based on voltages afforded by the degraded voltage relays. PSEG entered this issue into their corrective action program and performed preliminary calculations to demonstrate reasonable assurance of operability.

The finding is more than minor because it is associated with the design control 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. The team evaluated the finding in accordance with IMC 0609, Attachment 0609.04, Phase 1 – Initial Screening and Characterization of Findings, Table 4a for the Mitigating Systems Cornerstone. The team determined that the finding was of very low safety significance because it was a design deficiency confirmed not to result in loss of operability.

The team determined that this finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Operating Experience Component, because PSEG did not ensure that relevant internal and external operating experience was collected, evaluated, and communicated to affected internal stakeholders in a timely manner. Specifically, PSEG did not adequately evaluate a similar finding documented in a Hope Creek Generating Station NRC component design bases inspection report in November 2009 (NCV 05000354/2009007-03) and missed an opportunity in their internal response to NRC Information Notice 2008-02, "Findings Identified During Component Design Bases Inspections", issued in March 2008.

Inspection Report# : [2011007](#) (pdf)

**Significance:**  Feb 18, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

#### **FAILURE TO PERFORM A TS REQUIRED BATTERY PERFORMANCE TEST**

The team identified a finding of very low safety significance (Green) involving a non-cited violation of Salem Unit 1 Technical Specification (TS) Surveillance Requirement (SR) 4.8.2.5.2.h. Specifically, the team identified that PSEG did not perform a battery capacity test of the 1B 28VDC battery within 12 months of the previous performance test that showed signs of degradation (battery capacity as measured on October 28, 2008, dropped more than 10 percent compared to the April 26, 2004, performance test). PSEG promptly entered TS 4.0.3 and completed all TS 4.0.3

requirements for a surveillance not performed within its specified frequency. Additionally PSEG entered the issue into their corrective action program to evaluate the casual factors for long-term corrective action and scheduled the 1B 28VDC battery performance test during the next scheduled Salem Unit 1 shutdown.

The finding is more than minor because it is 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 availability of the 1B 28VDC battery was not ensured by performing additional surveillance testing to monitor for battery degradation. The team evaluated the finding in accordance with IMC 0609, Attachment 0609.04, Phase 1 – Initial Screening and Characterization of Findings, Table 4a for the Mitigating Systems Cornerstone. The team determined that the finding was of very low safety significance because it was a qualification deficiency confirmed not to result in loss of operability.

The team determined that this finding has a cross-cutting aspect in the area of Human Performance, Work Practices Component, because PSEG personnel did not follow procedure requirements during the 1B 28VDC battery performance discharge surveillance test. Specifically, personnel did not follow step 5.12.21 of SC.MD-FT.28D-0003, which required technicians to mark the surveillance data sheet “Yes” for “Battery Degraded”, notify supervision, and initiate a corrective action notification if the calculated battery performance capacity drop was greater than 10 percent.

Inspection Report# : [2011007](#) (*pdf*)

**Significance:**  Dec 31, 2010

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **13 Turbine Driven Auxiliary Feedwater Pump Trip Mechanism**

A self-revealing NCV of Appendix B, Criterion V, “Instructions, Procedures, and Drawings”, was identified because of two unexpected trips of the turbine trip valve (1MS52) for the 13 turbine driven auxiliary feedwater (TDAFW) pump. Specifically, adjustments made to the overspeed linkage for the 13 TDAFW pump using a threaded rod, which was installed on the head lever, were not prescribed by documented procedures or drawings. These adjustments led to the increased sensitivity of the trip mechanism that resulted in the two unexpected trips. The issue was entered into the CAP as notification 20469586. PSEGs immediate corrective action was to remove the threaded rod from the 13 TDAFW head lever. An extent of condition inspection on the 23 TDAFW pump resulted in the removal of a threaded rod from the 23 TDAFW pump head lever.

The trips of the 1MS52 valve and repairs to the overspeed trip mechanism resulted in 41 hours of unavailability of the 13 TDAFW pump. In accordance with NRC IMC 0609, Attachment 4, the inspectors performed a Phase 1 SDP screening and determined the finding was of very low safety significance (Green) because it was not a design or qualification deficiency, did not result in an actual loss of safety function, and was not potentially risk significant for external events. This finding had a cross-cutting aspect in the area of human performance, resources, because PSEG did not ensure that complete accurate and up-to-date procedures and work packages were available and adequate to assure nuclear safety. Specifically, the procedure used to set the overspeed trip did not address adjustment of the threaded rod. (H.2(c)) (Section 1R12)

Inspection Report# : [2010005](#) (*pdf*)

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## **Barrier Integrity**

**Significance:**  Feb 18, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO IDENTIFY AND CORRECT A CONDITION ADVERSE TO QUALITY AFFECTING THE CREACS EXPANSION JOINTS**

The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action", because PSEG did not identify and correct a condition adverse to quality. Specifically, PSEG did not identify and correct the degraded condition of the Unit 1 and Unit 2 control room emergency air conditioning system (CREACS) common suction expansion joints because they did not implement appropriate preventive maintenance (PM) per their performance-centered maintenance (PCM) template. PSEG placed the finding and the associated issues in its corrective action program. In response to the identified control room envelope (CRE) breach, operators promptly entered TS 3.7.6 and initiated mitigation actions. PSEG affected prompt repairs, performed an appropriate post maintenance test, declared the CRE fully operable, and exited the TS limiting condition for operation action statement.

The finding is more than minor because it is associated with the barrier performance attribute of the Barrier Integrity Cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the control room operators from radionuclide releases caused by accidents or events. The finding was evaluated in accordance with IMC 0609, Attachment 4, Table 4a for the containment barrier. Since the finding had the potential to impact more than the radiological barrier function, a Region I Senior Reactor Analyst (SRA) performed a Phase 3 analysis. The SRA determined that the dominant sequence involved a sufficient degradation of the CREACS barrier that would allow sufficient in-leakage to force an evacuation of the control room during a fire or toxic gas event. The areas with the degradation were in room 15615 and 25615 for Units 1 and 2, respectively. The SRA evaluated these areas and determined that the potential impact due to in-leakage through the degraded barrier from fire and toxic gas would be negligible. The SRA also reviewed the results of recent CRE in-leakage testing conducted in September 2010. The condition of the expansion joint tearing and wear could reasonably be assumed to have existed during the September testing. This testing also confirmed that the total in-leakage in these areas was small. Based on the above factors, the SRA determined the finding was of very low safety significance (Green).

The team determined that this finding has a cross-cutting aspect in the area of Human Performance, Work Control Component, because PSEG did not plan work activities to support long-term equipment reliability by ensuring that maintenance scheduling was more preventive than reactive. Specifically, PSEG did not implement appropriate PMs on the CREACS filter expansion joints necessitating several reactive corrective maintenance activities.

Inspection Report# : [2011007](#) (*pdf*)

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## **Emergency Preparedness**

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## **Occupational Radiation Safety**

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## **Public Radiation Safety**

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## **Physical Protection**

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

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## **Miscellaneous**

**Significance:** N/A Jul 21, 2011

Identified By: NRC

Item Type: FIN Finding

**Biennial PI&R Summary Assessment**

The inspectors concluded that PSEG was generally effective in identifying, evaluating, and resolving problems. PSEG personnel identified problems, entered them into the corrective action program at a low threshold, and prioritized issues commensurate with their safety significance. In most cases, PSEG appropriately screened issues for operability and reportability, and performed causal analyses that appropriately considered extent of condition and cause, generic issues, and previous occurrences. The inspectors also determined that PSEG typically implemented corrective actions to address identified problems in a timely manner. However, for one issue reviewed by the inspectors, the corrective actions completed by PSEG were not timely and the inspectors determined that this was a violation of NRC requirements, in the area of corrective action implementation.

The inspectors concluded that, in general, PSEG adequately identified, reviewed, and applied relevant industry operating experience to Salem operations and identified appropriate corrective actions. In addition, based on those items selected for review, the inspectors determined that PSEG self-assessments and audits were thorough and appropriately used the corrective action program to initiate corrective actions for identified issues.

With respect to safety conscious work environment, based on interviews and reviews of the corrective action program and the employees concerns program (ECP) the inspectors did not identify conditions that negatively impacted the site's safety conscious work environment and determined that site personnel were willing to raise safety issues through multiple means.

Inspection Report# : [2011009](#) (*pdf*)

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