

## Salem 2

### 3Q/2015 Plant Inspection Findings

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#### Initiating Events

**Significance:**  Mar 31, 2014

Identified By: Self-Revealing

Item Type: FIN Finding

##### **Inadequate Inspection of Isolated Phase Main Bus Duct Cooling Fan Sheave**

A self-revealing Green FIN was identified against PSEG procedure MA-AA-716-009, "Use of Maintenance Procedures," Revision 5, when PSEG staff did not follow "the rules of usage for Maintenance Department procedures" as applied to work on a Unit 2 isolated phase bus cooling fan. Specifically, PSEG staff did not perform inspection and testing as required. Subsequently, the 2B fan belts broke causing high temperatures in the bus enclosure, control room alarms, and an unplanned reduction to 51 percent reactor thermal power. As interim corrective actions, PSEG entered this in their corrective action program (CAP), initiated a prompt investigation, installed fan belts and swapped operations to the 2A motor, and established weekly readings to monitor drive belt conditions.

The issue was more than minor since it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and adversely impacted its objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure of the drive belts resulted in an unplanned downpower. The finding was evaluated in accordance with IMC 0609, Attachment 4, and Appendix A where it screened as very low safety significance (Green) as a support system initiator. Specifically, the finding did contribute to the likelihood of, or cause, both an initiating event and affect mitigation equipment. The finding had a cross-cutting aspect in the area of Human Performance, Teamwork, in that individuals and work groups communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, PSEG operations, maintenance, and engineering staff did not coordinate to ensure that inspections and testing were completed appropriately or that decisions not to complete steps as required were reviewed by the appropriate departments.

Inspection Report# : [2014002](#) (*pdf*)

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#### Mitigating Systems

**Significance:**  Sep 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

##### **Inadequate Operability Determination of Auxiliary Feedwater Flow Rate Indicator**

The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," when PSEG did not adequately implement procedure OP-AA-108-115, "Operability Determinations & Functionality Assessments." Specifically, PSEG did not properly evaluate and document an adequate basis for operability of an AFW flow rate indicator prior to restoring it to an operable status. PSEG re-declared the channel inoperable, vented air from the transmitter, took satisfactory voltage readings prior to declaring the channel operable, and entered this issue in their CAP.

The issue was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding was evaluated in accordance with IMC 0609, Attachment 4 and Appendix A, where it screened to Green since it did not affect the design or qualification of a mitigating structure, system, and component (SSC), did not represent a loss of system and/or function, and did not represent an actual loss of at least a single train for greater than its technical specification (TS) allowed outage time. The finding had a cross-cutting aspect in the area of Human Performance, Conservative Bias, in that licensee staff use decision making-practices that emphasize prudent choices over those that are simply allowable. Specifically, PSEG did not take a conservative approach to decision making, particularly when information was incomplete and conditions were unusual. Further, PSEG management did not take timely action to address degraded conditions commensurate with their safety significance.

Inspection Report# : [2015003](#) (*pdf*)

**Significance:**  Jun 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

#### **Inadequate Chiller Maintenance Procedure**

The inspectors identified a Green NCV of TS 6.8.1, “Procedures and Programs,” as described in Regulatory Guide (RG) 1.33, Revision 2, February 1978, when PSEG performed chiller water system maintenance activities that were not properly preplanned in accordance with documented instructions, resulting in multiple chiller system trips on both units. Specifically, PSEG maintenance procedure SC.MD-PM.CH-0001, “ACME Chiller Compressor Inspection and Repair,” did not incorporate documented instructions from the vendor technical document. PSEG performed an apparent cause evaluation (ACE) 70171934, and revised the maintenance procedure that included detailed vendor instructions.

This finding was more than minor because it was associated with the equipment performance attribute of the Mitigating System cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, failure to install the chiller evaporator gasket in accordance with written instructions from the vendor manual resulted in multiple chiller failures. Using IMC 0609, Attachment 4, “Initial Characterization of Findings,” and Exhibit 2 of IMC 0609, Appendix A, “The Significance

Determination Process for Findings At-Power,” dated June 19, 2012, the inspectors determined that this finding was of very low safety significance (Green) because the finding was not a design or qualification deficiency, did not represent a loss of safety system function, did not represent the loss of function for any TS system, train, or component beyond the allowed TS outage time, and it did not represent an actual loss of function of any non TS trains of equipment designated as high safety significance in accordance with PSEG’s maintenance rule program. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, in that licensees thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their significance. Specifically, PSEG did not thoroughly evaluate chiller divider plate head gasket failures in 2012, such that the resolution addressed the inadequate maintenance procedure instructions.

Inspection Report# : [2015002](#) (*pdf*)

**Significance:**  May 22, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

**Failure to Correct a Condition Adverse to the Quality of the Chillers**

The inspectors identified a Green NCV of 10 CFR, Part 50, Appendix B, Criterion XVI, because PSEG did not assure that an identified condition adverse to quality was corrected. The condition adverse to quality was associated with improper maintenance of the 12 chiller which led to the chiller failure on August 23, 2014. Specifically, a procedure related to compressor rebuilds was not effectively updated to address the improper maintenance practice. PSEG entered this violation into the CAP as notification 20690927, has placed compressor rebuilds that would require use of this procedure on hold, and has purchased new compressors for contingent replacement pending completion of the compressor maintenance procedure changes. The inspectors determined this performance deficiency was more than minor because it was associated with the procedure quality attribute of the Mitigating System cornerstone, and adversely affected the cornerstone objective of ensuring the reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, improper torqueing of the No. 4 discharge valve plate bolts for the 12 chiller caused the trip of that chiller on August 23, 2014, and, absent the procedural change, the vulnerability continued to exist for the occurrence of future improper torqueing and subsequent chiller failure. The inspectors determined that this finding screened to Green in accordance with IMC 0609, Appendix A, because the finding did not represent an actual loss of function of at least a single train for greater than its technical specification allowed outage time. The inspectors determined that this finding had a cross-cutting aspect in evaluation, because PSEG Root Cause 70169007 did not identify the improper torqueing of the discharge plate bolts as a condition adverse to quality. Consequently, PSEG assigned an action (ACIT) to address the problem, rather than a corrective action (CA) which, per LS-AA-125, requires additional reviews that verify the quality of completed corrective actions before closure. [P.2]

Inspection Report# : [2015008](#) (pdf)

**Significance:**  Mar 31, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

**Inadequate Corrective Actions for HELB Barrier Controls**

Inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, when PSEG did not implement adequate corrective actions from a previous Green NCV in a timeframe commensurate with its safety significance. Specifically, inadequate corrective actions resulted in high energy line break (HELB) and moderate energy line break (MELB) barriers being unsecured without implementing the associated station process. PSEG immediate corrective actions were to secure the affected barriers and enter these examples in their CAP as 20677643, 20683127, 20680283, and 20680680.

The issue was evaluated in accordance with IMC 0612, Appendix B, and determined to be more than minor since it was associated with the configuration control attribute of the Mitigating Systems cornerstone and adversely affected its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The issue was then evaluated using IMC 0609, Appendix A, where it screened to Green since it was not associated with a design or qualification deficiency or loss of system or function. The issue had a cross-cutting issue in Problem Identification and Resolution, Evaluation, in that organizations thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, PSEG did not thoroughly investigate and evaluate the previous NCV issues in order to understand the bases for staff decisions and the underlying organizational and safety culture contributors.

Inspection Report# : [2015001](#) (pdf)

**Significance:**  Dec 31, 2014

Identified By: NRC

Item Type: NCV Non-Cited Violation

**Failure to Promptly Correct Reactor Coolant Pump Turning Vane Bolt Failures**

The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” because PSEG staff did not promptly correct a condition adverse to quality related to failed Unit 2 reactor coolant pump (RCP) turning vane bolts. Specifically, PSEG staff’s “use as is” evaluation in 2012 was not technically adequate to support their conclusion that contact between the pump turning vane and rotating impeller was acceptable in the event all turning vane bolts failed. As a result, PSEG did not complete corrective actions to perform a pump specific technical analysis or replace the bolts until this issue was identified in July 2014. PSEG completed corrective actions to replace all Unit 2 RCP turning vane bolts with an improved material and measured pump internal dimensions to determine that, for each pump, turning vane to impeller contact would not have prevented proper RCP coast down, invalidate their locked rotor analysis, or result in debris that could impact the reactor coolant system. PSEG staff entered this issue into their CAP (notifications 20660176, 20660177, 20660191, 20660175 and 20660173).

Failure to promptly correct a condition adverse to quality was a performance deficiency. The finding was evaluated in accordance with IMC 0612, Appendix B, and determined to be more than minor because it affected the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the dropped turning vanes adversely affected the operating RCP lineup, and the supporting documentation errors brought into question their effect on the RCP locked rotor accident analysis and resulted in additional field work. The finding was then evaluated using IMC 0609, Attachment 4 and Appendix A, where it was screened to Green because it was a qualification deficiency of a mitigating component, the RCP as related to its coast down capability that ultimately retained its functionality. The finding was determined to have a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because PSEG, in addition to prior operating experience-related reports, had two opportunities in 2011 and 2012 when broken bolts were discovered, to thoroughly evaluate the technical basis for their conclusion that RCP turning vane dislodgement and contact with rotating pump components was acceptable. When PSEG thoroughly considered the problem in 2014, they determined that there was not adequate pump specific internal clearance information to support their prior technical conclusions that turning vane contact was acceptable.

Inspection Report# : [2014005](#) (*pdf*)

## Barrier Integrity

**Significance:**  Jun 30, 2015

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

### Untimely Corrective Actions For Service Water Outlet Valve

A self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” was identified when PSEG did not implement corrective actions in a timely manner. Specifically, PSEG identified a degrading trend in the stroke time for the 25 containment fan cooling unit (CFCU) service water (SW) outlet valve, 25SW72, but failed to implement corrective actions to address the trend prior to its failure to stroke in the required time. PSEG troubleshooting identified that air pressure on its air regulator had been set too low for the air volume required to stroke the valve. PSEG adjusted the regulator air and entered this issue in their corrective action program (CAP) as notifications 20661667, 20661710, and 20662206.

The issue was determined to be more than minor since it was associated with the system, structure, or component and barrier performance attribute of the Barrier Integrity cornerstone, and adversely affected its objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the lack of timely corrective actions ultimately resulted in exceeding the valve’s capability to

reposition in the in-service test (IST) and Updated Final Safety Analysis Report (UFSAR) required stroke time for containment isolation. The finding was evaluated in accordance with Exhibit 3 of IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, where it screened to very low safety significance (Green) since it did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, and heat removal components, nor did it involve the hydrogen igniter function. The inspectors determined this finding has a cross-cutting aspect in Human Performance, Teamwork, in that individuals and work groups communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, PSEG staff did not collaborate during operational activities such as CAP implementation, work management, and trend analyses to ensure the degrading stroke time was addressed.

Inspection Report# : [2015002](#) (*pdf*)

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## Emergency Preparedness

**Significance:** G Jun 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

### Inadequate Seismic EAL Scheme

The inspectors identified a Green NCV of 10 CFR 50.54(q)(2) when PSEG did not maintain an adequate emergency classification and action level scheme that met the planning standards of 10 CFR 50.47(b). Specifically, PSEG did not establish an effective emergency plan with respect to declaring an Alert for seismic activity in excess of an operating basis earthquake (OBE), specifically vertical acceleration. PSEG entered this issue into their CAP as notification 20691160 and developed a temporary Operations standing order.

The issue was determined to be more than minor since it was associated with the procedure quality attribute of the Emergency Preparedness cornerstone, and adversely affected its objective to ensure that licensees are capable of implementing adequate measures to protect the health and safety of the public in the event of radiological emergency. Specifically, PSEG would not declare on Alert based on exceeding their OBE without actuation of the Hope Creek seismic switch. The issue was reviewed in accordance with IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process," issued September 26, 2014, where it screened to very low safety significance (Green) since the seismic Alert emergency action level (EAL) had been rendered ineffective such that it would not be declared for seismic activity for the OBE vertical acceleration level. The inspectors determined this finding has a cross-cutting aspect in the area in Problem Identification and Resolution, Operating Experience, in that the organization systematically and effectively collects, evaluates and implements relevant external operating experience in a timely manner. The inspectors determined that PSEG staff did not thoroughly evaluate NRC Information Notice (IN) 2012-25, Performance Issues with Seismic Instrumentation and Associated Systems for Operating Reactors, published on February 1, 2013. Specifically, PSEG initiated CAP notification 20594195 in response to IN 2012-025, and took credit for previous actions completed to adjust SC.OP-AB.ZZ-0004, "Earthquake," but did not account for the vertical direction ground motion acceleration differences between Salem and Hope Creek.

Inspection Report# : [2015002](#) (*pdf*)

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## Occupational Radiation Safety

**Significance:** G Jun 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

**Inadequate HRA Controls**

The inspectors identified a Green NCV of TS 6.12, ‘High Radiation Area,’ when PSEG did not apply appropriate controls to high radiation areas. Specifically, the Unit 1 and 2 reactor cavities in containment, which are areas that exceed 1.0 rem/hour at 30 centimeters, were not properly controlled to prevent unauthorized personnel access. PSEG entered this issue in their CAP as notification 20682903 and installed six foot high scissor fences around each reactor cavity.

The issue was determined to be more than minor since it was associated with the program and process attribute of the Occupational Radiation Safety cornerstone, and adversely affected its objective to ensure the adequate protection of the worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. Specifically, high radiation areas with dose rates greater than 1.0 rem/hour at 30 centimeters were not properly controlled to prevent unauthorized personnel access. It was also similar to IMC 0612, Appendix E, example 6.g, in that access to a posted high radiation area (HRA) was not controlled in accordance with site TSs, a HRA actually existed, and it was not properly barricaded. The finding was then evaluated using IMC 0609, Appendix C, ‘Occupational Radiation Safety Significance Determination Process,’ issued August 19, 2008, where it screened to very low safety significance (Green) since it was not associated with an as low as is reasonably achievable (ALARA) issue, did not involve an overexposure, did not constitute a substantial potential for overexposure, and did not compromise PSEG’s ability to assess dose. The inspectors determined this finding has a cross-cutting aspect in the area of Human Performance, Avoid Complacency, in that individuals recognize and plan for the possibility of latent problems, even while expecting successful outcomes. Specifically, PSEG was not sufficiently aware of latent deficiencies in HRA access control given opportunities to identify the inadequate HRA controls when performing containment entries during normal plant operation and when routinely establishing the reactor cavities as locked high radiation areas following refueling outages.

Inspection Report# : [2015002](#) (*pdf*)

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## Public Radiation Safety

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## 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.

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## Miscellaneous

**Significance:** N/A May 22, 2015

Identified By: NRC

Item Type: FIN Finding

**Biennel PI&R Overall 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 (CAP) at a low threshold, and prioritized issues commensurate with their safety significance. The inspectors concluded that PSEG adequately identified, reviewed, and applied relevant industry operating experience to Salem operations, and completed self-assessments and audits as required. PSEG adequately screened issues for operability and reportability, and generally performed causal analyses that appropriately considered extent of condition, generic issues, and previous occurrences. The inspectors also determined that PSEG typically implemented corrective actions (CAs) that addressed problems identified in the CAP in a timely manner. However, the inspectors identified a violation of NRC requirements in the area of effectiveness of corrective actions.

Based on interviews the inspectors conducted over the course of the inspection, observations of plant activities, and reviews of individual CAP and employee concerns program issues, the inspectors did not identify any indications that site personnel were unwilling to raise safety issues through various available means.  
Inspection Report# : [2015008](#) (*pdf*)

Last modified : December 15, 2015