

## Salem 2

# 1Q/2015 Plant Inspection Findings

---

## Initiating Events

**Significance:** G Jun 30, 2014

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

### **Failure to Maintain Shutdown Margin Calculation Procedure to Cover certain Mispositioned Control Rod Events**

The inspectors determined there was a Green, self-revealing violation of TS 6.8.1, "Procedures and Programs," as described in Regulatory Guide 1.33, Revision 2, February 1978, when PSEG did not maintain procedure SC.RE-ST.ZZ-0002, "Shutdown Margin Calculation," to cover certain mispositioned control rod events. Consequently, PSEG performed unnecessary rapid boration, and a subsequent manual reactor trip, in response to a control rod drop event on January 31, 2014. PSEG entered this in their corrective action program (CAP), implemented compensatory measures for calculating shutdown margin, performed an apparent cause evaluation, and initiated actions to correct the cause of the problem, extent of condition, and extend of cause.

The issue was more than minor because it was associated with the procedure quality attribute of the initiating events cornerstone, and adversely affected the 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, the finding resulted in unnecessary rapid boration and a manual reactor trip. Using IMC 0609, Attachment 4, "Initial Characterization of Findings," and IMC 0609, Appendix A, "The SDP for Findings At-Power," the inspectors determined that this finding was of very low safety significance (Green) because it did not cause the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, Teamwork, because PSEG work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained [H.4]. Specifically, PSEG reactor engineering and operations services did not communicate and coordinate a change to the shutdown margin calculation procedure that was conducted in response to vendor-issued guidance. Inspection Report# : [2014003](#) (*pdf*)

**Significance:** G 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*)

## Mitigating Systems

**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)

**Significance:**  Jul 24, 2014

Identified By: NRC

Item Type: NCV Non-Cited Violation

**Salem Nuclear Generating Station, Unit Nos. 1 and 2 - NRC Component Design Bases Inspection Report**

The team identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” because PSEG did not promptly identify and correct conditions adverse to quality. Specifically, PSEG did not promptly identify and correct degraded conditions associated with the Unit 1 and Unit 2 auxiliary feedwater storage tank (AFWST) and refueling water storage tank (RWST) instrumentation panels. PSEG entered the associated issues into their corrective action program (CAP) as notifications 20654991, 20654996, 20656136, 20657114, 20657115, and 20657117. PSEG’s short-term corrective actions included installing bolts/plugs on the Unit 1 RWST panel 378-1 and unplugging the failed fan in Unit 1 AFWST panel 802-1.

The team determined that the inadequate identification and resolution of the conditions adverse to quality is a performance deficiency that was within PSEG’s ability to foresee and correct. The finding is associated with the Mitigating Systems cornerstone and is more than minor because if left uncorrected it could lead to a more significant safety concern. Specifically, if left uncorrected, the continued exposure to external environmental elements and/or existing internal degraded conditions could potentially result in loss of level indication, non-conservative level indication, and/or loss of low level alarm functions. In accordance with IMC 0609.04, “Initial Characterization of Findings,” and Exhibit 2 of IMC 0609, Appendix A, “The Significance Determination Process for Findings At-Power,” issued June 19, 2012, the team determined that the finding is of very low safety significance (Green), because the finding was a deficiency affecting the design or qualification of a mitigating system, structure, or component (SSC), where the SSC maintained its operability.

Inspection Report# : [2014007](#) (pdf)

---

## Barrier Integrity

**Significance:**  Jun 30, 2014

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

### **Inadequate Solid Pressurizer Control Resulted in Low Temperature Overpressure Relief Lifting**

A self-revealing, Green non-cited violation (NCV) of TS 6.8.1, "Procedures and Programs," was identified when PSEG did not control reactor coolant system (RCS) pressure in accordance with a procedure. Consequently, on April 13, 2014, this resulted in lifting a low temperature over-pressure protection valve during solid pressurizer operations. PSEG completed a prompt investigation, an apparent cause evaluation, entered this in their CAP, and submitted a Special Report to the NRC in accordance with TS 6.9.2.

Non-compliance with an operating procedure was a performance deficiency that was more than minor because it was associated with the human performance attribute of the Barrier Integrity cornerstone and affected its objective to provide reasonable assurance that physical design barriers (reactor coolant system) protect the public from radionuclide releases caused by accidents or events. It was also similar to IMC 0612, Appendix E, example 4.b in that not accomplishing activities in accordance with procedures is more than minor if it results in a trip or transient. Specifically, not following the procedure resulted in a reactor coolant system pressure transient that caused a protective relief valve to lift. The issue was evaluated using IMC 0609, Attachment 4, and determined to be associated with the Barrier Integrity cornerstone based on the PORV acting as an RCS boundary mitigator. Since the finding was associated with a shutdown event, IMC 0609, Appendix G, Attachment 1, Exhibit 4.A was used to determine significance. Since the finding was not associated with a freeze seal, nozzle dam, criticality drain-down path, leakage path, or safety injection actuation and did not involve or result in PORV unavailability or a setpoint issue, it screened to Green. The finding had a cross-cutting aspect in the area of Human Performance, Challenge the Unknown, in that individuals stop when faced with uncertain conditions. Specifically, a PSEG operator did not stop his activity after his first attempt to control pressure, communicate the unexpected RCS pressure response to supervision, and resolve the issue prior to resuming activities.

Inspection Report# : [2014003](#) (pdf)

---

## Emergency Preparedness

---

## Occupational Radiation Safety

**Significance:**  May 04, 2014

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

### **Failure to Establish and Implement Adequate Radiation Protection Procedures**

A self-revealing NCV of very low safety significance was identified for failure to establish and implement TS 6.8 required procedures. Specifically, PSEG did not establish and implement adequate procedures for transfer and control

of radioactive material within the Unit 2 fuel transfer canal that resulted in an unrecognized loss of location of radioactive material. As a result, PSEG did not recognize a loss of the location of radioactive material and, on May 4, 2014, did not establish and implement adequate radiological controls to provide for prompt identification and exposure control of elevated radiation dose rates to workers caused by radiation emanating from the radioactive material as water shielding was drained from the unexpected location. PSEG suspended the draining evolution, controlled the affected area, and entered this issue into their CAP (Notifications 20582871, 20649575, 20649581).

The failure to implement TS required radiation protection procedures is a performance deficiency (PD). The PD was determined to be more than minor because it was related to the programs and process attribute of the occupational radiation safety cornerstone, and adversely affected the cornerstone objective to ensure adequate protection of worker health and safety from exposure to radiation from radioactive material during routine reactor operation. Further, if left uncorrected, the PD had the potential to lead to a more significant safety concern if undetected. The finding was assessed using IMC 0609, Appendix C, 2 Enclosure, "Occupational Radiation Safety SDP," dated August 19, 2008, and was determined to be of very low safety significance (Green) because: 1) it was not related to the as low as reasonably achievable (ALARA) program; 2) did not result in an overexposure or a substantial potential for overexposure; and 3) did not compromise PSEG's ability to assess dose. This finding has a cross-cutting aspect of Work Management of the Human Performance cross-cutting component. Specifically, PSEG did not implement adequate planning, control and execution of work activities associated with transfer of radioactive material to ensure the identification and management of risk commensurate to the work such that nuclear safety was an overriding priority.

Inspection Report# : [2014003](#) (*pdf*)

---

## 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 16, 2015