

Salem 2

4Q/2014 Plant Inspection Findings

Initiating Events

Significance: G Jun 30, 2014

Identified By: Self-Revealing

Item Type: NCV NonCited 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: NRC

Item Type: NCV NonCited Violation

Inadequate Online Risk Assessment for an Adverse Change in Grid Conditions

The inspectors identified a Green NCV of Title 10 of the Code of Federal Regulations (10 CFR) 50.65(a)(4) when PSEG inadequately assessed risk during a period of adverse grid conditions. On January 7, 2014, the regional transmission organization declared a Maximum Emergency Generation Action, a condition that PSEG was procedurally required to consider a high risk evolution (HRE) for a loss of offsite power (LOOP). Specifically, PSEG was to elevate online risk to a Yellow condition; however, PSEG did not assess risk as Yellow. PSEG subsequently elevated their risk condition, protected equipment, took other risk management actions (RMAs), and entered the issue in their CAP.

The issue was more than minor since it was associated with the Protection Against External Factors attribute of the Initiating Events cornerstone and adversely affected 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 extreme cold weather conditions indirectly were affecting grid stability and required risk assessment and management. Additionally, it was similar to IMC 0612, Appendix E, example 7.e, in that an inadequate risk assessment is not minor if the overall plant risk would put the plant into a higher licensee-established risk category. In this case, plant risk was reclassified from Green to Yellow when properly assessed. Specifically, the extreme cold weather conditions indirectly were affecting grid stability. The inspectors evaluated the finding using IMC 0612, Appendix K, “Maintenance Risk Assessment and Risk Management Significance Determination Process.” Since the incremental core damage probability deficit was less than 1 E-6 and the incremental large early release probability deficit was less than 1 E-7, this finding was determined to be of very low safety significance (Green). The finding was determined to have 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 staff in the Electric System Operations Center (ESOC), Salem control room, and Hope Creek control room did not appropriately communicate across organizational boundaries to ensure that risk was appropriately assessed.

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

Significance:  Mar 31, 2014

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Risk Assessment and Risk Management Actions for UV Testing

Inspectors identified a Green NCV of 10 CFR 50.65(a)(4) when PSEG did not properly assess Unit 2 risk and implement RMAs in accordance with station procedures. PSEG conducted undervoltage (UV) surveillance testing on a 4 kilovolt (kV) vital bus without considering plant conditions to include operations without a redundant offsite power source and work in the vicinity of protected equipment. PSEG entered this in their CAP and completed a crew clock reset.

The issue was more than minor since it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and adversely affected 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, UV testing of a vital bus when powered by a single offsite power source had the potential to result in a loss of vital bus power or a LOOP. Additionally, the issue was more than minor based on similarity to IMC 0612, Appendix E, examples 7.e and 7.f. Specifically, the overall elevated plant risk placed the plant into a higher licensee-established risk category and required, under plant procedures, RMAs that were not implemented. The inspectors evaluated the finding using IMC 0612, Appendix K, “Maintenance Risk Assessment and Risk Management Significance Determination Process.” A senior reactor analyst considered the base condition of an increased probability of a LOOP and the lack of RMAs as two order of magnitude increases. Since the incremental core damage probability deficit was less than 1 E-6 and the incremental large early release probability deficit was not applicable for this issue, this finding was determined to be of very low safety significance (Green). The finding was determined to have a cross-cutting aspect in the area of Human Performance, Conservative Bias, in that individuals use decision making-practices that emphasize prudent choices over those that are simply allowable. Specifically, PSEG did not implement procedurally driven decision-making that would have emphasized prudent choices regarding UV testing under different plant conditions.

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

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)

Mitigating Systems

Significance:  Dec 31, 2014

Identified By: NRC

Item Type: NCV NonCited 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 NonCited 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*)

Significance:  Mar 31, 2014

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Follow Fire Protection Test Procedure Resulted in Fuel Oil Spill

The inspectors determined there was a Green, self-revealing violation of Technical Specification (TS) 6.8.1, “Procedures and Programs,” as described in Regulatory Guide 1.33, Revision 2, February 1978, when PSEG failed to adequately implement procedure steps associated with fire protection hose flow verification testing on March 6, 2014. Consequently, a fuel oil day tank was overfilled, resulting in approximately 3000 gallons of fuel oil on the pump house roof, leaks through the roof onto the fire pumps, and Salem fire water suppression system unavailability for approximately two days. PSEG stopped the leak, entered this issue in their CAP, and completed a Prompt Investigation.

The inspectors determined that the performance deficiency was more than minor because it was associated with the

Protection Against External Factors attribute of the Mitigating System cornerstone and adversely its cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events (fire) to prevent undesirable consequences. The inspectors determined that the finding was of very low safety significance (Green) because it did not impact the ability of Salem Units 1 or 2 to achieve and maintain safe shutdown. The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency, because PSEG fire protection operators did not recognize and plan for the possibly of mistakes, latent issues, and inherent risk, even while expecting successful outcomes of procedure steps to refill the fuel oil day tank. Further, they did not implement appropriate error reduction tools.

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

Significance:  Mar 31, 2014

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inadequate Post-Maintenance Testing of a Chiller

A self-revealing, Green NCV of 10 CFR 50, Appendix B, Criterion XI, “Test Control,” was identified when PSEG did not perform adequate post-maintenance testing (PMT) of the 22 chiller. The chillers cool safety-related loads in the auxiliary building during normal and emergency conditions. After failing to pump-down, corrective maintenance, and restoration, the chiller failed to pump-down again three days later. PSEG entered this in their CAP, backdated inoperability, performed a crew clock reset, and investigated the issue.

The finding was more than minor since it affected the Equipment Performance attribute of the Mitigating Systems cornerstone and its objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the inadequate PMT resulted in additional inoperability and unavailability of the 22 chiller. The finding was evaluated in accordance with IMC 0609, Appendix A, and screened to Green since it was not a design or qualification deficiency, not a loss of function, and did not involve equipment or function designed to mitigate a seismic, flooding, or severe weather initiating event. The finding was determined to have a cross-cutting aspect in the area of Human Performance, Consistent Process, in that individuals use a consistent, systematic approach to make decisions. Specifically, PSEG did not use a systematic approach to make decisions regarding the proper PMT.

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

Barrier Integrity

Significance:  Jun 30, 2014

Identified By: Self-Revealing

Item Type: NCV NonCited 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: G May 04, 2014

Identified By: Self-Revealing

Item Type: NCV NonCited 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

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