

Susquehanna 2

2Q/2008 Plant Inspection Findings

Initiating Events

Mitigating Systems

Significance:  Jun 30, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Inappropriate Corrective Actions in Response to Repeated ESW Pump Timer Failures

The inspectors identified a non-cited violation (NCV) of Title 10 of the Code of Federal Regulation (CFR), Part 50, Appendix B, Criterion XVI, "Corrective Action" because PPL did not implement timely corrective actions for a degraded condition associated with the "A" and "C" emergency service water (ESW) pump emergency diesel generator (EDG) load sequence timers. Inspectors identified that PPL had multiple opportunities to correct this condition adverse to quality. The inability of ESW pump initiation timers to function as designed over the entire surveillance interval was identified by PPL following failed surveillance tests in 2002, 2004, and 2006. On April 9, 2008, during the performance of Unit 1 Division I diesel generator LOCA/LOOP testing, the "A" and "C" ESW pump start sequencing timers failed their acceptance criteria with times that were longer than specified. In response to the timer failures, and to ensure the operability of the associated diesel generators, the operators deactivated the "A" and "C" ESW pumps by opening the DC knife switches in accordance with procedure. This resulted in elevated online risk for Unit 2 because one Division of ESW was inoperable and unavailable for automatic or manual start. PPL initiated actions to restore the function of the timers and has entered the issue into the corrective action program. The ESW pumps were returned to an operable status on April 10, 2008.

This finding is greater than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone; and it negatively impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

This finding is related to the Problem and Identification Resolution cross-cutting area (Corrective Action) because PPL did not take appropriate corrective actions to address a safety issue and adverse trend in a timely manner commensurate with its safety significance. (P.1(d)),

Inspection Report# : [2008003](#) (*pdf*)

Significance:  Mar 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Application of Work Instructions Resulted in Unavailable and Inoperable Engineering Safeguards Electrical Bus

A self-revealing, Green NCV was identified for failure to accomplish work in accordance with the appropriate instructions as required by 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings."

Specifically, PPL did not complete the required actions that would properly protect the Unit 1 transformer 1X210 windings from moisture intrusion when heat was not applied to the transformer as specified by the work instructions and original equipment vendor manual. This resulted in high initial Doble test results, an investigation into cause, a drying out period, and additional Doble testing which caused an approximate 24-hour delay in the restoration of the safety-related 1A 4 KV ES bus. This electrical bus provides power to common safety-related loads which increased the online risk for Unit 2, the operating unit during the Unit 1 refueling outage. PPL applied concentrated heat and energized the primary windings to remove moisture from the windings prior to returning the transformer to service.

This finding is greater than minor because it adversely impacted the equipment performance attribute of the Mitigating Systems cornerstone and affected the objective to ensure the availability, reliability and the capability of systems that respond to initiating events to prevent undesirable consequences. This finding was considered to have very low safety significance (Green), using phase one of the significance determination process for Unit 2. A

contributing cause of this finding is related to the Human Performance cross cutting area, work control planning attribute H.3.(a). Specifically, PPL did not appropriately plan and coordinate the work activities by incorporating job site conditions, including environmental conditions.

Inspection Report# : [2008002 \(pdf\)](#)

Significance:  Feb 01, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Adequately Evaluate a Deviation from BWROG EPG/SAG Resulted in an Inadequate EOP

The NRC identified a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because, in the 1990s, Susquehanna failed to adequately evaluate a deviation from the Boiling Water Reactor Owner's Group Emergency Procedure Guidelines / Severe Accident Guidelines (BWROG EPG/SAG), which resulted in one of the emergency operating procedures (EOPs) being inadequate. Specifically, Caution #1 in the BWROG EPG/SAG warned the operators that reactor pressure vessel (RPV) level instrumentation may be unreliable if the drywell temperatures exceeded RPV saturation temperature. The purpose of the Caution was to give the operators a chance to evaluate the validity of the RPV level instrumentation to avoid premature entry into the RPV flooding contingency procedure. Susquehanna did not adequately evaluate the deviation, and the Susquehanna EOPs did not use a Caution statement; but instead, changed the caution to a procedural step, which directed the operators to transition directly to the RPV flooding procedure.

The performance deficiency is more than minor because it is associated with the Procedure Quality attribute of the Mitigating Systems cornerstone and affects the objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the EOP could have directed entry into the RPV flooding procedure unnecessarily which would have restricted the use of suppression pool cooling and required other actions that would have complicated the operators' response to the event. The finding was determined to be of very low safety significance because it was not a design deficiency, did not result in an actual loss of safety function, and did not screen as potentially risk significant due to external initiating events. (Section 40A2.a.3 (a))

Inspection Report# : [2008006 \(pdf\)](#)

Significance:  Feb 01, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

failure to Identify and Correct Inconsistencies in the Licensing Basis and the EOPs

The NRC identified a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the failure to identify that an inconsistency between the procedures and the design basis for suppression pool (SP) cooling was a condition adverse to quality (CAQ), which resulted in corrective actions not being taken in a timely manner. Specifically, in January 2006, a Condition Report (CR) identified an inconsistency between an assumption in the Final Safety Analysis Report (FSAR) for the design basis accident and the emergency operating procedures (EOPs) regarding the timing for the implementation of SP cooling. At the time of the inspection, the inconsistency had not been resolved because Susquehanna did not recognize that it impacted current plant operations. This performance deficiency has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Susquehanna did not identify that the inconsistency documented in the CR should have been categorized as a CAQ, commensurate with its safety significance. [P.1(a)]

The performance deficiency is more than minor because it is associated with the Design Control attribute of Mitigating Systems and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the EOPs provided direction that, under some accident conditions, would affect the availability and/or capability of the SP cooling system to perform its safety function. The finding screened out as having very low safety significance because it was not a design deficiency, did not result in an actual loss of safety function, and did not screen as potentially risk significant due to external initiating events.

Inspection Report# : [2008006 \(pdf\)](#)

Significance:  Feb 01, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Accurately Model the Simulator for RPV Water Level Instrumentation

The NRC identified a Non-Cited Violation of 10 CFR 55.46(c)(1), "Plant Referenced Simulators," because the Susquehanna simulator did not accurately model reactor pressure vessel (RPV) level instrumentation following a design basis accident loss of coolant accident (DBA LOCA). Specifically, an analysis performed in 1994 to determine if the observed simulator response during a large break LOCA was consistent with the expected plant response, was based on an overly conservative assumption that the drywell would experience superheated conditions, which would cause RPV water level instrumentation reference leg flashing and a subsequent loss of all RPV level indication. The expected plant response, as stated in the analysis, was incorrect; in that a LOCA would not always cause a loss of all RPV level instruments. As a result, the simulator modeling was incorrect.

The performance deficiency is more than minor because it is associated with the Human Performance attribute of Mitigating Systems and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the modeling of the Susquehanna simulator introduced negative operator training that could affect the ability of the operators (a mitigating system) to take the appropriate actions during an actual event. The finding was determined to be of very low safety significance because it is not related to operator performance during requalification, it is related to simulator fidelity, and it could have a negative impact on operator actions.

Inspection Report# : [2008006 \(pdf\)](#)

Significance:  Feb 01, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to identify and Correct a Setpoint Error in the RHR and CS Operating Procedures

The NRC identified a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the failure to identify that a setpoint error in the operating procedures for safety-related systems was a condition adverse to quality (CAQ), resulting in the procedures not being corrected in a timely manner. The setpoint for the low pressure injection permissive interlock in the RHR and CS systems had been changed in 1999 as part of a modification.

However, the setpoint was not changed in the system operating procedures and operator aids. When this issue was identified by Susquehanna staff in 2006, the setpoint error in the procedure was not screened as a CAQ, which resulted in the procedures not being revised for 17 months after the issue was identified in an Action Report. This performance deficiency has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Susquehanna did not identify that a setpoint error in operating procedures for safety-related systems was a CAQ, commensurate with its safety significance. [P.1(a)]

The performance deficiency is more than minor because it is associated with the Procedure Quality attribute of Mitigating Systems and affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the incorrect setpoint reference in the procedure impacted the reliability of operator response to the event in that it could delay operator actions or result in misoperation of equipment. The finding screened out as having very low safety significance because it was not a design deficiency, did not result in an actual loss of safety function, and did not screen as potentially risk significant due to external initiating events.

Inspection Report# : [2008006 \(pdf\)](#)

Barrier Integrity

Significance:  Dec 31, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Inadequate Design Control to Support Fuel Rechanneling Activities

A self-revealing non-cited violation of 10CFR 50 Appendix B, Criterion III, "Design Control," was identified on December 6, 2007, when PPL maintenance personnel found broken pieces of fuel spacer grid assemblies at fuel preparation machines. The damage to fuel assembly spacer assemblies was determined to be from rechanneling

activities performed on or before October 20, 2007. The cause of the damaged fuel assemblies was due to the differing exposure histories of fuel channels and fuel bundle spacers not having been adequately analyzed prior to performance of the fuel rechanneling activities. Inspectors determined that the engineering analysis which implemented the allowable applied force limit used in fuel rechanneling procedures had not verified design interfaces, and did not verify the adequacy of design limits. PPL determined that the extent of condition was limited to those rechanneled fuel assemblies re-installed in the Unit 1 or Unit 2 reactors with greater than 25 GigaWatt-Days per Metric Tonne Uranium (GWD/MTU) average exposure.

This finding was more than minor because the finding is related to the Design Control and Human Performance attributes of the barrier integrity cornerstone and negatively impacts the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding) protect the public from radio nuclide releases caused by accidents or events. The inspectors completed a Phase 1 significance determination using IMC 0609 Appendix A, Significance Determination Process Phase 1 screening worksheet, and determined the finding to be of Very Low Safety Significance (Green) because the performance issue only degraded the Fuel Cladding Barrier and its associated cornerstone.

This finding is related to a cross-cutting component in the area of Human Performance associated with work practices H.4.(c) because PPL did not ensure supervisory and management oversight of specific work activities, specifically design reviews which supported the fuel rechanneling procedures used from October 2005 through October 2007 and the collective evaluation of 25 condition reports related to rechanneling difficulties. PPL entered this issue into the corrective action program and promptly initiated compensatory measures to impose fuel thermal limit penalties to assure fuel barrier integrity during reactor operation.

Inspection Report# : [2007005](#) (pdf)

Emergency Preparedness

Occupational Radiation Safety

Significance:  Dec 31, 2007

Identified By: Self-Revealing

Item Type: FIN Finding

Failure to Maintain Occupational Radiation Exposure As Low As Reasonably Achievable During CREOAS Work

A self-revealing finding having very low safety significance was identified due to a deficiency in the area of maintaining occupational radiation exposures as low as is reasonably achievable (ALARA). ALARA and work planning for the control room emergency outside air supply system (CREOAS) modification was less than adequate resulting in collective exposure for the work to expand from 3.37 person-rem to 11.9 person-rem.

The performance deficiency that resulted in the exposure overrun was due to significantly increased hours beyond that planned to perform the work. The root cause of the overrun was determined to be: (1) a failure to include contractor work hours in the ALARA planning process; and (2) design errors which did not properly identify bolting locations for the duct work, requiring extensive on-site rework. Susquehanna's three-year rolling average is 101 Person-rem, which is below the SDP criteria of 240 person-rem for Boiling Water Reactors (BWRs), therefore, overall ALARA performance has been effective and this finding is of very low safety significance.

A contributing cause of this finding was related to the Work Control aspect of the Human Performance cross-cutting area because the licensee did not appropriately coordinate work activities by incorporating actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance.

Inspection Report# : [2007005](#) (pdf)

Public Radiation Safety

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.

Miscellaneous

Last modified : August 29, 2008