U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Susquehanna 2 – Quarterly Plant Inspection Findings

2Q/2017 – Plant Inspection Findings

On this page:

Initiating Events

Significance: G Jul 22, 2016
Identified By: NRC
Item Type: FIN Finding
Failure to Implement or Develop Timely Interim or Final Corrective Actions for a Degraded Condition (4OA2.1.c(3))
The inspectors documented a self-revealing finding of very low safety significance (Green) against Susquehanna procedures LS-125 Revision 4, "Corrective Action Program (CAP)," and OI-AD-096 Revision 18, "Operator Challenges," for the failure to correct and establish appropriate corrective actions for a known degraded condition for an uninterruptable power supply (UPS) for vital 120 VAC load centers. Specifically, Susquehanna did not correct nor establish compensatory actions for the transfer switch for a UPS which was failed for over one year. The degraded condition subsequently complicated operator response to the loss of a vital 480 VAC switchboard and resulted in an unplanned manual reactor scram and valid emergency core cooling system (ECCS) actuation on May 13, 2016. Susquehanna entered this issue into their CAP, conducted an apparent cause evaluation, and repaired the UPS transfer switch. The finding was more than minor because it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and adversely affected the associated 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 long standing degraded condition of UPS 2D14212/2B246082 was not corrected or compensated for and did not function as designed, as a result operators had to manually scram the reactor following the loss of a vital bus on May 13, 2016. In accordance with IMC 0609.04, "Initial Characterization of Findings," dated June 19, 2012, and Exhibit 1 of IMC 0609, Appendix A, "The SDP for Findings At-Power," dated June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency did not cause both a reactor trip and loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Specifically, while this performance deficiency resulted in a reactor scram, it was not the cause of the loss of mitigation equipment credited in the Susquehanna safety analysis. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution - Resolution because the organization did not take effective

corrective actions to address issues in a timely manner commensurate with its safety significance. Specifically, failing to establish appropriate compensatory actions for this known degraded condition, prevented the operators from responding appropriately to a loss of a vital 480 VAC switchboard initiating event. [P.3].
Inspection Report# : 2016008 *(pdf)*

Significance: G Jul 22, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Promptly Identify and Correct a Condition Adverse to Quality on Vital 480 VAC MCCs (4OA2.1.c (4))
The inspectors documented a self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for failure to identify and correct a condition adverse to quality. Specifically, in October and December 2006 and July 2009, Susquehanna did not identify a non-conforming condition with the design and performance requirements of several 480 volt motor control center (MCC) breaker assemblies during receipt inspections. These non-conforming breaker assemblies were installed in vital 480 VAC applications and subsequently led to a phase to ground short and loss of a 480 volt safety-related motor control center on May 12, 2016. Susquehanna entered this issue into their CAP, conducted an apparent cause evaluation, replaced the damaged breaker assembly, and is conducting an extent of cause review for other susceptible breaker assemblies. The finding was more than minor because it was associated with the Design Control attribute of the Initiating Events cornerstone and adversely affected the associated 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, on May 12, 2016, an electrical transient on vital AC bus 2B246 occurred as a result of a phase to ground fault in breaker cubicle 2B24609, which resulted in a loss of bus 2B246 and associated safety related loads. In accordance with IMC 0609.04, "Initial Characterization of Findings," dated June 19, 2012, and Exhibit 1 of IMC 0609, Appendix A, "The SDP for Findings At-Power," dated June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency did not cause both a reactor trip and loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. This finding did not have a cross-cutting aspect because the performance deficiency was a historical issue with the actions taken in 2005, 2006, and 2009, and is not indicative of current licensee performance.
Inspection Report# : 2016008 *(pdf)*

Mitigating Systems

Significance: G Dec 31, 2016
Identified By: Self-Revealing
Item Type: FIN Finding
Failure Rates Exceed (20%) Twenty Percent for Biennial Requalification Exam
A self-revealing finding was identified associated with inadequate licensed operator performance during the annual licensed operator requalification operating test and biennial written examination. Specifically, 17 of 71 operators (23.9%) failed at least one portion of the requalification examinations. This finding is more than minor because it is associated with the Mitigating Systems cornerstone attribute of human performance and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, 17 of 71 licensed operators failed to demonstrate a satisfactory understanding of the required knowledge and abilities required to safely operate the facility under normal, abnormal, and emergency conditions. The inspectors evaluated this performance deficiency using IMC 0609, "SDP", Appendix I, "Licensed Operator Requalification SDP." This finding is of very low safety significance (Green) because the finding is related to requalification exam results, did not result in a failure rate of greater than 40 percent and all 17 operators were remediated and successfully retested prior to returning to licensed duties. This finding has a cross-cutting aspect in the

area of Human Performance, Training, because Susquehanna did not provide adequate operator requalification training to maintain a knowledgeable, technically competent workforce.
Inspection Report# : 2016004 *(pdf)*

Significance: G Dec 31, 2016
Identified By: Self-Revealing
Item Type: NCV Non-Cited Violation
Failure to Promptly Correct a Condition Adverse to Quality with LPCI Swing Bus Automatic Transfer Switches
A finding of very low safety significance (Green) and associated NCV of Title 10 Code of Federal Regulations (CFR) 50, Appendix B, Criterion XVI, "Corrective Action," was self-revealed when Susquehanna failed to assure that conditions adverse to quality were promptly identified and corrected on two separate occasions. Both examples resulted in the failures of safety-related automatic transfer switches (ATSs) associated with the low pressure coolant injection (LPCI) swing buses. Corrective actions included enhancing the work instructions for all applicable ATSs based off original equipment manufacturer (OEM) input and scheduling the enhanced work instructions to be performed on the four swing bus ATSs during their next scheduled bus outages. Inspectors determined that the finding was more than minor because it was associated with the Equipment Performance attribute of the Reactor Safety - Mitigating Systems 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 (i.e., core damage). In both examples, the failure to correct conditions adverse to quality resulted in the loss of power to the LPCI swing bus and inoperability of the respective division of LPCI. In accordance with IMC 0609.04, "Initial Characterization of Findings," dated June 19, 2012, inspectors and Exhibit 2 of IMC 0609, Appendix A, "The SDP for Findings At-Power," dated June 19, 2012, inspectors determined that the finding was of very low safety significance (Green). Specifically, though a single train was inoperable for greater than its technical specification (TS) allowed outage time, in consultation with regional senior reactor analysts, inspectors determined it did not represent an actual loss of function. The finding is related to the cross-cutting area of Problem Identification and Resolution, Evaluation, because Susquehanna did not thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, Susquehanna either failed to evaluate deficiencies encountered during maintenance or failed to ensure that corrective actions aligned with and corrected the identified causes.
Inspection Report# : 2016004 *(pdf)*

Significance: G Oct 21, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Specify and Maintain Safety-Related Quality Standards and Materials Essential for Reactor Core Isolation Cooling
The team identified a Green non-cited violation of Title 10 of the Code of Federal Regulations (CFR), Part 50, Appendix B, Criterion III, "Design Control," for the failure to classify and maintain reactor core isolation cooling (RCIC) system components as safety-related as specified by Updated Final Safety Analysis Report Table 3.2-1 and Section 7.1.1. Specifically, although Talen, the operator of Susquehanna Steam Electric Station, classified the RCIC system as safety-related, this classification did not extend to the Unit 1 and Unit 2 RCIC barometric condenser relief valves. The team determined failure of the non-safety related barometric condenser relief valves could result in a loss of RCIC lube oil cooling and failure of RCIC to perform its design basis safety function. Talen entered the issue into the corrective action program as condition report 2016-23615 and performed an immediate operability determination, which concluded RCIC remained operable. The finding was more than minor because it was 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 this finding using IMC 0609, Attachment 4, "Initial Characterization of Findings," and IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2 - Mitigating

System Screening Questions. The team determined the finding screened as very low safety significance (Green), because the finding was a design deficiency which did not result in an actual loss of functionality of the RCIC system. This finding was not assigned a cross-cutting aspect because the performance deficiency occurred during original plant design and did not reflect current licensee performance.
Inspection Report# : 2016007 *(pdf)*

Significance: G Sep 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Inadequate Work Instructions for Breaching Internal Flood Barrier
The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," because Susquehanna did not ensure that work instructions to breach a flood barrier appropriately incorporated design requirements for internal flooding so that equipment necessary to achieve and maintain safe shutdown would not be impacted. From August 30, 2016 to September 2, 2016, work instructions directed a breach of a flood barrier that was credited to provide assurance that equipment necessary for safe shutdown of the plant was protected against the effects of medium energy line breaks and, therefore, were not appropriate to the circumstances. Susquehanna entered this issue into their corrective action program (CAP) as condition report CR-2016-20472 and CR-2016-20859 and revised the work instructions to require a worker remain in the vicinity of the penetration to ensure that flooding could be secured prior to impacting equipment necessary to reach and maintain safe shutdown. This finding is more than minor because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, had the breach been completed, it could have allowed a medium energy line break in one flooding area to communicate with another area, potentially impacting equipment necessary to achieve and maintain safe shutdown. The inspectors evaluated the finding using IMC 0609, Appendix A, Exhibit 2, "Mitigating System Screening Questions," and determined the finding to be of very low safety significance (Green) because the PD was not a design or qualification deficiency, did not involve an actual loss of safety function, did not represent actual loss of a safety function of a single train for greater than its technical specification allowed outage time, and did not screen as potentially risk-significant due to a seismic, flooding, or severe weather initiating event. The finding has a cross-cutting aspect of Human Performance, Work Management because Susquehanna did not implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. Implementation of Susquehanna's work planning process did not ensure that the maintenance incorporated all requirements for protection against internal flooding and did not ensure that job site conditions were consistent with assumptions in engineering analyses. [H.5].
Inspection Report# : 2016003 *(pdf)*

Significance: G Sep 30, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Risk Management Actions Not Adequately Implemented
The inspectors identified a Green NCV of 10 CFR 50.65(a)(4) because Susquehanna did not assess and manage the increase in risk from online maintenance activities. From September 11 to 16, 2016, there were multiple affected areas that the fire protection engineer or designee did not walk down to inspect for fire impairments resulting in deficiencies not being corrected prior to releasing work and no fire watch was established for the impairments. Susquehanna removed the combustible materials from the areas or stationed a fire watch, and entered these issues into their CAP as CR-2016-21125, CR 2016-21423, CR-2016-21616, and CR-2016-21741. This finding is more than minor because it adversely impacted the protection against external factors attribute of the Mitigating Systems cornerstone objective to ensure the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, not implementing the required risk management actions (RMAs) for the only available safe shutdown pathway placed the station in a much higher risk condition in the event of an internal fire. The inspectors

evaluated the finding in accordance with IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." Since the performance deficiency was related to maintenance activities affecting structure, system, and components needed for fire mitigation, Appendix K directed the significance to be determined by an internal NRC management review using risk insights. IMC 0609, Appendix F, Attachment 1 "Fire Protection Significance Determination Process Phase 1 Worksheet," was used to develop this risk insight. Based on the nature and quantity of combustible materials in the areas, combined with the relatively short duration of which the fire risk was unmitigated, inspectors determined that it was of very low safety significance (Green). The finding was determined to have a cross-cutting aspect in the area of Human Performance, Avoid Complacency, in that, individuals did not plan for latent issues and inherent risk, even while expecting successful outcomes. Specifically, combustible materials were not appropriately controlled as required by OI-013-002, "Fire Risk Management," Revision 10, because in some cases they were assumed to be exempt from the program requirement or staff did not tour the areas because they assumed there were no combustible materials present based on past experience. [H.12]
Inspection Report# : 2016003 *(pdf)*

Significance: G Jul 22, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Failure to Implement and Maintain Quality Procedure Results in Control Room Chiller Inoperability (4OA2.1.c (2))
The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to implement and maintain a quality procedure, MT-GE-021, "Chiller Maintenance and Inspection." This resulted in the safety related 0K112A chiller being operated outside of its design specifications and being declared inoperable. Specifically, on January 9, 2014, a system engineer directed the maintenance personnel to overcharge 0K112A with R-114a refrigerant, which led to higher power consumption by the chiller's compressor motor, and the failure of the next biennial surveillance test on December 10, 2015 due to excessive compressor motor current. Susquehanna entered the issue into the CAP, conducted testing to establish the proper refrigerant charge, removed the excess refrigerant, and revised the procedure. The finding was determined to be more than minor because it was associated with the Mitigating System cornerstone attribute of Equipment Performance and adversely affected the associated cornerstone objective to ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). The refrigerant overcharge condition resulted in the 0K112A chiller being inoperable and unable to fulfil its safety function to cool safety related switchgear and equipment during accident conditions for a period of 23 months. 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," the inspectors determined a detailed risk evaluation would be required because the finding involved an actual loss of function of at least a single Train for greater than its Technical Specification allowed outage time of 30 days. A detailed risk assessment was performed by a Region 1 Senior Reactor Analyst (SRA). The SRA determined the finding to be of very low safety significance (Green.) This finding had a cross-cutting aspect in the area of Human Performance, Procedure Adherence because individuals did not follow processes, procedures, and work instructions. Specifically, for many years maintenance and engineering personnel relied upon informal work practices vice referring to the procedure when charging the chillers with refrigerant. [H.8]
Inspection Report# : 2016008 *(pdf)*

Barrier Integrity

Significance: G Dec 31, 2016
Identified By: NRC
Item Type: NCV Non-Cited Violation
Refuel Floor Radiation Monitor Inoperable Due to being Improperly Calibrated

A finding of very low safety significance (Green) and NCV of TS 5.4.1, "Procedures" was self-revealed when Susquehanna incorrectly calibrated the Unit 1 'B' refuel floor high exhaust duct high radiation monitor on November 15, 2014. This impacted the initiation capability of secondary containment isolation and control room emergency outside air supply system (CREOASS) and resulted in Susquehanna exceeding the allowed outage time for TSs 3.3.6.2, Secondary Containment Isolation, and 3.3.7.1, CREOASS Instrumentation. Upon identification of the issue, Susquehanna properly calibrated the radiation monitor to restore its operability. This finding is more than minor because it is associated with the Human Performance (Routine OPS/Maintenance Performance) attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of providing reasonable assurance that physical design barriers (Secondary Containment and Control Room Ventilation) protect the public from radionuclide releases caused by accidents or events. Specifically, incorrectly calibrating the radiation monitor resulted in both systems being inoperable for almost two years. In accordance with IMC 0609.04, "Initial Characterization of Findings," and Exhibit 3 of IMC 0609, Appendix A, "The SDP for Findings At-Power," both dated June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency was only associated with the radiological barrier function of the Control Room and Secondary Containment. This finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency because Susquehanna did not recognize and plan for the possibility of mistakes, latent problems, or inherent risk, even while expecting successful outcomes. Specifically, Susquehanna personnel did not consider the potential undesired consequences of their actions before performing work and implement appropriate error-reduction tools (e.g. self-check, peer-check).
Inspection Report# : 2016004 *(pdf)*

Emergency Preparedness
Occupational Radiation Safety
Public Radiation Safety
Security

The security cornerstone is an important component of the ROP, which includes various security inspection activities the NRC uses to verify licensee compliance with Commission regulations and thus ensure public health and safety. The Commission determined in the staff requirements memorandum (SRM) for SECY-04-0191, "Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors from Public Disclosure," dated November 9, 2004, that specific information related to findings and performance indicators associated with the security cornerstone will not be publicly available to ensure that security-related information is not provided to a possible adversary. Security inspection report cover letters will be available on the NRC Web site; however, security-related information on the details of inspection finding(s) will not be displayed.

Miscellaneous

Current data as of : August 03, 2017

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