UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BLVD.
KING OF PRUSSIA, PA 19406-2713

September 2, 2016

Mr. Timothy S. Rausch
President and Chief Nuclear Officer
Susquehanna Nuclear, LLC
769 Salem Blvd., NUCSB3
Berwick, PA 18603

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION – PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000387/2016008 AND 05000388/2016008

Dear Mr. Rausch:

On July 22, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Susquehanna Steam Electric Station (Susquehanna), Units 1 and 2. The enclosed report documents the inspection results, which were discussed on July 8, 2016, with Mr. Jon Franke, Site Vice President, and other members of your staff. During that discussion your staff requested to provide additional information for consideration. In-office review of the additional information continued by the NRC, and a telephonic exit meeting was conducted on July 22, 2016 with Mr. Jason Jennings, Susquehanna Regulatory Affairs Manager.

This inspection examined activities conducted under your licenses as they relate to identification and resolution of problems and compliance with the Commission's rules and regulations and conditions of your licenses. Within these areas, the inspection involved examination of selected procedures and representative records, observations of activities, and interviews with personnel.

Based on the samples selected for review, the inspection team concluded that Susquehanna Nuclear, LLC (Susquehanna) was generally effective in identifying, evaluating, and resolving problems. Susquehanna personnel were generally effective at identifying problems and entering them into the corrective action program at a low threshold. In general, Susquehanna prioritized and evaluated issues commensurate with the safety significance of the problems. Corrective actions were generally implemented in a timely manner. However, the team noted weaknesses associated with the timeliness of issues being entered into the corrective action program and the timeliness and effectiveness of the establishment of compensatory actions for degraded equipment.

In addition to implementation of the corrective action program, the inspectors also reviewed Susquehanna's use of operating experience, conduct of self-assessments, and safety conscious work environment at the station. Based on the samples selected for review, the inspectors did not identify any issues with Susquehanna's use of industry operating experience. The inspectors concluded that the self-assessments reviewed were generally effective in identifying issues and improvement opportunities. Finally, the inspectors found no evidence of significant challenges to Susquehanna's safety conscious work environment. Based on the inspectors' observations, Susquehanna staff are willing to raise nuclear safety concerns through at least one of the several means available.

This report documents two NRC-identified findings and two self-revealing findings of very low safety significance (Green). The inspectors determined that three of these findings also involved violations of NRC requirements. However, because of the very low safety significance and because the issues were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), consistent with Section 2.3.2.a of the NRC Enforcement Policy. If you contest any of these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Susquehanna. In addition, if you disagree with any finding not associated with a regulatory requirement in this report, or the cross-cutting aspect assigned to any finding in this report, you should provide a response, within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Susquehanna.

Additionally, the inspectors identified a Green NCV related to Physical Security. Due to the fact that details regarding security related issues are not made publically available, this issue is being documented in a separate NRC Inspection Report (05000387/2016406 and 388/2016406), but is referenced in this report for assessment purposes only. The deficiency identified by the inspectors in this NCV was corrected or compensated for, and the plant was in compliance with applicable physical protection and security requirements within the scope of this inspection before inspectors left the site.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC's website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Daniel L. Schroeder, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos. 50-387 and 50-388
License Nos. NPF-14 and NPF-22

Enclosure:
Inspection Report 05000387/2016008 and 05000388/2016008 w/Attachment
Supplementary Information
cc w/encl: Distribution via ListServ

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.	50-387 and 50-388
License Nos.	NPF-14 and NPF-22
Report Nos.	05000387/2016008 and 05000388/2016008
Licensee:	Susquehanna Nuclear, LLC
Facility:	Susquehanna Steam Electric Station, Unit 1 and Unit 2
Location:	Berwick, Pennsylvania
Dates:	June 6, 2016, through July 22, 2016
Team Leader:	A. Rosebrook, Senior Project Engineer Division of Reactor Projects
Inspectors:	T. Daun, Resident Inspector, Susquehanna M. Draxton, Project Engineer A. Siwy, Project Engineer
Approved by:	Daniel L. Schroeder, Chief Reactor Projects Branch 4 Division of Reactor Projects

SUMMARY

Inspection Report 05000387/2016008 and 05000388/2016008; 06/06/2016 – 07/08/2016; Susquehanna Steam Electric Station (Susquehanna), Units 1 and 2; Biennial Baseline Inspection of Problem Identification and Resolution. The inspectors identified five findings in the area of corrective action program (CAP) – two in problem identification and three in timely and effective corrective actions.

This U.S. Nuclear Regulatory Commission (NRC) team inspection was performed by three regional inspectors, and one resident inspector. The inspectors identified five findings during this inspection. Each of these findings were of very low safety significance (Green). Four of these Green findings are classified as non-cited violations (NCVs). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Problem Identification and Resolution

Based on the samples selected for review, the inspection team concluded that Susquehanna Nuclear, LLC (Susquehanna) was generally effective in identifying, evaluating, and resolving problems. Susquehanna personnel were generally effective at identifying problems and entering them into the corrective action program at a low threshold. In general, Susquehanna prioritized and evaluated issues commensurate with the safety significance of the problems. Corrective actions were generally implemented in a timely manner. However, the team noted weaknesses associated with the timeliness of issues being entered into the corrective action program and the timeliness and effectiveness of the establishment of compensatory actions for degraded equipment. The inspectors identified five findings in the area of CAP – two in problem identification and three in timely and effective corrective actions.

In addition to implementation of the corrective action program, the inspectors also reviewed Susquehanna's use of operating experience, conduct of self-assessments, and safety conscious work environment at the station. Based on the samples selected for review, the inspectors did not identify any issues with Susquehanna's use of industry operating experience. The inspectors concluded that the self-assessments reviewed were generally effective in identifying issues and improvement opportunities.

Based on the 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 nor did they identify any conditions that could have had a negative impact on the site's safety conscious work environment.

Cornerstone: Initiating Events

- Green. 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]. [Section 4OA2.1.c(3)]

- Green. 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. [Section 4OA2.1.c(4)]

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for Susquehanna failing to identify and correct conditions adverse to quality in a timely manner. Specifically, between April 16, 2016 and April 22, 2016, condition reports for potential or suspected degraded or non-conforming conditions related to the High Pressure Coolant Injection System (HPCI) and Reactor Core Isolation Cooling System (RCIC) were not written and operability determinations performed. In both cases, the equipment was subsequently declared inoperable due to the conditions. The issues were entered into the CAP and the equipment was taken out of service, repaired, and retested satisfactorily.

  The inspectors determined that there were two examples of the same performance deficiency and violation. In accordance with NRC Enforcement Manual Section 1.3.4, "Documenting Multiple Examples of a Violation," multiple examples of a single violation are allowed to be documented as a single violation bounded by the characterization of the most significant example. The RCIC example is considered the most significant due to the longer exposure time in a required mode and number of mode changes that occurred during the exposure period. The finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the associated cornerstone objective to ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the failure to identify and correct degraded conditions associated with a RCIC system lube oil leak which rendered that system inoperable. In accordance with IMC 0609.04, "Initial Characterization of Findings," dated June 19, 2012, the inspectors determined that this finding screened to Green because the safety function was not lost, and the finding did not represent an actual loss of function of at least a single train for greater than its Tech Spec Allowed Outage Time or two separate safety systems out-of-service for greater than its Tech Spec Allowed Outage Time.

  This finding had a cross-cutting aspect in the area of Human Performance, Teamwork, because individuals and work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, in both examples, individuals were aware of potential degraded conditions but actions were not taken to communicate the activity to other groups, such as the control room operators, to allow for the issues to be evaluated for operability and determine if proposed actions were timely and/or appropriate. [H.4] [Section 4OA2.1.c(1)]

- Green. 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] [Section 4OA2.1.c(2)]

Cornerstone: Safeguards-Security

- Green: The inspectors identified a Green NCV of 10 CFR 73.55 (o), "Compensatory Measures," for Susquehanna's failure to establish timely and adequate compensatory measures for degraded or inoperable equipment, systems, or components. This finding had a cross cutting aspect of Problem Identification and Resolution- Evaluation [P.2]. Due to the fact that details regarding security related issues are not made publically available, this issue is documented separately in IR 05000387; 388/2016406.

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution (71152B)

This inspection constitutes one biennial sample of problem identification and resolution as defined by Inspection Procedure 71152. All documents reviewed during this inspection are listed in the Attachment to this report.

.1 Assessment of Corrective Action Program Effectiveness

a. Inspection Scope

The inspectors reviewed the procedures that described the CAP at Susquehanna and evaluated CAP performance since the last NRC biennial Problem Identification and Resolution inspection completed in June 2014. To assess the effectiveness of the CAP, the inspectors reviewed performance in three primary areas: problem identification, prioritization and evaluation of issues, and corrective action implementation. The inspectors compared performance in these areas to the requirements and standards contained in 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action” and Susquehanna procedure LS-125 Revision 4, “Corrective Action Program (CAP).”

For each of these areas, the inspectors considered risk insights from the station’s risk analysis and reviewed condition reports (CRs) and action requests (ARs) selected across the seven cornerstones of safety in the NRC’s Reactor Oversight Process. Additionally, the inspectors attended multiple CAP screening committee meetings, management review committee (MRC) meetings, performance improvement review boards, and corrective action review boards (CARB). The inspectors selected items from the following functional areas for review: engineering, operations, maintenance, emergency preparedness, radiation protection, chemistry, physical security, nuclear oversight, and the CAP.

(1) Effectiveness of Problem Identification

In addition to the items described above, the inspectors reviewed system health reports, a sample of completed corrective and preventative maintenance work orders, completed surveillance test procedures, operator logs, and periodic trend reports. The inspectors also completed field walkdowns of various systems on site, such as the Units 1 and 2 4160 volts alternating current (VAC) and 480 VAC distribution systems, the Units 1 and 2 HPCI systems, the Units 1 and 2 RCIC systems, the fire protection system, control structure chiller system, the emergency diesel generators (EDGs), the Blue Max diesel, and the diesel fuel oil (DFO) transfer systems. Additionally, the inspectors reviewed a sample of CRs and ARs written to document issues identified through internal self-assessments, audits, emergency preparedness drills, and the operating experience program. The inspectors completed this review to verify that Susquehanna staff entered conditions adverse to quality into their CAP as appropriate.

(2) Effectiveness of Prioritization and Evaluation of Issues

The inspectors reviewed the evaluation and prioritization of a sample of CRs and ARs issued since the last NRC biennial Problem Identification and Resolution inspection completed in June 2014. The inspectors also reviewed CRs and ARs that were assigned lower levels of significance that did not include formal cause evaluations to ensure that they were properly classified. The inspectors' review included the appropriateness of the assigned significance, the scope and depth of the causal analysis, and the timeliness of resolution. The inspectors assessed whether the evaluations identified likely causes for the issues and developed appropriate corrective actions to address the identified causes. Further, the inspectors reviewed equipment operability determinations, reportability assessments, and extent-of-condition reviews for selected problems to verify these processes adequately addressed equipment operability, reporting of issues to the NRC, and the extent of the issues.

(3) Effectiveness of Corrective Actions

The inspectors reviewed Susquehanna's completed corrective actions through documentation review and, in some cases, field walkdowns to determine whether the actions addressed the identified causes of the problems. The inspectors also reviewed CRs and ARs for adverse trends and repetitive problems to determine whether corrective actions were effective in addressing the broader issues. The inspectors reviewed Susquehanna's timeliness in implementing corrective actions and effectiveness in precluding recurrence for significant conditions adverse to quality. The inspectors also reviewed a sample of CRs and ARs associated with selected NCVs and findings to verify that Susquehanna personnel properly evaluated and resolved these issues. In addition, the inspectors expanded the corrective action review to five years to evaluate Susquehanna's actions related to deficiencies associated with the Units 1 and 2 HPCI systems and review of long term corrective actions developed in response to Susquehanna's Chilling Effects Letter of January 28, 2009. (ML090280115)

(4) Trending

The inspectors reviewed Susquehanna's processes for identifying and addressing emergent and existing adverse trends in equipment and human performance. The inspectors conducted interviews with plant staff who conducted the department trend reviews, reviewed department trend reports, site quarterly trend reports, maintenance rule performance monitoring reports, and a(1) action plans and evaluations as required by 10 CFR 50.65. The inspectors also reviewed the minutes from System Health Committee meetings.

b. Assessment

(1) Effectiveness of Problem Identification

Based on the selected samples, plant walkdowns, and interviews of site personnel in multiple functional areas, the inspectors determined that, in general, Susquehanna identified problems and entered them into the CAP at a low threshold. Susquehanna staff initiated approximately 22,000 CRs and IRs between June 2014 and May 2016. The inspectors observed staff and supervisors at the Plan-of-the-Day, CAP screening meeting, CARB, PIRB, and MRC meetings appropriately questioning and challenging CRs to ensure clarification of the issues.

Based on the samples reviewed, the inspectors determined that Susquehanna generally trended equipment and programmatic issues, and appropriately identified problems in CRs. The inspectors verified that conditions adverse to quality identified through this review generally were entered into the CAP as appropriate. In general, the inspectors did not identify any issues or concerns that had not been appropriately entered into the CAP for evaluation and resolution. In response to several questions and minor equipment observations identified by the inspectors during plant walkdowns, Susquehanna personnel promptly initiated CRs and/or took immediate action to address the issues. The inspectors also observed that the CAP screening committee members went back to the originators of several CRs/ARs in order to obtain additional details so the issue was clearly documented in the CAP and could be appropriately evaluated.

However, the inspectors did identify a potential adverse trend representing a weakness in this area. The inspectors identified multiple instances where degraded or non-conforming conditions were not entered into the CAP in a timely manner. This precluded operations from entering the issue into the operability determination process and in some cases resulted in a delay in identifying safety related equipment inoperability. Examples supporting this potential trend include:

- On April 22, 2016, an unexpected increase in vibrations for the HPCI Auxiliary Oil Pump by 200 - 250 percent from the previous measurements on December 7, 2015, was identified. A CR 2016-11217 was written on April 26, 2016 after additional data was taken. At this time, the HPCI Auxiliary Oil pump and HPCI system were declared inoperable. The auxiliary oil pump was subsequently replaced. The enforcement aspects of this issue are discussed further in section 4OA2.1.c(1) of this report.

- On April 16, 2016, an oil leak was discovered on the duplex oil strainers during a post maintenance testing (PMT) run of RCIC. The strainers were adjusted to stop the leak; however, a CR was not written as required by station procedures. On April 22, 2016, the oil leak was still present, CR 2016-10998 was written, and RCIC was declared inoperable. The enforcement aspects of this issue are discussed further in section 4OA2.1.c(1) of this report.

- On June 17, 2016, CR-2016-15295 documented that plant operations did not write a CR when it was discovered that metal temperature points were potentially outside of the acceptable range of the Technical Specification 3.4.10 Pressure Temperature Curve during the vessel leak checks conducted during the Unit 1 refueling outage U1 19RIO. This delayed evaluation of the condition by 2 weeks. The technical issue is currently being reviewed by the resident inspectors.

- On May 17, 2016, CR-2016-12854 was written to document operator performance concerns identified during the May 13, 2016 Unit 2 Trip and ECCS Actuation and related to the operation of the HPCI system during the event. This concern was not raised during the post trip reviews or in several previous CRs related to the Unit 2 trip. As a result, this operator performance issue was not evaluated and addressed in a timely manner for the operating crew. The operator performance issue and untimely evaluation issue was documented in the second quarter integrated inspection report as Green NCV 05000388/2016002-07.

- The inspectors identified that the Radiation Protection Corrective Action Program Coordinator (CAPCO) has been fulfilling the role for approximately two years without completing the required job familiarization guide (JFG) contrary to NDAP-00-0711, Conduct of Performance Improvement Group, Attachment B, CAPCO/Performance Improvement Coordinator (PIC) JFG. Specifically NDAP-00-0711 states that the JFG shall be completed within one year of an individual assigned the CAPCO / PIC function. A CR was not written as required by station procedures. Susquehanna entered the inspectors' observation into the CAP as CR-2016-04336.

Susquehanna agreed with the inspectors that the observations represented a potential adverse trend. Susquehanna entered the observation into the CAP as CR 2016-16254 and developed communications for all station personnel discussing this potential trend.

In addition, the inspectors identified another issue in the problem identification area:

- The 'A' Control Structure Chiller's critical design parameters of refrigerant charge and compressor amps were not being adequately monitored by the station. As a result, the station did not recognize that Susquehanna staff was not maintaining these parameters in accordance with procedural requirements. The 'A' control structure chiller was eventually determined to have been inoperable for a period of 23 months due to a refrigerant overcharge condition. The enforcement aspects of this issue are discussed further in section 4OA2.1.c(2) of this report.

(2) Effectiveness of Prioritization and Evaluation of Issues

The inspectors determined that, in general, Susquehanna appropriately prioritized and evaluated issues commensurate with the safety significance of the identified problem. Susquehanna screened CRs for operability and reportability, categorized the CRs by significance, and assigned actions to the appropriate department for evaluation and resolution. The CR screening process considered human performance issues, radiological safety concerns, repetitiveness, adverse trends, and potential impact on the safety conscious work environment.

Based on the sample of CRs reviewed, the inspectors noted that the guidance provided by Susquehanna CAP implementing procedures was sufficient to ensure consistency in categorization of issues. Operability and reportability determinations were generally performed when conditions warranted and in most cases, the evaluations supported the conclusion. Causal analyses appropriately considered the extent of condition or problem, generic issues, and previous occurrences of the issue. Root cause evaluations (RCEs) and apparent cause evaluations reviewed were completed when required and received management review prior to approval. However, the inspectors noted several observations associated with Susquehanna's prioritization and evaluation of issues (described below).

Potential Weakness in the Area of Reportability

The inspectors identified several recent issues related to the evaluation of reportability of events in accordance with 10 CFR 50.73 and NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73," Revision 2. Examples include:

- During review of licensee event report (LER) 05000387; 388/2015-014-00, "'A' Control Structure Chiller Discovered Inoperable Beyond Technical Specification Limit Due to Refrigerant Overcharge," inspectors noted that Susquehanna concluded that the 'A' Control structure chiller was inoperable due to an R114a refrigerant overcharge condition. The inspectors discovered additional periods where the described overcharge existed for greater than the Technical Specification allowed outage time. These additional time periods were within 3 years of the date of discovery and were not documented, evaluated for operability, or reported if appropriate. Susquehanna entered this observation into their CAP as CR-2016-17576. On August 10, 2016, Susquehanna submitted a revised LER acknowledging these additional time periods and committed to evaluating them for past operability. See Section 4OA3 for additional details. This issue was reviewed using NRC IMC 0612 Appendix B, "Issue Screening," and the NRC Enforcement Policy and determined to be a minor violation.

- On June 21, 2016, Susquehanna submitted LER 05000387/2016-018-00, Inoperability of RCIC Due to an Oil Leak, for condition prohibited by Technical Specifications due to an oil leak and high oil particulate levels in the RCIC system. However, Susquehanna did not report the failure as a loss of safety function as well. This is required since after Susquehanna's extended power uprate licensee amendment being approved, RCIC is credited in USFAR safety analysis. Susquehanna entered the inspectors' observation into the CAP as CR-2016-15710. This issue was reviewed using NRC IMC 0612 Appendix B, "Issue Screening," and the NRC Enforcement Policy and determined to be a minor violation.

- NCV 05000387/2016001-02 was issued in the first quarter of 2016 when the resident inspectors identified a Severity Level IV NCV of 10 CFR Part 50.73 (a)(2)(v) when Susquehanna did not submit a LER within 60 days of identifying that both trains of the CREOASS were rendered inoperable during surveillance testing, a condition that could have prevented fulfillment of a safety function.

  Weakness Related to the Evaluation of Security Related Equipment Issues

- Operability and Functionality Assessments: When a CR is written it goes to the operations shift for an immediate operability/functionality assessment. Since security equipment is not categorized as safety related or technical specification, it gets a functionality assessment performed by the on-shift operating crew. While the onsite SROs are well versed in operational plant requirements, they do not typically have the same level of knowledge when it comes to security equipment and associated regulatory requirements. This can lead to an inaccurate functionality assessment. Security shift supervisor input should be required in cases like this to ensure the SRO has the necessary support to make an accurate functionality assessment.

- Screening Team and Use of CAP: The daily Condition Report Screening Team is not required to have a security department representative to meet the quorum. Occasionally, this results in security department CRs being screened without an individual knowledgeable of the security systems, procedures, and associated regulatory requirements. As a result, security equipment issues may be incorrectly classified with respect to their security significance, resulting in the issue not receiving an appropriate evaluation and corrective actions not being scheduled in a timely manner.

Both of the above factors contributed to the security finding documented in IR 05000387 and 388/2016406 (Note: not a publically available report). Susquehanna documented the inspectors' observations in their CAP as CR-2016-14789.

Simulator Fidelity Issues Not Appropriately Classified as CRs

The inspectors noted a number of simulator modeling differences from actual plant response identified during post transient reviews of plant events were not documented as CRs as required by station procedures. While simulator issues are normally entered as ARs, in accordance with TQ-301, Simulator Configuration Management, CRs are directed to be written in these cases to evaluate whether negative operator training had occurred due to the modeling differences. The inspectors noted that some of these issues were not corrected within 12 months as required by TQ-301. Susquehanna wrote CR-2016-16801 to capture the inspectors' observations.

(3) Effectiveness of Corrective Actions

The inspectors concluded that corrective actions for identified deficiencies were generally timely and adequately implemented. For significant conditions adverse to quality, Susquehanna identified actions to prevent recurrence. The inspectors concluded that in most cases, corrective actions to address the sample of NRC NCVs and findings since the last problem identification and resolution inspection were timely and effective. However, the inspectors did identify three findings in this area and a potential adverse trend this area.

The inspectors identified a potential adverse trend related to the failure to develop and implement adequate compensatory actions for known long-term degraded conditions. Specifically, adequate instructions were not provided for operating crews and security supervisors as required. Examples include:

- Susquehanna did not correct nor establish compensatory actions for transfer switch for UPS 2D14212/2B246082 which was failed for over one year. The degraded condition subsequently complicated operator response to the loss of a vital 480 VAC switchboard initiating event and resulted in an unplanned manual reactor scram and valid emergency core cooling system (ECCS) actuation on May 13, 2016. Operators were not provided with any instructions or guidance as required by procedure OI-AD-096 Revision 18, "Operator Challenges," even though the degraded condition adversely impacts the loss of drywell cooling and loss of vital bus abnormal operating procedures due to additional equipment being lost due to a loss of vital bus 2B246. The enforcement aspects of this issue are discussed further in section 4OA2.1.c(3) of this report.

- A security system was in a known degraded condition for four and a half months and adequate compensatory actions were not developed for security supervisors as required by 10 CFR 73.55 (o), "Compensatory Measures.". The enforcement aspects of this issue are discussed further in Security IR 05000387 & 388/2016406 (Non-Publicly available).

- The “Blue Max” emergency diesel, used for station blackout purposes, and credited in the station’s risk models, is susceptible to clouding of the fuel oil at low temperatures. Following a modification to address this condition, it was determined that below -5°F ambient, the heaters could not ensure the fuel oil would remain above the cloud point for the fuel oil. As a result of this known condition, when temperatures fall below -5°F operators need to conduct a functionality assessment or declare the Blue Max non-functional. During the winter of 2015-2016, the temperature dropped to -6°F on at least one occasion. However, no guidance was provided to the operators to conduct a functionality assessment when conditions warranted. This issue was evaluated using IMC 0612 Appendix B and IMC 0612 Appendix E, and determined to be minor.

Susquehanna agreed with the inspectors that the observations represented a potential adverse trend. Susquehanna entered the inspectors’ observation into their CAP as CR-2016-20062 and developed communications for all station personnel discussing this potential trend.

Five Year Reviews

The inspectors completed a five year look back of the HPCI system. The inspectors reviewed CRs, system health reports, previous NCVs, conducted system walkdowns and conducted interviews with the system engineer and operators. This review did not identify any long-term repetitive technical issues with the HCPI system equipment.

The inspectors also conducted a review of long-term corrective actions developed in response to Susquehanna’s Chilling Effects Letter of January 28, 2009 (ML090280115). The inspectors conducted small group interviews with six selected groups across the site organization. These groups included employees from the operations training, systems engineering, programs engineering, electrical maintenance, radiation protection, and security groups.

The inspectors also interviewed the station Employee Concerns Program coordinators, and station management. The inspectors concluded that Susquehanna has taken appropriate actions to correct the original concerns, communicate the importance of raising safety concerns, developed multiple options for staff to raise concerns, and developed methods to evaluate and monitor safety culture on an ongoing basis.

No findings were identified during the five year reviews.

(4) Trending

The inspectors reviewed Susquehanna’s processes for identifying and addressing emergent and existing adverse trends in equipment and human performance. In general, Susquehanna was able to identify trends at a low level using their department trending process. These trends were rolled up to station level on a quarterly basis and action and monitoring plans were developed as appropriate. Additionally, the station’s maintenance rule performance monitoring program was generally effective in evaluating system performance and identifying trends. The CAP screening team and system engineers also identified potential trends during their screening meeting and elevated the significance of low-level issues based on the identification of potential trends.

However, the inspectors did observe that on some occasions, previous maintenance rule functional failure (MRFF) determinations were no longer accurate due to the addition information obtained from more recent evaluations. Examples of this include:

- The 'A' Control Structure Chiller tripped in December 2015. The initial MRFF determination was that there was no MRFF since it was believed that one train of chillers had always been available. However, during the ACE it was determined that the 'A' Control Structure Chiller had been inoperable for a period of 23 months and during that period there were times the other train was OOS. Thus LER 05000387; 388/2015-014-00 reported a Safety System Functional Failure, which is defined the same as the definition of a MRFF. However the initial MRFF decision was not updated.

- The failure of RCIC on April 22, 2016 was not classified as a MRFF initially. After further evaluation, the licensee determined that RCIC was not able to perform its safety function and reported the condition as LER 05000387; 388/2016-018-00 on June 21, 2016. The initial MRFF determination was not updated.

In both cases, because the MRFF determination errors did not result in the exceedance of a pre-established 10 CFR 50.65 a.2 performance monitoring goal for the associated system, this is not considered to be a violation per the guidance in NRC IP 71111.12 and the NRC Enforcement Manual. Susquehanna staff entered the inspector's observations in to the CAP and revised the MRFF determinations appropriately.

c. Findings

.1 Failure to evaluate operability for degraded conditions which challenged operability of safety related equipment.

Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for Susquehanna failing to identify and correct conditions adverse to quality in a timely manner. Specifically, between April 16, 2016 and April 22, 2016, condition reports for potential or suspected degraded or non-conforming conditions related to the High Pressure Coolant Injection System (HPCI) and Reactor Core Isolation Cooling System (RCIC) systems were not written and operability determinations performed. In both cases, the equipment was subsequently declared inoperable due to the conditions. The equipment was taken out of service, repaired, and retested and the issues entered into the CAP.

Description:
Example #1: RCIC Oil Leak

During the Unit 1 refueling outage, the RCIC system was taken out of service for a turbine internal inspection under work order (WO) 1855709. As part of the inspection, the oil was drained from the system and the lube oil filter elements were replaced. Post maintenance testing (PMT) was performed during the overspeed testing of the RCIC turbine from April 15 – April 16. During the PMT, a leak was identified on the "B" side of the duplex oil filter fiber washer. The maintenance technician checked tightness and the leak appeared to stop as documented in the actions taken on April 16 of WO 1855709. The test director was made aware of this condition but no condition report (CR) was generated.

On April 21, 2016 at 12:57 a.m., operations commenced starting up the reactor and entered Mode 2. RCIC was aligned for automatic operation at 3:35 p.m., in preparation for steam dome pressure exceeding 150 psig. At 7:35 p.m., 150 psig steam dome pressure was reached and operations completed the RCIC 24 month flow verification. Operations reached Mode 1 on April 22, 2016 at 11:25 a.m. and at 12:59 p.m. commenced the RCIC quarterly flow verification. During the flow verification, an operator noted the "B" oil filter exhibited a 1-2 drop per second leak and initiated CR-2016-10998. Operations determined that the condition identified in CR-2016-10998 rendered the RCIC system inoperable since they did not have reasonable assurance that RCIC could meet its required mission time.

NDAP-QA-0482, Post Maintenance Testing, Rev 7, Section 6.6.4.d states, "If equipment adjustment is required to meet the identified post maintenance testing criteria after maintenance is complete, initiate an action request condition report (AR/CR) to identify potential work practice, equipment, procedure or work instruction deficiency. Information will be used for trending and/or to identify actions necessary to correct the deficiency." When the leak was identified on April 16, the cap nut tightness was checked and the leak stopped but no AR/CR was generated to identify actions necessary to correct the deficiency and determine if the actions taken were appropriate. The failure to initiate an AR/CR was questioned by inspectors and entered into CAP as CR-2016-14716. As a result, adequate actions were not taken to address the deficiency, and the deficiency was not evaluated for impact on operability. RCIC was subsequently declared inoperable on April 22 when the oil leak recurred. In order to repair the leak, the filter was disassembled and gaskets/washers replaced. Susquehanna submitted LER 05000387/2016-018-00, Inoperability of RCIC Due to an Oil Leak on June 21, 2016.

Example #2: HPCI Auxiliary Oil Pump Vibrations

On April 22, with the Unit 1 in Mode 2, the vibration data on the auxiliary oil pump was taken following the performance of SO-152-002, Unit 1 HPCI Flow Surveillance. Predictive maintenance personnel noticed elevated overall vibration level on the pump vibration measuring points. Vibration data for the motor point was unchanged from the previous runs. Vibrations data for the inboard and outboard pump bearings increased from 200 percent to 250 percent when compared to the two previous runs. The vibration engineer was notified of the elevated vibrations and an email was sent to the HPCI system engineer. The following day the system engineer and vibration engineer discussed the condition and coordinated with operations to conduct an additional run of the auxiliary oil pump on April 26, 2016.

On April 26, the auxiliary oil pump was placed in service with the HPCI turbine in standby (the turbine was running on April 22), in order to take additional vibration data. Auxiliary oil pump vibrations increased an additional 25 – 30 percent from the April 22 run. These results were reported to the Control Room, CR 2016-11217 was written, and operators declared the HPCI system inoperable based upon the rate of change of pump vibration and there was not reasonable assurance that HPCI could meet its required mission time. System Engineering recommended pump replacement prior to the Unit 1 restart and the pump was replaced.

NDAP-QA-0703, “Operability Determinations and Functionality Assessments,” Section 5.1.1 states ,”A person upon discovering a potential or suspected degraded or non-conforming condition shall PERFORM the following: Immediately notify the Main Control Room, ensure the concern is documented in a condition report per LS-120, Issue Identification and Screening. LS-120 section 5.2.4 states, “A condition report shall be written for a condition adverse to quality or ANY question of operability.” Procedure MT-GM-009 “Vibration Monitoring” Section 7.5.1 states, “Data review and evaluation is the most important aspect of vibration analysis process. Greater emphasis should be placed on observed trends rather than absolute amplitudes.” MT-GM-009 section 7.5.8 states, in part, when a legitimate problem is suspected PDM personnel shall discuss the finding with the PDM program administrator. The PDM program administrator should take appropriate actions to inform the station. A condition report should be considered. Section 7.5.9 states, in part, equipment that exhibits characteristics of a degraded condition may be monitored at an increased frequency specified by the PDM Administrator. Section 7.5.10 states, in part, if the data indicates an increasing trend, discuss the results with the PDM program administrator to ensure diagnostic information is collected. Consider writing a CR. The actions of MT-GM-009 7.5.8, 7.5.9, and 7.5.10 were taken, other than writing a CR. Per the procedure guidance, this indicates a suspected or potential degraded condition existed for the HPCI System.

In addition to not writing a CR, this information was not shared with the Main Control Room Operators on April 22. Shortly after this concern was identified, RCIC was declared inoperable. The immediate technical specification action statement for RCIC being declared inoperable is to verify that HPCI is operable. Thus a potential operability concern for HPCI was not made available for operations when they evaluated this action statement as being completed.

Analysis: Inspectors determined that not initiating condition reports for deficiencies identified during testing as required by NDAP-QA-0482 (Example 1) or NDAP-QA-0703 (Example 2) was a performance deficiency within Susquehanna’s ability to foresee and correct. Specifically, degraded conditions were not documented in a CR as required by station procedures so they could be evaluated. When the conditions were evaluated, the equipment was determined to be inoperable. The inspectors determined that there were two examples of the same performance deficiency and violation. In accordance with NRC Enforcement Manual Section 1.3.4, “Documenting Multiple Examples of a Violation,” multiple examples of a single violation are allowed to be documented as a single violation bounded by the characterization of the most significant example. The RCIC example is considered the most significant due to the longer exposure time in a required mode and number of mode changes that occurred during the exposure period.

Inspectors reviewed IMC 0612 Appendix B, “Issue Screening,” and IMC 0612 Appendix E, “Examples of Minor Issues,” and determined that the finding was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the associated cornerstone objective to ensuring the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the failure to identify and correct degraded conditions associated with of the RCIC system which rendered that system inoperable. In accordance with IMC 0609.04, “Initial Characterization of Findings,” dated June 19, 2012, and Exhibit 2 of IMC 0609, Appendix A, “The SDP for Findings At-Power,” dated June 19, 2012, the inspectors determined that this finding

screened to green because in the safety function was not lost, and the finding did not represent an actual loss of function of at least a single Train for greater than its Tech Spec Allowed Outage Time OR two separate safety systems out-of-service for greater than its Tech Spec Allowed Outage Time.

This finding had a cross-cutting aspect in the area of Human Performance, Teamwork, because individuals and work groups did not communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained [H.4]. Specifically, in both examples, individuals were aware of potential degraded conditions but actions were not taken to communicate the activity to other groups, such as the control room operators, to allow for the issues to be evaluated for operability and determine if proposed actions were timely and/or appropriate.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected.

Contrary to the above, (example 1) from April 16 to April 22, 2016, a known condition adverse to quality which resulted in the RCIC system being declared inoperable was not identified and corrected in a timely manner. Specifically, despite identifying a condition adverse to quality associated with the RCIC lube oil system duplex filter, implementation of CAP did not assure that the condition adverse to quality was promptly corrected. Susquehanna entered this issue into their CAP, repaired the RCIC lube oil system duplex filter, and returned the system to an operable status restoring compliance.

Contrary to the above (example 2) from April 22 to April 26, a known condition adverse to quality which resulted in the HPCI system being declared inoperable was not identified and corrected in a timely manner. Specifically, despite identifying a condition adverse to quality associated with the HPCI auxiliary oil pump, implementation of the CAP did not ensure the condition was evaluated for operability and corrected in a timely manner. Susquehanna entered this issue into their CAP, replaced the HPCI auxiliary oil pump, and returned the system to an operable status restoring compliance.

In accordance with NRC Enforcement Manual Section 1.3.4, "Documenting Multiple Examples of a Violation," multiple examples of a single violation are allowed to be documented as a single violation bounded by the characterization of the most significant example. Because this violation was of very low safety significance (Green) and Susquehanna entered this performance deficiency into the CAP as CR-2016-10998, CR-2016-12089, CR-2016-11217, and CR-2016-14613, the NRC is treating this as an NCV in accordance with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000387/ 2015008-01; Failure to Evaluate Operability For Degraded Conditions Which Challenged Operability of Safety Related Equipment)**

.2 Failure to implement and maintain a quality procedure results in control room chiller inoperability

Introduction: 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.

Description: The 0K112A chiller is one of two chillers in the Control Structure Chilled Water System (CSCW), which provides chilled water to the cooling coils located in the Control Room, Control Structure, Computer Room, and Unit 1 Emergency Switchgear Room cooling air handling units. The Control Room, the Computer Room, and the Control Structure air handling units are located inside the Control Structure and the Unit 1 Emergency Switchgear Room Cooling units are located in the Unit 1 Reactor Building. The cooling coils transfer heat from the air stream to the CSCW system. During normal, transient, and design basis accident conditions, the Control Structure HVAC systems maintain the temperature inside the Control Structure areas within design limits so that the various safety and non-safety related system components located in these areas can perform their design functions. Under accident conditions, cooling for the chiller is provided by Emergency Service Water (ESW). Under normal conditions, cooling is provided by Service Water (SW).

On December 10, 2015, both units were in Mode 1 operating at 100 percent power for the performance of SE-030-014A, "'A' Control Room Floor Cooling Performance Test." During the surveillance operators identified that actual kilowatt input to the 0K112A compressor motor was greater than the maximum acceptable kilowatt input, a test acceptance criteria to provide assurance the chiller would not trip on overcurrent at design loading during an accident. The 0K112A chiller was declared inoperable and TS 3.7.4 was entered.

Historically, the 0K112A chiller has had issues with refrigerant stacking, the loss of oil via carryover in the refrigerant. In 1996, a modification was made to the 0K112A chiller to recover oil from the evaporator. ME-GE-021 specifies a charge of 1710 pound of R114a for both the 'A' and 'B' chillers in accordance with the vendor manuals. A vendor representative recommended that the refrigerant charge for the 0K112A chiller be increased by approximately 300 pounds to address the oil stacking issues. This change was never incorporated in ME-GE-021 and the impact of this overcharge on system performance was not evaluated. It appears that the use of a long standing informal work practice of weighing the amount of refrigerant removed during maintenance and then restoring that same amount was followed instead of referring to the written procedure. On October 13, 2013, 2090 pounds of R114a was removed in order to perform a re-tubing modification on 0K112A as documented in CR-2014-01110. Following the maintenance, workers recharged 0K112A to 1710 pound per ME-GE-021.

On January 8, 2014, 0K112A tripped on high bearing temperatures due to low oil levels due to refrigerant stacking. At that time, the system engineer directed maintenance staff to overcharge 0K112A to 2010 pounds of R114A. This was performed on January 9, 2014 and 0K112A returned to service. CR 2014-01188 was written on January 10, 2014 requesting ME-GE-021 be revised to reflect a refrigerant charge of 2010 pounds.

CR-2014-01188 states that maintenance and engineering had been operating using verbal instructions instead of maintenance procedure MT-GE-021 and requested the procedure be revised to reflect the higher refrigerant charge. This procedure was revised without an engineering review to determine any impact on chiller performance. On December 10, 2015, SE-030-014A failed. It was later determined by an empirical process of slowly removing excess refrigerant that this was approximately 100 pounds too much as documented in CR-2015-32904. The chiller maintenance procedures were subsequently revised to incorporate the empirically determined refrigerant charge. This overcharge had caused the compressor motor to work harder and draw excessive current and eventually led to the actual kilowatt input to the 0K112A compressor motor being greater than the maximum acceptable kilowatt input allowed by the test procedure. Susquehanna entered the issue into the CAP as CR-2015-32904 and a failure modes analysis determined the refrigerant overcharge was the most likely cause for the surveillance failure. MT-GE-021 was revised to reflect the new lower R-114a charge, and CSCW was restored to an operable status on December 14, 2015.

An apparent cause evaluation (ACE) concluded the 0K112A was inoperable from January 9, 2014 until December 10, 2015 due to the R114a overcharge conducted on January 9, 2014. Contributing causes identified by the ACE were a failure to adequately monitor refrigerant loading and compressor motor currents. LER 05000387 and 388/2015-014-00 was submitted on February 8, 2016 for the discovery of a condition prohibited by Technical Specifications (TS 3.7.4) and the loss of a safety function. During times of testing and maintenance on the ‘B’ train, both trains of CSCW were inoperable during the 23 months the ‘A’ train was inoperable. The inspectors also noted that the biennial surveillance test SE-030-014A does not monitor refrigerant loading and that the R114a refrigerant overcharge condition existed previous to January 9, 2014. 0K112A last passed its surveillance test on August 15, 2013, with the overcharge condition present. Susquehanna is reopening their ACE, to determine if there were any additional contributing causes which could explain why this refrigerant overcharge condition had a larger impact on the December 2015 test and re-evaluate past operability prior to October 13, 2013.

Analysis: The inspectors determined that Susquehanna did not properly implement and maintain quality procedure MT-GE-021 in accordance with 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” which was a performance deficiency reasonably within Susquehanna’s ability to foresee and correct. Specifically, Susquehanna staff increased the amount of refrigerant charge specified but failed to update the MT-GE-021 procedure in 1996, did not follow the written procedure from 1996 until 2014, and failed to fully evaluate the procedure change made in 2014 to ensure it did not adversely affect chiller performance. This resulted in an operating condition which caused in the ‘A’ chiller to be inoperable from January 9, 2014 until December 14, 2015.

Inspectors reviewed IMC 0612 Appendix B, “Issue Screening,” and IMC 0612 Appendix E, “Examples of Minor Issues,” and determined this finding is more than minor because it is 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.

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 control structure chillers are not specifically modelled in Susquehanna’s NRC SPAR model or in their EOOS risk model; therefore, a quantitative risk number could not be obtained. The SRA determined risk to be very low safety significance based upon the fact that the control structure chillers are a support system for safety related switchgear and main control room equipment and instrumentation. There is a 100 percent capacity redundant train available in most circumstances. The control structure chillers are scoped as a low risk system in the maintenance rule and a functional failure only occurs if both trains are inoperable. A failure of CSCW will not directly result in the failure of a supported component and any subsequent failure of the supported system is time and temperature dependent allowing an ample opportunity for recovery. Based on these factors, 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 [H.8]. Specifically, for many years maintenance and engineering personnel relied upon informal work practices vice referring to the procedure when charging the chillers with refrigerant.

Enforcement: 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” states, “Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.” Quality procedure MT-GE-021, Revision 23, Appendix F stated the acceptance criteria for refrigerant charge - pressure for 0K112A is 1710 pounds of R114a. Contrary to the above, from 1996 until December 14, 2015, Susquehanna failed to implement or maintain MT-GE-021’s acceptance criteria for R114a refrigerant change for the 0K112A chiller, a safety related component. This resulted in the failure of a surveillance test and subsequent determination that the 0K112A chiller had been inoperable for a period of 23 months. Susquehanna entered the issue into the CAP as CR-2015-32904, conducted a failure mode analysis, revised MT-GE-021 to establish adequate acceptance criteria, removed the excess refrigerant, and restored the 0K112A chiller to an operable status on December 14, 2015.

Because this violation is of very low safety significance (Green) and has been entered into Susquehanna's CAP, this finding is being treated as an NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(05000387 & 388/2016008-02: Failure to maintain or follow quality procedure results in control room chiller inoperability)**

.3 Failure to Implement or Develop Timely Interim or Final Corrective Actions For a Degraded Condition

Introduction: 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 for a vital 120 VAC load center. Specifically, Susquehanna did not correct nor establish compensatory actions for the transfer switch for UPS 2D14212/2B246082 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.

Description: AC UPS 2D666 provides power to 120 VAC Distribution Panel 2Y629. This panel powers loads that ensure the ability to manually drive control rods, Turbine Electro-Hydraulic Control System (EHC) controllers, turbine bypass valve controllers, and main control room indications. This panel is normally powered from 250 VDC load Center Breaker 2D14212 (non-safety related) via an Inverter and alternately via Vital 480 VAC Breaker 2B246082 (safety related). The UPS function and the transfer switch are non-Class 1E and therefore not safety related.

Switch 2D666SW1 failed during maintenance on May 14, 2015 during refueling outage U217RIO and CR-2015-15305 was written to document the failure. The switch was failed in the alternate power supply position and still provided power to Panel 2Y629. The failed switch 2D666SW1 was originally scheduled to be replaced during the outage when it was discovered, but it was removed from the outage scope. Repairs were scheduled for U218RIO under PCWO 1904183.

With the UPS function of 2D666 unavailable, a loss of vital 480 VAC Switchboard 2B246, now would result in a loss of Panel 2Y629. Off normal procedure ON-4KV-201 is written under the assumption that vital UPS's are aligned or can be aligned to its normal supply. Since this assumption was no longer valid, the plant was out of its design configuration and compensatory measures were needed to be taken. Procedure OI-AD-096 would require these compensatory actions be developed as an "Operator Burden" and that they remain in place until the degraded condition is corrected. This was not done despite the presence of a locked-in alarm in the MCR indicating that transfer switch 2D666 was not in its normal position.

There were several additional opportunities to reevaluate the significance of this issue and the timeliness of the corrective actions. These included CR-2015-18178 which correctly identified a 2.5X increase in plant risk with this condition when the new PRA model was implemented at Susquehanna, the implementation of Temporary Engineering Change (TEC) 1914932 to lift leads to remove the locked alarm for 2D666 being out of its normal position, and the 50.59 review completed due to the temporary change of greater than 90 days.

On May 12, 2016, 480 VAC Switchboard 2B246 and 2Y246 were de-energized due to a phase to ground short of an MCC on 2B246. This also resulted in 120VAC Distribution Panel 2Y629 being de-energized. This resulted in operators being unable to carry out the guidance of ON-4KV-201 and actions for loss of drywell coolers. As a result, operators inserted a manual reactor scram at 12:35 a.m. on May 13, 2016, due to drywell pressure approaching its automatic scram setpoint. Drywell temperature and pressure continued to rise until 3:35 A.M. when the high drywell ECCS actuation setpoint was reached. As a result, this was considered a scram with complications due to multiple emergency operating procedure (EOP) entry criteria being met and key plant parameters not being controlled following the scram.

Analysis: The inspectors determined that failure to correct and establish appropriate corrective actions for a known degraded condition for an uninterruptable power supply for a vital 120 VAC load center as required by station procedures, was a performance deficiency within Susquehanna's ability to foresee and correct. Specifically, Susquehanna did not correct nor establish compensatory actions for the transfer switch for UPS 2D14212/2B246082 which was failed for over one year.

Inspectors determined that 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, on May 13, 2016, the loss of vital 480V switchboard 2B246 resulted in operators having to insert a manual reactor scram, and subsequently received a valid ECCS actuation due to complications arising from the automatic transfer switch being degraded. 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. [P.3]. 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.

Enforcement: This finding does not involve enforcement action because no violation of a regulatory requirement was identified. The UPS function of switch 2D666 and the switch itself are not classified as Class 1E or safety related; therefore, 10 CFR 50 Appendix B is not applicable. The Susquehanna procedures which were not followed are not listed in NRC Regulatory Guide 1.33 Appendix A, Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors; therefore, TS 5.4.1, Procedures, is also not applicable. Because this finding does not involve a violation, is of very low safety significance, and Susquehanna entered the issue into its CAP, as CR-2016-12681, it is identified as a FIN. **(FIN 05000388/2015008-03; Failure to Implement or Develop Timely Interim or Final Corrective Actions For a Degraded Condition.)**

.4 Failure to Promptly Identify and Correct a Condition Adverse to Quality on Vital 480 VAC Motor Control Centers

Introduction: 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.

Description: In September 2005 during receipt inspection activities for nine MCC breaker assemblies received under purchase order 313584, Susquehanna identified that wiring routed from the stabs on the rear of the MCC breaker assemblies were in very close proximity, or in some cases in contact with, the mounting screws. Susquehanna determined that this condition created the potential for wire insulation to become abraded over time and could cause a phase to ground short while in service. Susquehanna documented this in CR 713554 and performed an evaluation which resulted in corrective actions to modify the screws on the nine MCC breaker assemblies. Susquehanna also revised the associated design specification, E-1116 – Motor Control Center Replacement Units and Components, to include design and performance requirement 2.2.1.27 requiring all fasteners used to mount components to MCC breaker assemblies to have a threaded section approximately two thread lengths through the back of the breaker assembly panel. Revision 2 of E-1116 was issued in January 2006 and contained this design requirement.

In June 2006, purchase order (PO) 349080 was issued to order 47 MCC breaker assemblies using design specification E-1116 revision 2. 41 MCC breaker assemblies were received and receipt inspected in October 2006 and the remaining six in December 2006. No discrepancies with the MCC breaker assemblies were noted in the receipt inspection reports or CAP. Additionally, the same non-conforming screws were identified on six breaker assemblies inspected during receipt inspections on July 14, 2009 for purchase order 365120. However, these assemblies were installed in the plant without any corrective actions taken.

In January 2007, MCC breaker assembly 2B246091, which was part of purchase order 349080, was inspected and prepared for use as a replacement for drywell cooling fan 2V411B. On May 12, 2016, an electrical transient occurred on MCC 2B246 which resulted in the loss of 2B246 and 2Y246 due to an arc fault on 2B46091. This resulted in a loss of drywell cooling fans, required a rapid downpower and eventually resulted in a manual reactor scram being inserted. Post event investigation revealed screws used to secure breaker components were not in conformance with design specification E-1116 Revision 2. One of these screws caused abrasions to the cable insulation and created a phase to ground short as predicted by engineers in 2005. Susquehanna entered this event into CAP as CR-2016-12619.

Susquehanna has implemented an extent of condition review and have identified a population of 53 additional breaker assemblies received under POs 349080 and 365120. Each of the MCC breaker assemblies inspected prior to July 8, 2016 were found to have the same non-conforming condition and modified appropriately. Work orders have been

initiated to inspect and modify the remaining breaker assemblies Susquehanna also initiated actions to perform a 25 percent sample of MCCs received under PO 355547 to determine if the non-conforming condition exists with those breaker assemblies as well.

Analysis: Inspectors determined that not ensuring adequate measures were established to assure that the MCC breaker assemblies purchased conformed to design specifications was a performance deficiency within Susquehanna's ability to foresee and correct. Specifically, receipt inspections failed to identify that MCC breaker assemblies received did not conform to Revision 2 of design specification E-1116.

Inspectors determined that 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 2B246 occurred as a result of a phase to ground fault on 2B24609, which resulted in operators inserting a manual reactor scram, due to a known non-conforming condition. 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.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. Contrary to the above, from October 15, 2006 until the present, Susquehanna did not assure that corrective actions to address an identified condition adverse to quality associated with non-conforming MCC breaker assemblies identified and corrected the non-conforming condition. Specifically, MCC breaker assemblies for up to 54 breaker assemblies used in safety related applications may have been installed with a non-conforming condition. One of these breaker assemblies subsequently failed resulting in a plant transient on May 12-13, 2016. Susquehanna entered this issues into their CAP, conducted an investigation, is conducting extent of condition inspections, and modifying non-conforming breakers when identified. Because this violation was of very low safety significance (Green), and Susquehanna has entered this performance deficiency into the CAP as CR-2016-12619 and CR-2016-15710, the NRC is treating this as an NCV in accordance with Section 2.3.2 of the NRC Enforcement Policy**. (NCV 05000387; 388/2015008-04; Failure to Promptly Identify and Correct a Condition Adverse to Quality on Vital 480 VAC MCCs)**

.2 Assessment of the Use of Operating Experience

a. Inspection Scope

The inspectors reviewed a sample of CRs and ARs associated with review of industry operating experience to determine whether the Susquehanna staff appropriately evaluated the operating experience information for applicability to Susquehanna and had taken appropriate actions, when warranted. The inspectors also reviewed evaluations of operating experience documents associated with a sample of NRC generic communications to ensure that Susquehanna staff adequately considered the underlying problems associated with the issues for resolution via their CAP. In addition, the inspectors observed various plant activities to determine if the station considered industry operating experience during the performance of routine and infrequently performed activities.

b. Assessment

The inspectors determined that Susquehanna staff appropriately considered industry operating experience information for applicability, and used the information for corrective and preventive actions to identify and prevent similar issues when appropriate. The inspectors determined that operating experience was appropriately applied and lessons learned were communicated and incorporated into plant operations and procedures when applicable. The inspectors also observed that industry operating experience was routinely discussed and considered during the conduct of MRC and Plan-of-the-Day meetings, during pre-job briefs, and included in work packages.

c. Findings

No findings were identified.

.3 Assessment of Self-Assessments and Audits

a. Inspection Scope

The inspectors reviewed a sample of audits, including the most recent audit of the CAP, departmental self-assessments, and assessments performed by independent organizations. The inspectors performed these reviews to determine if Susquehanna entered problems identified through these assessments into the CAP, when appropriate, and whether Susquehanna staff initiated corrective actions to address identified deficiencies. The inspectors evaluated the effectiveness of the audits and assessments by comparing audit and assessment results against self-revealing and NRC-identified observations made during the inspection.

b. Assessment

Based on the inspected sample, the inspectors concluded that self-assessments, audits, and other internal Susquehanna assessments were critical, thorough, and effective in identifying issues. The inspectors observed that Susquehanna personnel knowledgeable in the subject completed these audits and self-assessments in a methodical manner. The inspectors observed that Nuclear Oversight was critical and identified weaknesses and areas requiring improvement. When progress in improving performance was not being accomplished in a timely manner, Nuclear Oversight

escalated the issues. Susquehanna completed these audits and self-assessments to a sufficient depth to identify issues which were then entered into the CAP for evaluation. In general, the station implemented corrective actions associated with the identified issues commensurate with their safety significance.

c. Findings

No findings were identified.

.4 Assessment of Safety Conscious Work Environment

a. Inspection Scope

During interviews with station personnel, the inspectors assessed the safety conscious work environment at Susquehanna. Specifically, the inspectors interviewed personnel to determine whether they were hesitant to raise safety concerns to their management and/or the NRC. The inspectors conducted small group interviews with “rank and file” employees from the operations training, systems engineering, programs engineering, electrical maintenance, radiation protection, and security groups. The inspectors also interviewed the station Employee Concerns Program coordinators to determine what actions are implemented to ensure employees were aware of the program and its availability with regards to raising safety concerns. The inspectors reviewed the Employee Concerns Program files to ensure that the Susquehanna staff entered issues into the CAP when appropriate.

b. Assessment

During interviews, Susquehanna staff expressed a willingness to use the CAP to identify plant issues and deficiencies and stated that they were willing to raise safety issues. The inspectors noted that no one interviewed stated that they personally experienced or were aware of a situation in which an individual had been retaliated against for raising a safety issue. All persons interviewed demonstrated an adequate knowledge of the CAP and the Employee Concerns Program. Based on these limited interviews, the inspectors concluded that there was no evidence of an unacceptable safety conscious work environment and no significant challenges to the free flow of information.

c. Findings

No findings were identified.

40A3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample) (Closed) LER 05000387 & 388/2015-014-00: ‘A’ Control Structure Chiller Discovered Inoperable Beyond Technical Specification Limit Due to Refrigerant Overcharge

The inspectors reviewed Susquehanna's actions and reportability criteria associated with LER 05000387 & 388/2015-014-00, which is addressed in CR-2015-32904. On December 10, 2015, Susquehanna discovered the ‘A’ Control Structure Chiller (0K112A) had failed to meet its acceptance criteria in relation to the quantity of cooling provided during scheduled surveillance of the chiller. The 0K112A chiller is one of two chillers in the Control Structure Chilled Water System, which provides chilled water to the cooling coils located in the Control Room, Control Structure, Computer Room, and Unit 1 Emergency Switchgear Room cooling air handling units.

The chiller failure resulted in a condition prohibited by TS 3.7.4 for the inoperability of one control room floor cooling subsystem for greater than 30 days and could have prevented the fulfillment of a safety function of an SSC needed to provide chilled water to the cooling coils located in the Control Room, Control Structure, Computer Room, and Unit 1 Emergency Switchgear Room cooling air handling units. The 'A' control structure chiller was determined to have been inoperable from January 9, 2014 until December 10, 2015, a period of 23 months. The performance deficiency and enforcement aspects of this issue are discussed in Section 4OA2.1.c.2 above. Corrective actions taken included immediately removing excess refrigerant, performing an equipment apparent cause evaluation, and revising procedural guidance related to refrigerant charge. This LER is closed.

The inspectors identified that the same refrigerant overcharge condition also existed for the 'A' control structure chiller previous to October 13, 2013. As such, the period from the last successful surveillance, August 15, 2013, until October 13, 2013, when the overcharge was removed, operability of the 'A' control structure chiller is in question. The LER did not identify this. Susquehanna agreed with the inspectors' observation, entered the observation in the CAP, developed corrective actions to evaluate this additional period for operability, re-opened the apparent cause evaluation to validate the conclusions and identify any contributing causes. The revised LER was submitted on August 10, 2016 and will be reviewed separately.

4OA5 Other Activities

.1 Follow-up Inspection for a Green Notice of Violation (NOV) (IP 92702)

a. Inspection Scope

The inspectors performed a follow-up inspection on NOV 05000387; 388/2014009-04, Failure to Take Action to Restore Degraded Emergency Action Level Scheme, issued on August 1, 2014. Susquehanna did not take timely corrective actions to provide an adequate means to measure temperature in nine out of 21 areas, where reactor building temperatures are considered for the fission product barrier degradation emergency action levels (EALs). Because Susquehanna failed to restore compliance with NRC requirements within a reasonable time after the issue was discussed in a formal exit meeting on January 24, 2014 and documented in NRC Inspection Report 05000387; 388/2013005 on February 14, 2014 as NCV 05000387; 388/2013005-04, this violation was treated as a cited violation.

The inspectors reviewed Susquehanna's reply to the NOV, submittals to the NRC related to revising the EALs, revised EAL technical basis documents, Susquehanna's evaluation of the NOV, and actions taken as a result of the Notice of Violation.

b. Findings and Observations

No findings were identified.

The inspectors concluded that Susquehanna's staff completed a timely evaluation and took appropriate actions to address the issue. Susquehanna submitted a License Amendment Request to update the station's EAL scheme for NRC review and approval on October 15, 2015, and they expect to implement these changes by December 2016. As a compensatory measure, Susquehanna revised the operator rounds procedures to

require operators to routinely assess each of the nine areas that lacked adequate means to measure temperature for high temperature conditions, indicative of an unisolable leak, and document the performance of that assessment for these areas.

The inspectors concluded that Susquehanna's actions were sufficient to address the identified cause and that the completed and planned corrective actions addressed the causes described in the evaluation. NOV 05000387; 388/2014-009-04 is now closed.

4OA6 Meetings, Including Exit

On July 8, 2016, the inspection results, which were discussed with Mr. Jon Franke, Site Vice President, and other members of your staff. During that discussion your staff requested to provide additional information for consideration. In-office review of the additional information continued by the NRC, and a telephonic exit meeting was conducted on July 22, 2016 with Mr. Jason Jennings, Susquehanna Regulatory Affairs Manager. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
J. Franke - Site Vice President
B. Franssen – Plant Manager
A. Geiss - Nuclear Training Group
B. Martonick – Security Manager
B. Reppa - GM Engineering
C. Castiglione – Maintenance CAPCO
C. Manges - Regulatory Assurance Engineer
C. Torres - Radiological Engineer
D. Crispell – Employee Concerns Rep
D. Deretz – Performance Improvement Manager
D. Jones – Operations Manager
D. LaMarca – AOM- Shift
E. Carter - Operations Training
J. Alexander - Performance Improvement
J. Diehl - Radiation Protection
J. Dougherty - Operations
J. Goodbred – Training Manager
J. Grisewood - Special Projects Manager
J. Hartzell - Supervisor of PRA
J. Jennings – Regulatory Affairs Manager
J. Meartz - Engineering Branch Manager
J. Rodriquez – Maintenance Manager
K. Cimorelli – GM Operations
K. Daly - Engineering Supervisor
K. Dyer - Correction Action and Assessments
M. Christopher – Senior Assessor
M. Eckert – Systems Engineer
M. Sivaraman - Operations
N. Pagliaro - Regulatory Affairs
P. Ervin - Performance Improvement
P. O'Malley – Susquehanna Advancement Team Manager
S. Muntzenberger – Engineering Branch Manager
T. Illiadis - GM Programs
T. Roth - Supervisor Operations Engineering
V. Schuman - Special Projects for Chemistry and Environmental

NRC Personnel
D.Caron, Region 1 DRS Plant Support Branch 1
J. Cherubini, Region 1 DRS Plant Support Branch 1

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened and Closed

05000387/2016008-01	NCV	Failure to Write a Condition Report for Degraded Conditions Which Challenged Operability of Safety Related Equipment (4OA2.1.c(1))
05000387, 388/2016008-02	NCV	Failure to Implement and Maintain Quality Procedure Results in Control Room Chiller Inoperability (4OA2.1.c(2))
0500388/2016008-03	FIN	Failure to Implement or Develop Timely Interim or Final Corrective Actions for a Degraded Condition. (4OA2.1.c(3))
05000387; 388/2016008-04	NCV	Failure to Promptly Identify and Correct a Condition Adverse to Quality on Vital 480 VAC MCCs (4OA2.1.c(4))

Closed

05000387, 388/2014009-04	VIO	Failure to Take Action to Restore Degraded Emergency Action Level Scheme (4OA5)
05000387, 388/2015-014-00	LER	“A' Control Structure Chiller Discovered Inoperable Beyond Technical Specification Limit Due to Refrigerant Overcharge (4OA3)

Discussed

05000387; 388/2016406-01	NCV	Physical Security Finding

LIST OF DOCUMENTS REVIEWED

Section 4OA2: Problem Identification and Resolution

Audits and Self-Assessments

Chemistry and Environmental Department Performance Assessment Report, Fourth Quarter 2015
Nuclear Maintenance Quarterly Performance Assessment Report 2nd Quarter 2015
Nuclear Maintenance Quarterly Performance Assessment Report 4th Quarter 2015
Nuclear Operations Performance Assessment Report, Fourth Quarter 2015
Radiation Protection Department Performance Assessment Report, Fourth Quarter 2015
Reactivity Management Focused Self-Assessment, First Quarter 2015 (DI-2014-38532)
Security Self-Assessment of NEI 08-07 Security Performance Objectives (DI-2015-00147)
Security Self-Assessment on the SGI Room for 2015 (AR-2015-33114)
Security/Security Access & FFD Quarterly Performance Assessment Report 4th Quarter 2015
Security/Security Access & FFD Quarterly Performance Assessment Report 1st Quarter 2015

Condition Reports (* indicates that issue report was generated as a result of this inspection)

2013-01143	2014-39116	2015-22882
2013-04794	2015-01413	2015-24137
2014-01110	2015-01443	2015-24278
2014-01188	2015-02590	2015-24279
2014-05421	2015-02688	2015-24553
2014-17151	2015-03695	2015-25547
2014-17666	2015-04701	2015-26455
2014-18806	2015-04730	2015-26475
2014-19008	2015-04739	2015-26590
2014-19427	2015-06936	2015-26768
2014-20115	2015-07058	2015-29047
2014-20221	2015-08469	2015-29925
2014-20671	2015-09148	2015-29925
2014-21113	2015-09890	2015-30092
2014-24152	2015-09907	2015-30383
2014-25076	2015-10324	2015-30721
2014-25851	2015-10768	2015-30901
2014-26136	2015-12112	2015-30901
2014-27243	2015-12130	2015-30924
2014-28492	2015-12908	2015-31084
2014-28693	2015-14813	2015-31171
2014-29252	2015-14868	2015-31409
2014-30995	2015-14877	2015-31410
2014-31909	2015-15187	2015-32656
2014-31911	2015-16998	2015-32904
2014-34344	2015-17473	2015-33033
2014-34374	2015-18472	2016-00900
2014-35063	2015-19103	2016-01016
2014-35154	2015-22407	2016-01038
2014-35235	2015-22417	2016-01141
2014-35270	2015-22420	2016-01946
2014-37665	2015-22425	2016-01992
2014-37848	2015-22554	2016-02355
2014-38324	2015-22586	2016-03128

2016-03538
2016-03543
2016-03583
2016-03790
2016-03909
2016-03983
2016-04137
2016-04210
2016-04336*
2016-04535
2016-04990
2016-05171
2016-05930
2016-06873
2016-07015
2016-07023
2016-07589
2016-07893
2016-08498
2016-09723
2016-10669
2016-10998
2016-11086
2016-11217
2016-11618
2016-12089*
2016-12604
2016-12619
2016-12619
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2016-12680
2016-12681
2016-12735
2016-13634
2016-14243
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2016-14291
2016-14366
2016-14373
2016-14382
2016-14494
2016-14500*
2016-14501*
2016-14517*
2016-14525*
2016-14534*
2016-14534*
2016-14536*
2016-14537*
2016-14537*
2016-14587*
2016-14588
2016-14592
2016-14594
2016-14609
2016-14612*
2016-14613
2016-14613*
2016-14628*
2016-14655
2016-14702
2016-14716*
2016-14789*
2016-14791*
2016-15449*
2016-15468*
2016-15493*
2016-15550*
2016-15710*
2016-16801*
2016-16803*
2016-17576*
2016-20062*
709387
713554

Drawings
E-10, 125VDC, 250 VDC, and 120VAC Systems, Sheet 1, Revision 24
E-11, 125VDC and 120VAC Control Center North and South, Sheet 8, Revision 9
E-25, Uninterruptible Power Supply Power Distribution Panels, Sheet 3, Revision 42
E-25, Uninterruptible Power Supply Power Distribution Panels, Sheet 5, Revision 22
E-25, Uninterruptible Power Supply Power Distribution Panels, Sheet 6, Revision 20
E-9, 480V MCC, Sheet 26, Revision 12
F1000, Design and Installation of Electrical Raceway Fire Barriers, Revision 9
M-100, P&ID & HVAC Control Diagrams, Legends, and Symbols, Sheets 1-4, Revision 33

Operating Experience
MRC OE Reports for June 7, 2016 and June 21, 2016
NRC EN 51030
NRC EN 51932
NRC EN 51955
NRC EN 51962
NRC EN 51982
NRC EN 51964
NRC EN 51965
NRC EN 51967
NRC EN 51969
NRC EN 51972
NRC EN 51975
NRC EN 51976

Procedures
C1073, Revision 4, Inspection of Fire Wrapped Raceways For Compliance With Technical Requirements
EP-RM-004, Revision 8, EAL Classification Bases.
LS-120, Issue Identification and Screening Process, Revision 6
LS-125, Corrective Action Program, Revision 4
LS-125-1001, Root Cause Analysis Manual, Revision 2
LS-125-1003, Apparent Cause Evaluation Manual, Revision 2
LS-125-1004, Effectiveness Review Manual, Revision 3

LS-125-1005, Work Group Evaluation Manual, Revision 4
LS-125-1007, Equipment Apparent Cause Manual, Revision 2
LS-125-1008, Quarterly Performance Assessment Manual, Revision 5
LS-125-1009, Station Trending Manual, Revision 2
LS-125-1010, Prompt Investigation, Revision 0
MT-050-003, RCIC Pump Turbine Disassembly and Reassembly, Revision 15
MT-GE-021, Revision 36, Chiller Maintenance and Inspection-Infrequent.
MT-GE-021, Revisions 23 and 24, Chiller Maintenance and Inspection-Infrequent
MT-GE-058, Revision 3, Carrier Chiller Maintenance.
MT-GM-009, Revision 12, Vibration Monitoring
NDAP-00-0708, Corrective Action Review Board, Revision 19
NDAP-00-0711, Conduct of Performance Improvement Group, Revision 14
NDAP-00-0761, Departmental Corrective Action Review Board (DCARB), Revision 5
NDAP-00-0780, Management Review Committee (MRC), Revision 10
NDAP-QA-0019, Utilization, Management and Oversight of Supplemental Workers, Revision 11
NDAP-QA-0343, Time Critical and Time Sensitive Operator Actions, Revision 0
NDAP-QA-0407, Revision 4, Filter Testing of HEPA and Charcoal Filtration Units.
NDAP-QA-0482, Post Maintenance Testing, Revision 7
NDAP-QA-0500, Conduct of Maintenance, Revision 28
NDAP-QA-0502, Work Order Process, Revision 46
NDAP-QA-0514, Rework Evaluation and Reduction, Revision 4
NDAP-QA-1901, Work Management Process, Revision 22
NOSP-QA-303, Receipt Inspection, Revision 3
NSEP-AD-0413D, Revision 4, Maintenance Rule – Performance Monitoring.
OP-032-002, Security System UPS, Revision 11
OT-290-001, De-Energizing SPDS UPS for Maintenance, Revision 5
PII-AD-001, Guidance for Performing Screening Team Duties, Revision 12
SE-030-014A, Revision 12, 24 Month “A” Control Room Floor Cooling Performance Test.
SE-030-014A, Revision 8, 24 Month “A” Control Room Floor Cooling Performance Test.
SE-030-A10, Revision 6, “A” CREOASS Charcoal Radionuclide Penetration and Retention Test.
SE-070-A10, Revision 6, 24 Month “A” SGTS Charcoal Test Canister Analysis for 0F169A.
TQ-301, Simulator Configuration Management, Revision 1

Work Orders

313584	1657747	1946794
349080	1744309	1946972
355547	1849890	1946973
365120	1855709	1964073
756041	1896778	1989327
757821	1942154	
1631505	1944633	

Miscellaneous

50.59 screening for CO# 57-001-1916188-01 being applied for > 60 days (2D666)
50.59 screening for EC 1864434 Replace Union Connection #8 On Recirc Pump 1P401B
Calculation EC-002-1083, Revision 0
Calculation EC-049-0683 Revision 0
Calculation EC-052-0591 Revision 0
EWR 2016-16096
Failure mode analysis worksheet for CS Chiller 0K112A failed to achieve design heat load cooling per SE-030-014A
Hot Box 16-18 ACT-16-CR-2016-12681, “Risk of loss of Unit 2 Vital UPS 2D666 not recognized as an Operator Workaround.

LER 05000387, 388/2015-014-00,
M1948-01, 0F169A Pull Charcoal Test Canister IAW SE-070-A10 SGTS Charcoal Filter Test
ML14241A682, August 29, 2014, Susquehanna Steam Electric Station Reply to a Notice of Violation – PLA-7212.
ML15296A048, October 15, 2016, Susquehanna Steam Electric Station Proposed Additional Changes to the SSES Emergency Plan Basis Document Since Submittal of Response to NRC Request for Additional Information PLA-7399.
Operator Rounds Documentation, Unit 1 Reactor Building Temperature, June 19, 2016
Operator Rounds Documentation, Unit 1 Reactor Building Temperature, June 20, 2016
Operator Rounds Documentation, Unit 2 Reactor Building Temperature, June 19, 2016
Operator Rounds Documentation, Unit 2 Reactor Building Temperature, June 20, 2016
PM- V0540-03
Receipt Inspection Report 128060
Receipt Inspection Report 129673
Receipt Inspection Report 162656
Spreadsheet of CRs, ARs, and DIs generated 2012-2016
Susquehanna Engineering Department Fundamentals
Susquehanna Industrial Pocket Safety Guide
Timeline of Recent SSES Small Bore Piping Leaks on Reactor Recirc
UFSAR Unit 1 and Unit 2, Revision 67
Vendor Manual – IOM14 “Reactor Core Isolation Cooling Turbine Unit 1”, Revision 22
Vibration Data traces for HPCI Auxiliary Oil Pump Inboard and Outboard bearing 1993-2016
White Paper for Unit 1 HPCI Auxiliary Oil Pump Operability.
White Paper-‘A’ Control Structure Chiller (0K112A) Unknown Inoperability Response –M. Eckert

Section 4OA3: Follow-Up of Events and Notices of Enforcement Discretion
CR-2014-01110
CR-2104-01188
CR-2015-32904
CR-2016-17576

LER 05000387, 388/ 2015-014-00
SE-030-014A, ‘A’ Control Room Floor Cooling Performance Test, Completed on August 15, 2013 and December 10, 2015.

Section 4OA5: Other Inspection
Maintenance Rule Basis Document for System 30, dated 5/16/2016
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LIST OF ACRONYMS

10 CFR	Title 10 of the Code of Federal Regulations
ACE	Apparent Cause Evaluation
AR	Action Request
CAP	corrective action program
CAPCO	Corrective Action Program Corrdinator
CARB	Corrective Action Review Board
CEA	control element assembly
CR	condition report
CREOASS	Control Room Emergency Ventilation System
CSCW	Control Structure Chill Water System
DFO	diesel fuel oil
DSC	dry storage cask
EAL	Emergency Action Level
ECCS	Emergency Core Cooling System
ECP	engineering change package
EDG	emergency diesel generator
EHC	Electro-Hydraulic Controls System
EOOS	Equipment Out Of Service Model
ESW	Emergency Service Water System
FOST	fuel oil storage tank
HPCI	High Pressure Coolant Injection System
IMC	Inspection Manual Chapter
IR	issue report
ISFSI	independent spent fuel storage installation
JFG	Job Familiarization Guides
LER	Licensee Event Report
MCC	Motor Control Center
MRC	Management Review Committee
MRFF	Maintenance Rule Functional Failure
NCV	non-cited violation
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission, U.S.
PIC	Performance Improvement Coordinator
PIRB	Performance Improvement Review Board
PM	Preventive maintenance
PMT	Post Maintenance Testing
PO	Purchase Order
RCE	root cause evaluation
RCIC	Reactor Core Isolation Cooling System
RRP	Reactor Recirculation Pumps
SDP	Significance Determination Process
SOC	Station Ownership Committee
SPAR	Standard Plant Accident Risk Model
SRA	Senior Reactor Analyst
SSC	Structures, Systems, or Components
SW	Service Water System
TBD	Not yet determined
TEC	Temporary Engineering Change
UFSAR	Updated Final Safety Analysis Report
UPS	Uninterruptable power supply
VAC	volts alternating current
WO	Work Order