



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
2100 RENAISSANCE BLVD., SUITE 100
KING OF PRUSSIA, PA 19406-2713

February 9, 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 – INTEGRATED INSPECTION
REPORT 05000387/2015004 AND 05000388/2015004**

Dear Mr. Rausch:

On December 31, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Susquehanna Steam Electric Station (SSES), Units 1 and 2. The enclosed report documents the inspection results, which were discussed on January 19, 2016 with you and other members of your staff.

NRC Inspectors examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents four NRC-identified or self-revealing findings of very low safety significance (Green). Three of these findings were determined to involve violations of NRC requirements. Additionally, a licensee-identified violation, which was determined to be of very low safety significance, is listed in this report. However, because of the very low safety significance, and because they are entered into your corrective action program (CAP), the NRC is treating these findings as non-cited violations (NCVs), consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCVs in this report, 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 SSES. In addition, if you disagree with 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 SSES.

In accordance with 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 Management System (ADAMS). ADAMS is accessible from the NRC 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 05000387/2015004
and 05000388/2015004
w/Attachment: Supplementary Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.: 50-387, 50-388

License Nos.: NPF-14, NPF-22

Report No.: 05000387/2015004 and 05000388/2015004

Licensee: Susquehanna Nuclear, LLC (Susquehanna)

Facility: Susquehanna Steam Electric Station, Units 1 and 2

Location: Berwick, Pennsylvania

Dates: October 1, 2015 through December 31, 2015

Inspectors: J. Greives, Senior Resident Inspector
T. Daun, Resident Inspector
T. Fish, Senior Operations Engineer
C. Graves, Health Physicist
E. H. Gray, Senior Reactor Inspector
J. DeBoer, Emergency Preparedness Inspector
N. Embert, Operations Engineer
P. Meier, Project Engineer
S. Barr, Senior Emergency Preparedness Inspector

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

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SUMMARY

IR 05000387/2015004, 05000388/2015004; October 1, 2015 to December 31, 2015; Susquehanna Steam Electric Station, Units 1 and 2; Maintenance Effectiveness, Operability Determinations and Functionality Assessments, Drill Evaluation, and Follow-Up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The inspectors identified three non-cited violations, all of which were of very low safety significance (Green and/or Severity Level IV). 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 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 5.

Cornerstone: Initiating Events

Green. A self-revealing finding of very low safety significance (Green) was identified when Susquehanna did not correctly validate a deficient condition associated with the Unit 1 'B' inboard main steam isolation valve (MSIV) direct current (DC) solenoid valve as an actual valve issue, vice indication-only, through the use of specific acceptance criteria as required by MT-AD-509, "Control of Minor Maintenance Activities." By incorrectly concluding the issue was indication only, testing was allowed to be performed which inserted a half-isolation by de-energizing the alternating current (AC) solenoid valve on the 'B' inboard MSIV. When this maintenance was performed, the 'B' inboard MSIV closed unexpectedly, resulting in a reactor scram. The cause of the closure was the failure of the DC solenoid valve on the 'B' inboard MSIV. Susquehanna entered the issue into the CAP as CR-2015-30721 and replaced the DC solenoid for the 'B' MSIV.

The finding is more than minor because it is associated with the equipment performance attribute of the Initiating Events cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. Specifically, the maintenance activity performed to validate the DC solenoid valve continuity was inadequate and as a result the testing was allowed to be performed which relied on DC solenoid valve continuity to prevent an MSIV closure. The inadvertent closure of the 'B' inboard MSIV resulted in a high pressure scram. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 1, for the Initiating Events cornerstone. The inspectors determined the finding was of very low safety significance (Green) because it did not cause the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Specifically, the condenser was maintained for decay heat removal via the bypass valves through the other three main steam lines following the trip. This finding had a cross-cutting aspect in the area of Human Performance, Challenge the Unknown, because Susquehanna did not stop when faced uncertain conditions and instead rationalized unanticipated test results. Specifically, the investigation of the extinguished continuity monitor focused on the possibility that it was an indication-only issue and failed to question the acceptability of the current values obtained during troubleshooting [H.11]. (Section 40A3)

Cornerstone: Barrier Integrity

Green. A self-revealing finding of very low safety significance (Green) and associated violations of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," and Technical Specification (TS) 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)," was identified when Susquehanna did not take adequate corrective action to address the inoperability of the reactor recirculation sample line outboard PCIV when it failed during surveillance testing on July 1, 2015. The valve failed its subsequent surveillance test on September 30, 2015 due to the same degraded condition, which rendered the valve inoperable for longer than the allowed outage time specified in TS 3.6.1.3. The repeat failure was entered into the CAP as CR-2015-26590 and restored the valve to an operable condition by replacing its associated solenoid valve.

The finding was determined to be more than minor because it was associated with the structure, system and component (SSC) and Barrier Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to correct the degraded condition of solenoid valve sticking resulted in a PCIV being rendered inoperable for longer than the TS allowed outage time. Inspector evaluated the finding 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, and determined it is of very low safety significance (Green) because the performance deficiency did not result in an actual open pathway in the physical integrity of reactor containment, because the inboard valve remained operable for the duration of the inoperability, and it did not involve the hydrogen recombiners. This finding had a cross-cutting aspect in the area of Human Performance, Challenge the Unknown, because Susquehanna did not stop when faced with uncertain conditions and ensure the risks were evaluated and managed before proceeding. Specifically, Susquehanna did not challenge the unanticipated test results and did not ensure that the condition adverse to quality, associated with the faulty solenoid valve, was resolved prior to considering the valve operable [H.11]. (Section 1R12)

Green. An NRC-identified finding of very low safety significance (Green) and associated violations of TS 5.4.1, "Procedures," TS 5.5.11, "Safety Function Determination," and TS 3.7.3, "Control Room Emergency Outside Air Supply System" was identified when Susquehanna performed maintenance on redundant trains of the standby gas treatment (SBGT) system and control room emergency outside air supply system (CREOASS) concurrently. When performing these actions, operators did not apply NDAP-QA-0312, "Control of LCOs, technical requirement for operations (TROs) and Safety Function Determination Program," correctly which resulted in the unrecognized loss of safety function of SBGT and CREOASS. Susquehanna entered the issue into the CAP as CR-2015-26475 and restored one of the subsystems to service, restoring the safety function.

This finding is more than minor because it is associated with the Human Performance (Routine OPS/Maintenance Performance) attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of providing reasonable assurance that physical design barriers (Secondary Containment and Control Room Ventilation) protect the public from radionuclide releases caused by accidents or events. Specifically, allowing work to be performed on redundant trains of SBGT and CREOASS concurrently, while not applying plant TSs correctly, resulted in a loss of safety function of both systems. In accordance with IMC 0609.04, "Initial

Characterization of Findings,” and Exhibit 3 of IMC 0609, Appendix A, “The SDP for Findings At-Power,” both dated June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency was only associated with the radiological barrier function of the Control Room and Secondary Containment. This finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency because Susquehanna did not recognize and plan for the possibility of mistakes, latent problems, or inherent risk, even while expecting successful outcomes. Specifically, Susquehanna did not perform a thorough review of the planned activities every time work was performed to ensure compliance with plant TSs, rather than relying on past successes and assumed conditions [H12]. (Section 1R15)

Cornerstone: Emergency Preparedness

Green. The inspectors identified a finding of very low safety significance (Green) and a NCV of 10 CFR 50, Appendix E, Section IV.B.1. Specifically, Susquehanna emergency plan implementing procedures did not provide the guidance for the dose assessment staff in the Technical Support Center (TSC) to determine the magnitude of, and continually assess the impact of, the release of radioactive materials. The TSC staff was procedurally limited to performing forward and back dose calculations, but not blowout panel calculations. Blowout panel release calculations were only to be performed by the Emergency Operations Facility (EOF) staff. Susquehanna entered this issue into their corrective action program as CR-2015-04701, which led to the revision of the applicable procedures to allow the TSC dose assessment staff to perform the full scope of dose calculations available to the EOF staff.

The inspectors determined that the failure to have the same scope of dose assessment capabilities available to the full emergency response organization (ERO) was a performance deficiency that was within Susquehanna’s ability to foresee and correct. The performance deficiency is more than minor because it is associated with the ERO Readiness and ERO Performance attributes of the emergency preparedness cornerstone, and adversely affected the cornerstone objective of ensuring that a licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. Using IMC 0609, Appendix B, Section 5.9, the finding is of very low safety significance (Green) because the finding was determined to not be an example of the overall dose projection process being incapable of providing technically adequate estimates of radioactive material releases; the deficiency was limited to the TSC staff which in fact had the capability of performing dose projections and was only limited by the lack of procedural guidance. The cause of this finding has a cross-cutting aspect in the area of Documentation, because Susquehanna did not ensure that their organization creates and maintains complete, accurate and up-to-date documentation. Specifically, Susquehanna did not provide emergency plan implementing procedures to enable the TSC dose assessment staff to perform dose projections for all required radioactive material releases [H.7]. (Section 1EP6)

Other Findings

A violation of very low safety significance that was identified by Susquehanna was reviewed by the inspectors. Corrective actions taken or planned by Susquehanna have been entered into Susquehanna’s CAP. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On November 10, 2015, operators reduced reactor power to approximately 30 percent, removed the 'B' reactor recirculation pump (RRP) from service and entered single loop operation. This planned activity was conducted so that the RRP motor-generator set tachometer, which was identified previously as being degraded, could be replaced. Following replacement of the tachometer, operators commenced power restoration. On November 12, 2015 power restoration had reached approximately 98 percent when a reactor scram occurred. The scram was caused by high reactor pressure when the 'B' MSIV unexpectedly closed during testing. Following the completion of the maintenance activities, operators commenced a reactor startup on November 18, 2015. During startup, with power at approximately 85 percent, operators inserted a RRP runback to 62 percent due to rapidly lowering reactor feed pump suction pressure. Power was stabilized and the cause of the pressure transient was identified and corrected. Power was restored to 100 percent on November 22, 2015. On December 4, 2015, operators reduced power to approximately 75 percent to perform a rod pattern adjustment and power was restored to 100 percent on December 5, 2015. On December 11, 2015, operators reduced power to 62 percent to perform a planned rod sequence exchange and power was restored to 100 percent on December 13, 2015. On December 22 and 27, 2015, operators reduced power to 74 and 80 percent, respectively, to perform planned rod pattern adjustments and power was restored to 100 percent the same days. The unit remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power and operated at full power until October 28, 2015, when operators reduced reactor power to 62 percent at the request of the grid operator for stability concerns due to the loss of the Sunbury 230 kV line. Power was restored to 100 percent on October 30, 2015. On October 30, 2015, operators reduced power to approximately 84 percent to perform a rod pattern adjustment and power was restored to 100 percent on October 31, 2015. Unit 2 remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

.1 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed a review of Susquehanna's readiness for the onset of seasonal extreme low temperatures from October 31 - December 21, 2015. The review focused on the engineered safeguards service water pump house, exposed portions of the condensate and refueling water storage system, the circulating water pump house and the station portable diesel generator (Blue Max). The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), TS, control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure Susquehanna personnel had adequately prepared for these challenges.

The inspectors reviewed station procedures, including Susquehanna's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment A.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1, division II core spray (CS) during division I system outage window (SOW) on October 6, 2015
- Unit 1, high-pressure coolant injection (HPCI) during reactor core isolation cooling (RCIC) SOW on October 26, 2015
- Unit 1, RCIC and automatic depressurization system (ADS) during HPCI SOW on December 1, 2015
- Unit 1, division I residual heat removal (RHR) during division II SOW on December 1, 2015

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, TSS, work orders, CRs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Susquehanna staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

On October 15-16 and 21-23, the inspectors performed a complete system walkdown of accessible portions of the Unit 1 reactor protection system (RPS) and alternate rod insertion (ARI) system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify as-built system configuration matched plant documentation, and that system components and support equipment remained operable. The inspectors confirmed that systems and components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified, and protected from external threats. The inspectors also examined the material condition of the components for degradation and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related condition reports (CRs) and work orders to ensure Susquehanna appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 4 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Susquehanna controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Unit 2, RCIC room (fire zone 2-1D) on November 5, 2015
- Units 1 and 2, division II CS (fire zone 1-1B and 2-1B) on November 30, 2015
- Unit 1, HPCI room (fire zone 1-1C) on December 1, 2015
- Unit 1, Wingslab elevation 749' (fire zone 1-4G) on December 16, 2015

b. Findings

No finding were identified.

.2 Fire Protection - Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed a fire brigade drill scenario conducted on December 14, 2015, that involved a fire in the 'B' Emergency Diesel Generator (EDG). The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that Susquehanna personnel identified deficiencies, openly discussed them in a self-critical manner during the debrief, and took appropriate corrective actions as required. The inspectors evaluated the following specific attributes of the drill:

- Proper wearing of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate fire-fighting techniques
- Sufficient fire-fighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas
- Smoke removal operations
- Utilization of pre-planned strategies
- Adherence to the pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with Susquehanna's fire-fighting strategies.

c. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

.1 Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to identify internal flooding susceptibilities for the site. The inspectors review focused on the elevation of 683' of the Unit 1 reactor building including the RHR equipment space, which includes both loops of low pressure coolant injection, HPCI and RCIC steam lines and both CS test lines. It verified the adequacy of equipment seals located below the flood line, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. It assessed the adequacy of operator actions that Susquehanna had identified as necessary to cope with flooding in this area and also reviewed the CAP to determine if Susquehanna was identifying and correcting problems associated with both flood mitigation features and site procedures for responding to flooding.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance

.1 Quarterly Review of Licensed Operator Requalification Testing and Training
(71111.11Q – 1 sample)

a. Inspection Scope

The inspectors observed licensed operator simulator training on December 8, 2015, which included loss of offsite power with a fire in an EDG and subsequent steam leak in the HPCI system. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the unit supervisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room
(71111.11Q – 1 sample)

a. Inspection Scope

On October 28, 2015, inspectors observed the control room operators respond to plant alarms and conduct an unplanned emergent power reduction on Unit 2 in response to a loss of one line into the 500 kV switchyard. The inspectors observed the reactivity control briefing to verify that it met the criteria specified in OP-AD-002, "Standards for Shift Operations," Revision 57, OP-AD-300, "Administration of Operations," Revision 5, and OP-AD-338, "Reactivity Manipulations Standards and Communication Requirements," Revision 31. The inspectors observed the crew during the evolution to verify that procedure use, crew communications, control board component manipulations, and coordination of activities in the control room met established standards.

b. Findings

No findings were identified.

3. Operator Requalification (71111.11B – 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10, and Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program."

Examination Results

Requalification exam results (operating test, only) for year 2015 were reviewed to determine if pass/fail rates were consistent with the guidance of NRC IMC 0609, Appendix I, "Operator Requalification Human Performance SDP." The review verified that the failure rate (individual or crew) did not exceed 20%.

- The overall individual failure rate was 7.8%.
- The crew failure rate was 8.3%

Written Examination Quality

The inspectors reviewed three comprehensive written exams previously administered to the operators in October and November 2014.

Operating Test Quality

The inspectors reviewed annual operating tests, scenarios and job performance measures (JPMs), associated with the on-site inspection week.

Licensee Administration of Operating Tests

The inspectors observed facility training staff administer dynamic simulator exams and JPMs. These observations included facility evaluations of crew and individual operator performance during the simulator exams and individual performance of JPMs.

Exam Security

The inspectors assessed whether facility staff properly safeguarded exam material, and whether test item repetition was excessive.

Remedial Training Program

The inspectors reviewed two remediation packages, including re-tests, associated with operators who failed their 2014 biennial written exam.

Conformance with License Conditions

License reactivation and license proficiency records were reviewed to ensure that 10 CFR 55.53 license conditions and applicable program requirements were met. The inspectors also reviewed a sample of records for requalification training attendance, and a sample of medical examinations for compliance with license conditions and NRC regulations.

Simulator Performance

Simulator performance and fidelity were reviewed for conformance to the reference plant control room. A sample of simulator deficiency reports was also reviewed to ensure facility staff addressed identified modeling problems.

Problem Identification and Resolution

The inspectors reviewed recent operating history documentation found in inspection reports, licensee event reports, the licensee's CAP, NRC End-of-Cycle and Mid-Cycle reports, and the most recent NRC plant issues matrix. The resident staff was also consulted for insights regarding licensed operators' performance. The inspectors focused on events associated with operator errors that may have occurred due to possible training deficiencies.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance work orders, and maintenance rule basis documents to ensure that Susquehanna was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the structure, system, or component was properly scoped into the maintenance rule in accordance with 10 CFR 50.65 and verified that the (a)(2) performance criteria established by Susquehanna staff was reasonable. As applicable, for structures, systems, and components classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these structures, systems, and components to (a)(2). Additionally, the inspectors ensured that Susquehanna staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Unit 2, repeat failure of reactor sample outboard isolation valve (HV243F020) from November 10, 2015 through November 16, 2015
- Unit 1 and Unit 2, RPS electrical power monitoring assembly breaker failures on December 18, 2015

b. Findings

Introduction. A self-revealing Green finding and associated violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," and TS 3.6.1.3, "PCIVs," was identified when Susquehanna did not take adequate corrective action to address the inoperability of the reactor recirculation sample line outboard PCIV when it failed during surveillance

testing on July 1, 2015. The valve failed its subsequent surveillance test on September 30, 2015 due to the same degraded condition, which rendered the valve inoperable for longer than the allowed outage time specified in TS 3.6.1.3.

Description. HV-243F020 is the outboard PCIV for the sample line from the reactor recirculation system. The valve is normally open to allow for continuous sampling of the reactor coolant system. SV-24320 is a normally energized solenoid valve which de-energizes on a primary containment isolation signal to vent air from HV-243F020, allowing it to spring close. TS limiting condition for operation (LCO) 3.6.1.3, "Primary Containment Isolation Valves," requires HV-243F020 to be operable in Modes 1, 2 and 3 and requires action to isolate the line with a closed, deactivated valve within 4 hours if it is determined to be inoperable. To be considered operable, TSs require, in part, that the valve be capable of closing within 2 seconds of receiving an isolation signal.

On July 1, 2015, HV-243F020, failed its TS surveillance test in that it did not close within the acceptance criteria of 2 seconds. In response to the failure, Susquehanna lubricated the external limit switch arms and stroked the valve three additional times. Based on the stroke times meeting the acceptance criteria of closing within 2 seconds, Operations personnel determined the valve was operable. Subsequent to restoring the valve to an operable condition, a failure mode analysis was performed which identified three potential causes of the failure: limit switch sticking, solenoid valve sticking due to internal degradation and solenoid valve sticking due to exhaust line blockage. Despite the corrective action taken having only addressed one of the failure modes, no additional action was taken to address the other two potential causes. CR-2015-21156 was generated to evaluate the failure. The equipment apparent cause evaluation was completed on August 26, 2015 and identified that the failure was most likely caused by "solenoid valve malfunction due to internal sticking or an airline blockage," a cause which was unrelated to the limit switches. Despite this, no additional action was taken to investigate the solenoid valve and no action was taken to address the identified cause.

On September 30, 2015 during the subsequent quarterly test, HV-243F020 failed to stroke closed within the acceptance criteria again, rendering the valve inoperable. The repeat failure was entered into the CAP as CR-2015-26590. Susquehanna identified the direct cause of the failure was due to solenoid valve sticking and attributed it to the same mechanism that occurred on July 1st. Additionally, Susquehanna identified an apparent cause of solenoid valve sticking as less than adequate corrective actions following the July failure. Susquehanna determined the condition was reportable as a condition prohibited by plant TSs in accordance with 10 CFR 50.73(a)(2)(i)(B) because the valve was inoperable for longer than the TS allowed outage time.

Then inspectors determined that Susquehanna had identified a condition adverse to quality on July 1, 2015 associated with solenoid valve sticking, which rendered HV-243F020 inoperable, however, did not take sufficient corrective actions to restore the valve to an operable condition as was revealed in a subsequent failure on September 30, 2015.

Analysis. The failure to take adequate corrective actions to address an inoperable PCIV was reasonably within Susquehanna's ability to foresee and correct and should have been prevented. Specifically, despite identifying solenoid valve malfunction as the likely cause of a PCIV failure, Susquehanna did not take any action to address the condition adverse to quality. The finding was determined to be more than minor because it was

associated with the SSC and Barrier Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to correct the degraded condition of solenoid valve sticking resulted in a PCIV being rendered inoperable for longer than the TS allowed outage time. Inspector evaluated the finding 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, and determined it is of very low safety significance (Green) because the performance deficiency did not result in an actual open pathway in the physical integrity of reactor containment, because the inboard valve remained operable for the duration of the inoperability, and it did not involve the hydrogen recombiners.

This finding had a cross-cutting aspect in the area of Human Performance, Challenge the Unknown, because Susquehanna did not stop when faced with uncertain conditions and ensure the risks were evaluated and managed before proceeding [H.11]. Specifically, Susquehanna did not challenge the unanticipated test results and did not ensure that the condition adverse to quality, associated with the faulty solenoid valve, was resolved prior to considering the valve operable

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Actions," 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 this, despite identifying a condition adverse to quality on July 1, 2015 associated with solenoid valve malfunction, implementation of CAP did not assure that the condition adverse to quality was promptly corrected.

Additionally, TS 3.6.1.3 requires HV-243F020, the reactor recirculation sample line outboard PCIV to be operable in Mode 1 and requires action be taken within 4 hours to isolate the line if it is determined to be inoperable. Contrary to this, HV-243F020 was inoperable from July 1, 2015 through September 30, 2015 without the line being isolated with a closed, deactivated valve. Following the September 30 failure, Susquehanna closed and deactivated the inboard PCIV to establish compliance with TSs and replaced the solenoid valve, restoring operability of the outboard PCIV.

Because it was of very low safety significance (Green) and has been entered into the CAP as CR-2015-26590, this finding is being treated as a NCV in accordance with section 2.3.2 of the NRC's Enforcement Policy. (**NCV 05000388/2015004-01, Failure to Correct a Condition Adverse to Quality Associated with an Inoperable Primary Containment Isolation Valve**)

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 4 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Susquehanna performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that

Susquehanna personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Susquehanna performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 1, yellow risk during division 2 RHR SOW on November 3, 2015
- Unit 1, elevated risk during replacement of the 'B' RRP motor/generator set tachometer on November 10, 2015
- Unit 1, emergent repair of HPCI following identification of significant amounts of water in the oil system on December 4, 2015
- Common, yellow risk during startup transformer 10 SOW during the week of October 19, 2015

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 4 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Unit 1, water identified in HPCI lube oil on December 4, 2015
- Unit 2, 'B' RRP discharge bypass valve dual indication on November 9, 2015
- Common, application of plant TSs during nuclear steam supply shutoff system instrumentation surveillance testing on November 23, 2015
- Common, 'A' CS chiller failed capacity test on December 14, 2015

The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TSs and UFSAR to Susquehanna's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, such as in the case of operator workarounds (OWAs), the inspectors determined whether the measures in place would function as intended and were properly controlled by Susquehanna. The inspectors verified that Susquehanna identified OWAs at an appropriate threshold and addressed them in a manner that effectively managed OWA-related adverse effects on operators and SSCs.

b. Findings

Introduction. An NRC-identified Green finding and associated violation of TS 5.4.1, “Procedures” and TS 5.5.11, “Safety Function Determination,” was identified when Susquehanna performed maintenance on redundant trains of the SBT system and CREOASS concurrently. When performing these activities, operators did not apply NDAP-QA-0312, “Control of LCOs, TROs and Safety Function Determination Program,” correctly which resulted in the unrecognized loss of safety function of SBT and CREOASS.

Description. On September 29, 2015, Susquehanna authorized performing SI-180-306, “24-Month Calibration- Rx Vessel Water Level 1 & 2 Isolation Channels A & C.” Each channel provides an input to one division of the nuclear steam supply shutoff system, in part, for initiation of the primary containment isolation system (PCIS), secondary containment isolation system (SCIS) and CREOASS. This surveillance test calibrates level switches and satisfies surveillance requirements of the following TSs:

- TS 3.3.6.1, Primary Containment Isolation Instrumentation;
- TS 3.3.6.2, Secondary Containment Isolation; and
- TS 3.3.7.1, CREOASS System Instrumentation.

Performance of the surveillance renders each of the channels inoperable when they are isolated from the process stream so that external test equipment can be used to calibrate the level instruments. A note in the surveillance requirement allows a 6-hour delay prior to taking the required action of the TS LCO if the inoperability is due solely to testing as long as isolation/initiation function is maintained. Each of these functions is arranged in two, two-out-of-two logic subsystems. For example, the ‘A’ train of SCIS and CREOASS are initiated by 2 of 2 from ‘A’ and ‘B’ level instruments and the ‘B’ train of SBT/CREOASS are initiated by 2 of 2 from ‘C’ and ‘D’ level instruments. Therefore, with the ‘A’ instrument isolated for testing, one division of the PCIS, SCIS, and CREOASS would not have isolated/initiated because one of the two instruments would not have tripped. Additionally, because the SBT system receives an initiation signal from the SCIS, one division of the SBT system would not have initiated. However, because this test only impacted the ability of one division to function, operators were not required to take the actions of TS LCO 3.3.6.1, 3.3.6.2 or 3.3.7.1.

During performance of SI-180-306, operators commenced SE-030-002B, “24 Month Control Structure Ventilation System Operability Test Division 2,” in accordance with the approved plant schedule, which rendered the ‘B’ trains of the SBT system and CREOASS inoperable. Subsequently, maintenance technicians notified the control room operators that the ‘A’ level instrument, which was being calibrated per SI-180-306, was found outside of TS acceptance criteria. Operators determined that the 6-hour delay was no longer applicable and that the LCO action statements required, in part, declaring the ‘A’ trains of SBT and CREOASS inoperable. In conjunction with performance of SE-030-002B, operators entered the action statement of TS 3.6.4.1 for both trains of SBT inoperable and reported the loss of safety function to the NRC in event notification 51432.

Susquehanna entered the issues into CAP as CRs 2015-26442, 2015-26455 and 2015-26475. Susquehanna's investigation determined that the losses of safety function (SBGT and CREOASS) occurred when the 'A' level instrument was identified as failed, concurrent with a planned inoperability of 'B' SBGT and CREOASS during SE-030-002B. Therefore, Susquehanna identified the cause of the event was that the risk was not considered when scheduling surveillance tests because personnel were accustomed to successful outcomes and therefore had allowed surveillances from multiple divisions to be performed concurrently.

Inspectors reviewed the apparent cause evaluation and associated corrective actions and determined that Susquehanna had not identified the appropriate cause of the event and therefore had not identified reasonable corrective actions. Specifically, Susquehanna did not recognize that they had inappropriately applied the note in the TS SR which allows delaying entry into the action statement if an inoperability is solely due to testing. Susquehanna had considered that this note allowed considering the instrument operable for the delay period. By interpreting the TS in this manner, operators did not correctly apply all TS LCOs correctly and therefore, in this instance, only considered that the loss of safety function occurred when the 'A' instrument was identified as failed. Inspectors determined that the instrument was inoperable the entire time and therefore a loss of safety function had occurred for the duration of the two activities.

To assess whether this was a one-time error or potentially more programmatic, inspectors reviewed past performance of the level instrument calibration on both units. Inspectors identified that on October 3, 2014, Susquehanna performed SI-280-306, which is the Unit 2 equivalent to the surveillance, concurrent with a surveillance on the 'B' CS chiller, which renders the 'B' train of CREOASS inoperable. Inspectors determined that this also constituted a loss of safety function of CREOASS, similar to the event that occurred on September 29.

Inspectors reviewed NDAP-QA-0312, "Control of LCOs, TROs and Safety Function Determination Program," which requires operators to enter the appropriate LCOs and apply the safety function determination process when a TS system or component is declared inoperable. This procedure is, in part, required by TS 5.5.11, "Safety Function Determination Program," which states that the program contains provisions for cross-divisional checks to ensure a loss of capability to perform the safety function assumed in the accident analysis not go undetected. Additionally, it states that a loss of safety function exists if a required system redundant to a system supported by the inoperable support system is also inoperable. Attachment B of NDAP-QA-0312 lists SCIS instrumentation as a support system of the SBGT system and CREOASS. Inspectors determined that Susquehanna had not implemented this procedure correctly in multiple instances when 1) the appropriate LCOs were not entered when rendering systems inoperable and 2) a loss of safety function determination was not made when rendering a support system inoperable. In particular, when the 'A' trains of SBGT and CREOASS were rendered inoperable when a support system for the redundant train was inoperable, a loss of safety function had occurred.

Inspectors considered whether this violation was licensee-identified because the loss of safety function was identified by Susquehanna during a surveillance test, but determined that inspectors added significant value because of the identified weaknesses in evaluation and correction of the issue and therefore determined it should be characterized as NRC-identified.

Analysis. Inspectors determined that failing to apply plant TSs appropriately was a performance deficiency that was within Susquehanna's ability to foresee and correct and should have been prevented. Specifically, on multiple occasions operators did not apply a note in plant TSs correctly and allowed work on redundant trains to be performed concurrently, resulting in a loss of safety function of the SGBT system and CREOASS. This finding is more than minor because it is associated with the Human Performance (Routine OPS/Maintenance Performance) attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of providing reasonable assurance that physical design barriers (Secondary Containment and Control Room Ventilation) protect the public from radionuclide releases caused by accidents or events. Specifically, allowing work to be performed on redundant trains of the SGBT system and CREOASS concurrently, while not applying plant TSs correctly, resulted in a loss of safety function of both systems. In accordance with IMC 0609.04, "Initial Characterization of Findings," and Exhibit 3 of IMC 0609, Appendix A, "The SDP for Findings At-Power," both dated June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) because the performance deficiency was only associated with the radiological barrier function of the Control Room and Secondary Containment.

This finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency because Susquehanna did not recognize and plan for the possibility of mistakes, latent problems, or inherent risk, even while expecting successful outcomes [H12]. Specifically, Susquehanna did not perform a thorough review of the planned activities every time work was performed to ensure compliance with plant TSs, rather than relying on past successes and assumed conditions.

Enforcement. TS 5.4.1.a, "Procedures," requires in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in RG 1.33. RG 1.33, Appendix A, requires administrative procedures control of maintenance, including a method for obtaining permission to work. Additionally, TS 5.5.11, "Safety Function Determination Program" provides requirements for the program required to implement the requirements of TS LCO 3.0.6. NDAP-QA-0312, "Control of LCOs, TROs and Safety Function Determination Program," is one of the administrative procedures which is intended to meet these requirements. This procedure requires operators to enter the appropriate LCOs and apply the safety function determination process when a TS system or component is declared inoperable.

Contrary to the above, on October 3, 2014 and September 29, 2015, work which affected both trains of SGBT and/or CREOASS was scheduled and executed, which resulted in a loss of safety function of both systems. On both occasions, operators did not enter the appropriate TS LCO action statements and did not perform a safety function determination prior to rendering systems inoperable. Additionally, with both trains of CREOASS inoperable, TS 3.7.3, "Control Room Emergency Outside Air Supply System," requires immediate entry into LCO 3.0.3 if both trains are rendered inoperable. TS LCO 3.0.3 requires action be initiated within 1 hour to shutdown both

units. Contrary to this, both trains of CREOASS were inoperable from 10:20 a.m. to 12:28 p.m. on September 29, 2015 and no action was initiated as required by TS LCO 3.0.3.

Upon identification of the issue, operators restored one of the divisions of SGBT and CREOASS, restoring the safety function of both systems. Because it was of very low safety significance (Green) and has been entered into the CAP as CR-2015-26475, this finding is being treated as a NCV in accordance with section 2.3.2 of the NRC's Enforcement Policy. (**NCV 05000387/2015004-02, Loss of Safety Function of SGBT and CREOASS due to Concurrently Performing Maintenance on Redundant Trains**)

1R18 Plant Modifications (71111.18 – 1 sample)

.1 Permanent Modifications

a. Inspection Scope

The inspectors evaluated significant changes to the emergency operating procedures and severe accident guidelines which were implemented by actions 1733969 and 1731628. The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the procedure changes. In addition, the inspectors reviewed modification documents associated with the change.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 5 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- Unit 1, division I CS following SOW on October 8, 2015
- Unit 1, RCIC testing following SOW on October 28, 2015
- Unit 1, A and B inboard MSIVs following solenoid valve replacement on November 16, 2015
- Unit 1, 'B' RRP lower seal cavity vent line weld repairs on November 17, 2015
- Unit 1, HPCI following SOW on December 3, 2015

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 forced outage, which was conducted November 12 through 19, 2015. The inspectors reviewed Susquehanna's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable TSs when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and equipment was appropriately configured to safely support the associated work or testing
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that TSs were met
- Monitoring of decay heat removal operations
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Maintenance of secondary containment as required by TSs
- Fatigue management
- Tracking of startup prerequisites, walkdown of the drywell (primary containment) to verify that debris had not been left which could block the emergency core cooling system suction strainers, and startup and ascension to full power operation
- Identification and resolution of problems related to refueling outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 1 sample)a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant structures, systems, and components to assess whether test results satisfied TSs, the UFSAR, and Susquehanna procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test

instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- Unit 1, HPCI quarterly flow surveillance on December 3, 2015

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation (71114.02 - 1 Sample)

a. Inspection Scope

An onsite review was conducted to assess the maintenance and testing of the Susquehanna alert and notification system (ANS). During this inspection, the inspectors conducted a review of the Susquehanna siren testing and maintenance programs. The inspectors reviewed the associated ANS procedures and the Federal Emergency Management Agency (FEMA) approved ANS Design Report to ensure compliance with design report commitments for system maintenance and testing. The inspection was conducted in accordance with NRC Inspection Procedure 71114.02. 10 CFR 50.47(b)(5) and associated requirements of 10 CFR Part 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System (71114.03 - 1 Sample)

a. Inspection Scope

The inspectors conducted a review of the Susquehanna Emergency Response Organization (ERO) augmentation staffing requirements and the process for notifying and augmenting the ERO. The review was performed to verify the readiness of key Susquehanna staff to respond to an emergency event and to verify Susquehanna's ability to activate their emergency response facilities (ERFs) in a timely manner. The inspectors reviewed: the Susquehanna Emergency Plan for ERF activation and ERO staffing requirements; the ERO duty roster; applicable station procedures; augmentation test reports; the most recent drive-in drill reports; and corrective action reports related to this inspection area. The inspectors also reviewed a sample of ERO responder training records to verify training and qualifications were up to date. The inspection was conducted in accordance with NRC Inspection Procedure 71114.03. 10 CFR 50.47(b)(2) and associated requirements of 10 CFR 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 sample)

a. Inspection Scope

Susquehanna implemented various changes to the Susquehanna Emergency Action Levels (EALs), Emergency Plan, and Implementing Procedures. Susquehanna had determined that, in accordance with 10 CFR 50.54(q)(3), any change made to the EALs, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan, and that the revised Plan continued to meet the standards in 50.47(b) and the requirements of 10 CFR 50 Appendix E.

The inspectors performed an in-office review of all EAL and Emergency Plan changes submitted by Susquehanna as required by 10 CFR 50.54(q)(5), including the changes to lower-tier emergency plan implementing procedures, to evaluate for any potential reductions in effectiveness of the Emergency Plan. This review by the inspectors was not documented in an NRC Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety. The requirements in 10 CFR 50.54(q) were used as reference criteria. The specific documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings were identified.

1EP5 Maintaining Emergency Preparedness (71114.05 - 1 Sample)

a. Inspection Scope

The inspectors reviewed a number of activities to evaluate the efficacy of Susquehanna's efforts to maintain the Susquehanna emergency preparedness program. The inspectors reviewed: memorandums of agreement with offsite agencies; the 10 CFR 50.54(q) Emergency Plan change process and practice; Susquehanna maintenance of equipment important to EP; records of evacuation time estimate population evaluation; and provisions for, and implementation of, primary, backup, and alternative emergency response facility (ERF) maintenance. The inspectors also verified Susquehanna's compliance at Susquehanna with NRC EP regulations regarding: emergency action levels for hostile action events; protective actions for on-site personnel during events; emergency declaration timeliness; ERO augmentation and alternate facility capability; evacuation time estimate updates; on-shift ERO staffing analysis; and, ANS back-up means.

The inspectors further evaluated Susquehanna's ability to maintain Susquehanna's EP program through their identification and correction of EP weaknesses, by reviewing a sample of drill reports, self-assessments, and 10 CFR 50.54(t) reviews. Also, the inspectors reviewed a sample of EP-related CRs initiated at Susquehanna from January

2014 through July 2015. The inspection was conducted in accordance with NRC Inspection Procedure 71114.05. 10 CFR 50.47(b) and the associated requirements of 10 CFR 50, Appendix E, were used as reference criteria.

b. Findings

No findings were identified.

1EP6 Drill Evaluation

(Closed) Unresolved Item (URI) 05000387; 388/2015001-04: Effectiveness of Declaration Capability of Abnormal Radiation Level EAL.

a. Inspection Scope

The inspectors reviewed an unresolved item (URI 05000387; 388/2015001-04) related to certain dose assessment practices which was identified during an emergency preparedness drill in the first calendar quarter of 2015. Specifically, during a full-scale emergency preparedness (EP) drill on February 17, 2015, Susquehanna identified during their drill critique that various dose assessment methods are only procedurally directed to be performed by the emergency operations facility (EOF) dose assessment staff. Additionally, Susquehanna's Nuclear Oversight (NOS) documented that the remote monitoring system (RMS), which consists of 16 fixed radiation monitors at the site boundary that are activated and monitored by TSC/EOF staff, was in a condition that could impact the ability to assess the EAL thresholds. The inspectors reviewed Susquehanna's evaluation of the issue. This URI is closed based upon the issuance of the following Green NCV and the licensee-identified violation documented in section 4OA7 of this report. The basis for URI closure is further described in the two NCVs.

b. Findings

Introduction. The inspectors identified a finding of very low significance (Green) and a NCV of 10 CFR 50, Appendix E, Section IV.B.1. Specifically, Susquehanna emergency plan implementing procedures did not provide the guidance for the dose assessment staff in the Technical Support Center (TSC) to determine the magnitude of, and continually assess the impact of, the release of radioactive materials. The TSC staff was procedurally limited to performing forward and back dose calculations but not blowout panel calculations.

Description. In the first quarter of 2015, the inspectors observed a full-scale emergency preparedness drill. During the post-drill critique, Susquehanna identified that various dose assessment methods were procedurally directed only to be performed by the emergency operations facility (EOF) dose assessment staff. Specifically, those procedures did not allow the technical support center (TSC) dose assessment staff to assess offsite consequences of an unfiltered and unmonitored release unless field monitoring was available. In response to inspectors' question concerning the disparity between the EOF and TSC dose assessment capability, Susquehanna determined that the current revision of their emergency plan only required the ERO to be able to assess dose consequences by forward calculations using release data from the vent stack monitors and back calculations using field monitoring data. Therefore, though the EOF had the capability to perform several other types of dose calculations if either of those methods were ineffective or out-of-service, Susquehanna determined that corrective

action was not required. Despite this, Susquehanna did take some action to enhance the dose assessment capability of TSC responders via improved procedures and training. At the completion of that inspection period, the inspectors did not have enough information to determine whether the issue had resulted in Susquehanna failing to maintain the effectiveness of their emergency plan and could not determine whether a violation of regulatory requirements existed. The issue was tracked as an unresolved item pending NRC review of Susquehanna's evaluation of the issue.

During this inspection, the inspectors reviewed Susquehanna's evaluation documented under CR-2015-03695 and CR-2015-04701, and consulted with EP specialists at the Office of Nuclear Security and Incident Response (NSIR). Susquehanna concluded that providing procedural direction for the TSC dose assessment staff to perform forward and back dose calculations, provided field team data was available, satisfied their emergency plan commitments. However, the licensee further concluded that providing the TSC with the full range of dose assessment capabilities was desirable. TSC dose assessment procedures were revised to include those additional capabilities, and TSC dose assessment staff training was expanded to include those additional dose assessment techniques. NUREG-0696, "Functional Criteria for Emergency Response Facilities," states that the onsite TSC will perform EOF functions for the Alert Emergency class and for the Site Area Emergency (SAE) class and General Emergency (GE) class until the EOF is functional. Additionally, Susquehanna's Emergency Plan requires that the TSC is staffed within 60 minutes of a declared emergency and that the EOF is staffed within 90 minutes of a declared SAE or GE. Considering this, inspectors determined that the procedural changes made by Susquehanna were required to ensure that the TSC staff could perform the same functions of the EOF, until relieved of those duties by EOF staff.

Analysis. Susquehanna's failure to have the same scope of dose assessment capabilities available to the full emergency response organization (ERO) was a performance deficiency that was within Susquehanna's ability to foresee and correct. Specifically, Susquehanna failed to provide the TSC dose assessment staff the same capability as the EOF dose assessment staff to analyze unmonitored radiological releases, without field team data, from the Susquehanna site. The performance deficiency is more than minor because it is associated with the ERO Readiness and ERO Performance attributes of the emergency preparedness cornerstone, and adversely affected the cornerstone objective of ensuring that a licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency.

In accordance with Section 5.9 of IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process," dated September 23, 2014, the inspectors determined that this finding is of very low safety significance (Green), because the finding was determined to not be an example of the overall dose projection process being incapable of providing technically adequate estimates of radioactive material releases, and the deficiency was limited to the TSC staff which had the capability of performing dose projections but was limited by lack of procedural guidance. The inspectors, in consultation with NSIR, concluded that forward and backward dose calculations, with the availability of field teams, provided an adequate dose projection process, but the failure to provide the TSC with the same capabilities as the EOF was a failure to meet NRC regulations.

This finding had a cross-cutting aspect in the area of Documentation, because Susquehanna did not ensure that their organization creates and maintains complete, accurate and up-to-date documentation [H.7]. Specifically, Susquehanna did not provide emergency plan implementing procedures to enable the TSC dose assessment staff to perform dose projections for all required radioactive material releases.

Enforcement. 10 CFR Part 50, Appendix E, Section IV.B.1, requires that the means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described in the Emergency Plan. Contrary to the above, prior to December 15, 2015, Susquehanna failed to ensure that the same capabilities for assessing all potential radioactive release paths that are described in the Emergency Plan for the EOF staff were also described for the TSC. To restore compliance, Susquehanna revised the applicable procedures for, and expanded the training of, the TSC dose assessment staff in order to provide them the same capabilities as their EOF counterparts. Because this violation was of very low safety significance, was not repetitive or willful, and was entered into Susquehanna's CAP as CR-2015-03695 and CR-2015-04701, this violation is being treated as a NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000387; 388/2015004-03, Dose Assessment Capabilities in the Technical Support Center)**

2. RADIATION SAFETY

Cornerstone: Occupational and Public Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls

a. Inspection Scope

During October 13-15, 2015, the inspectors reviewed the Susquehanna's performance in assessing and controlling radiological hazards in the workplace. The inspectors used the requirements contained in 10 CFR 20, TSs, applicable Regulatory Guides (RGs), and the procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the performance indicators for the occupational exposure cornerstone, radiation protection (RP) program audits, and reports of operational occurrences in occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors reviewed recent plant radiation surveys and any changes to plant operations since the last inspection to identify any new radiological hazards for onsite workers or members of the public.

Instructions to Workers

The inspectors observed several containers of radioactive materials and assessed whether the containers were labeled and controlled in accordance with requirements. The inspectors reviewed several occurrences where a worker's electronic personal dosimeter alarmed. The inspectors reviewed the Susquehanna's evaluation of the incidents, documentation in the CAP, and whether compensatory dose evaluations were conducted when appropriate.

Contamination and Radioactive Material Control

The inspectors observed the monitoring of potentially contaminated material leaving the radiological control area and inspected the methods and radiation monitoring instrumentation used for control, survey, and release of that material.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were identified at an appropriate threshold and properly addressed in the CAP.

Findings

No findings were identified

2RS2 Occupational ALARA Planning and Controls

a. Inspection Scope

During October 13-15, 2015, the inspectors assessed the Susquehanna's performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements contained in 10 CFR 20, applicable RGs, TSs, and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted a review of collective dose history and trends; ongoing and planned radiological work activities; radiological source term history and trends; and ALARA dose estimating and tracking procedures.

Radiological Work Planning

The inspectors selected the following radiological work activities based on exposure significance for review:

- RWP 20152118 noble metals injection modifications in the radiological controlled area
- RWP 20152120 reactor water cleanup complex and back wash receiving tank room general work and inspections
- RWP 20152324 recirculation pump 2P401B motor replacement
- RWP 20152336 recirculation pump work

For each of these activities, the inspectors reviewed: ALARA work activity evaluations; exposure estimates; exposure reduction requirements; results achieved (dose rate reductions, actual dose); person-hour estimates and results achieved; and post-job reviews that were conducted to identify lessons learned.

Verification of Dose Estimates and Exposure Tracking Systems

The inspectors reviewed the current annual collective dose estimate; basis methodology; and measures to track, trend, and reduce occupational doses for ongoing work activities.

Source Term Reduction and Control

The inspectors reviewed the current plant radiological source term and historical trend, plans for plant source term reduction, and contingency plans for changes in the source term as the result of changes in plant fuel performance or changes in plant primary chemistry.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures (2 samples)

a. Inspection Scope

The inspectors sampled Susquehanna's submittals for the Safety System Functional Failures performance indicator for both Unit 1 and Unit 2 for the period of July 1, 2014, through June 30, 2015. To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73." The inspectors reviewed Susquehanna's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, CRs, event reports and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index (4 samples)

a. Inspection Scope

The inspectors reviewed Susquehanna's submittal of the Mitigating Systems Performance Index for the following systems for the period of October 1, 2014, through September 30, 2015:

- Unit 1, RHR System
- Unit 2, RHR System
- Unit 1, Cooling Water System
- Unit 2, Cooling Water System

To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed Susquehanna's operator narrative logs, CRs, mitigating systems performance index derivation reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

.3 Emergency Preparedness (3 samples)

a. Inspection Scope

The inspectors reviewed data for the following three EP Performance Indicators (PI): (1) drill and exercise performance; (2) ERO drill participation; and, (3) ANS reliability. The last NRC EP inspection at Susquehanna was conducted in the fourth calendar quarter of 2013. Therefore, the inspectors reviewed supporting documentation from EP drills and equipment tests from the fourth calendar quarter of 2013 through the third calendar quarter of 2015 to verify the accuracy of the reported PI data. The review of the PIs was conducted in accordance with NRC Inspection Procedure 71151. The acceptance criteria documented in NEI 99-02, "Regulatory Assessment Performance Indicator Guidelines," Revision 7, was used as reference criteria.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152 – 1 sample)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure (IP) 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that PPL entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended management review committee meetings.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by Susquehanna outside of the corrective action program, such as trend reports, performance indicators, system health reports, maintenance rule assessments, and maintenance or corrective action program backlogs. The inspectors also reviewed Susquehanna's corrective action program database for the third and fourth quarters of 2015 to assess CRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRCs daily CR review (Section 4OA2.1). The inspectors reviewed the Susquehanna quarterly performance assessment report for the second and third quarter of 2015, conducted under LS-125-1009, "Station Trending Manual," revision 1, to verify that Susquehanna personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

Adequacy of Corrective Actions. Inspectors noted a potential trend in the adequacy of corrective actions. Specifically, inspectors noted that from July through December, 2015 there were several events that were either caused by or exacerbated by inadequate or untimely corrective actions. Specific examples include:

- On September 29, 2015, Susquehanna identified that a loss of safety function occurred when a division 1 reactor vessel level instrument failed during TS testing, which was being performed concurrently with testing of division 2 of the SBT system and CREOASS. Susquehanna entered the issue into the CAP as CRs 2015-26442, 2015-26455 and 2015-26475. As documented in section 1R15 of this report, inspectors reviewed the evaluation and associated corrective actions and determined that Susquehanna had not identified the appropriate cause of the event and therefore had not identified reasonable corrective actions.
- As documented in section 1R12 of this report, Susquehanna did not take adequate corrective actions to address a failure of a PCIV to close within the limits specified in TSs. This resulted in a repeat failure during the subsequent surveillance test. (CR-2015-26590)
- As documented in 4OA3 section of this report, Susquehanna's actions to investigate and address an extinguished light that provided indication of MSIV solenoid valve continuity were inadequate to ensure that the solenoid remained energized while testing the redundant solenoid. (CR-2015-30092)

Preparation for and Execution of Maintenance. Inspectors noted several examples since the last semi-annual review in which planned preventative or corrective maintenance was not able to be executed due to inadequate preparation, noting that this was indicative of a possible adverse trend. Specific examples include:

- On September 15, 2015, division 2 of the ultimate heat sink was rendered inoperable for performance of spray array nozzle inspections. After hanging the clearance order and releasing the maintenance item, the work group identified that the boat that was required to perform the inspection was non-functional and the evolution had to be aborted. This resulted in 11.5 hours of unnecessary unavailability of a high safety significant system. (CR-2015-25208)
- On October 21, 2015, fuel oil was drained from Blue Max, as part of a modification to install a fuel oil heater. The following day, maintenance determined that the temperature switch associated with the thermostat could not be calibrated and that the modification had to be aborted. This resulted in approximately 24 hours of unnecessary unavailability of a high safety significant system. (CR-2015-28612)
- In August and October, 2015, the maintenance rule unavailability criteria was exceeded for both the diesel driven and backup diesel driven fire pumps. Though inspectors recognize that much of the accrued unavailability was due to piping and pump replacement, which were identified as corrective actions to address previous unavailability exceeding the performance criteria established under the maintenance rule, inspectors noted considerable unnecessary unavailability during both projects due to deficiencies in preparation or execution of the work windows. (CR 2015-28486, 2015-28232 and 2015-23100)
- On January 6, 2016, several maintenance items that were scheduled during the 12-year overhaul of the 'A' control structure chiller had to be rescheduled due to either lack of parts or lack of test equipment. These will require additional unavailability of the safety-related chillers to complete once rescheduled. (CR-2016-00551, CR-2016-00564)

Readiness for Seasonal Weather. Inspectors documented a potential adverse trend in Susquehanna's preparedness for adverse weather in IR 05000387;388/2012005 (CR-1638800). In part, this trend was identified because the station had not completed preparations for the winter season by November 1 of each year from 2008 through 2012 as required by NDAP-00-1913, "Seasonal Readiness." Subsequent to this, the station was able to meet the requirement for 2013 based on management intervention in response to the documented trend. However, inspectors noted that the station did not meet the procedural requirements in 2014 as documented in CR-2014-33693. Additionally, inspectors noted that not all procedural actions were completed as required in 2015. Specifically, 1) a modification to install a fuel tank heater in Blue Max was not completed by December 1 due to issues with parts (CR-2015-28612), 2) compensatory measures were necessary to maintain the functionality of the liquid radwaste sample tank line to the Unit 1 condensate storage tank due to non-functional heat trace (CR-2015-31811), and 3) compensatory measures were required to maintain functionality of Blue Max in temperatures below 14F due to the lack of cold weather qualification of the electrical cables (CR-2015-19827).

These three potential trends were entered into the CAP as CRs 2015-32988, 2016-01868, and 2016-01870, respectively.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 1 sample).1 Plant Eventsa. Inspection Scope

For the plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Susquehanna made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR Parts 50.72 and 50.73. The inspectors reviewed Susquehanna's follow-up actions related to the events to assure that Susquehanna implemented appropriate corrective actions commensurate with their safety significance.

- Unit 1 Reactor scram during MSIV testing on November 12, 2015

b. Findings

Introduction. A self-revealing Green finding was identified for not correctly validating a deficient condition associated with the Unit 1 'B' inboard MSIV DC solenoid valve as an actual valve issue, vice indication-only, through the use of specific acceptance criteria as required by MT-AD-509, "Control of Minor Maintenance Activities." By incorrectly concluding the issue was indication only, testing was allowed to be performed which inserted a half-isolation by de-energizing the AC solenoid valve on the 'B' inboard MSIV. When this maintenance was performed, the 'B' inboard MSIV closed unexpectedly, due to the failure of the DC solenoid, resulting in a reactor scram.

Description. The main steam system consists of four steam lines that are isolated by two redundant MSIVs. The MSIVs are pneumatic opening, spring and/or pneumatic closing valves. Each of the MSIVs are controlled by two solenoid operated pilot valves. For reliability one of the solenoids are powered by an AC source and the other by a DC source. When both pilots are de-energized the associated MSIV will close. An inadvertent closure of one MSIV with the reactor at-power will result in a rapid increase in reactor pressure, which in turn will result in a rapid increase in reactor power due to the positive reactivity added by the rapid collapse of steam voids in the core. Depending on initial reactor power level, the reactor protection system may generate either a high reactor pressure or high power scram to prevent exceeding safety limits during the power transient.

On November 6, 2015, operators identified the continuity light for the DC solenoid associated with the 'B' inboard MSIV was out. The operator verified the bulb was functional by changing with a known good bulb and generated CR-2015-30092. CR-2015-30092 directed an investigation to determine if the current transformer or the actual solenoid was bad.

On November 9, 2015, electrical maintenance performed an investigation utilizing MT-AD-509, Control of Minor Maintenance Activities, and observed a current of approximately 40 ma across the DC solenoid. Maintenance concluded that the

continuity monitor needed to be replaced and calibrated but did not assess the acceptability of the DC solenoid. The minor maintenance work checklist did not provide acceptance criteria associated with the DC solenoid, troubleshooting guidance, or technical information for the continuity monitor.

On November 11, 2015, technicians commenced a routine quarterly surveillance of the main steam line 'C' flow channels (SI-183-207). I&C technicians noted the DC solenoid continuity light was not lit as required by SI-183-207, step 5.2.14, so the technicians utilized the alternate method identified in step 5.2.14 to verify current at the field side terminal wiring was approximately 50maDC through the use of a clamp-on ammeter. I&C continued with the surveillance testing per SI-183-207. When the test pressure for the trip associated with the AC solenoid was reached, the 'B' MSIV inadvertently went closed resulting in an automatic scram. Follow-on troubleshooting revealed that the current values associated with the DC solenoid circuit were erratic and the DC solenoid was experiencing intermittent performance before failing. Susquehanna's evaluation of the scram identified that the measured currents were insufficient to ensure the continuity of the DC solenoid and separately concluded that the minor maintenance work document, which was performed on November 9, did not provide sufficient detail to ensure the degraded condition was appropriately evaluated. MT-AD-509 requires the initial apparent cause be identified sufficiently to enable the formal work planning process. Since Susquehanna did not utilize any formal acceptance criteria for the validation, they incorrectly validated the cause of the problem as a material failure of the continuity monitor.

Analysis. Susquehanna's failure to adequately troubleshoot and diagnose the deficient condition of an extinguished continuity monitor for a DC solenoid as valve degradation, vice an indication-only issue, was a performance deficiency. This performance deficiency was more than minor because it is associated with the equipment performance attribute of the Initiating Events cornerstone and affected the objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. Specifically, the maintenance activity performed to validate the DC solenoid continuity was inadequate and did not identify that the solenoid valve was degraded. Testing of the redundant AC solenoid was allowed to be performed the following day which resulted in the 'B' MSIV inadvertently closing and a resultant high pressure reactor scram. The inspectors evaluated the finding in accordance with IMC 0609, Appendix A, "The SDP for Findings At-Power," Exhibit 1, for the Initiating Events cornerstone. The inspectors determined the finding was of very low safety significance (Green) because it did not cause the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Specifically, the condenser was maintained for decay heat removal via the bypass valves through the other three main steam lines following the transient.

This finding had a cross-cutting aspect in the area of Human Performance, Challenge the Unknown, because Susquehanna did not stop when faced uncertain conditions and instead rationalized unanticipated test results. Specifically, the investigation of the extinguished continuity monitor focused on the possibility that it was an indication-only issue and failed to question the acceptability of the current values obtained during troubleshooting [H.11].

Enforcement. This finding does not involve any enforcement action since no violation of regulatory requirements was identified. Specifically, the failure of the DC solenoid does not impact the safety-related function of the MSIV. Because the finding does not involve a violation of regulatory requirements and has very low safety significance, it is identified as a FIN. **(FIN 05000387/2015004-04, Inadvertent Closure of the 'B' Inboard MSIV)**

4OA6 Meetings, Including Exit

On January 19, 2016, the inspectors presented the inspection results to Mr. T. Rausch, Senior Vice President and Chief Nuclear Officer, and other members of the Susquehanna's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

4OA7 Licensee-Identified Violations

On March 6, 2015, Susquehanna identified a programmatic deficiency associated with the perimeter radiation monitoring system (RMS), which consists of 16 fixed radiation monitors at the site boundary that are activated and monitored by TSC/EOF staff, in that it was in a condition that could impact the ability to assess the EAL thresholds. Specifically, Susquehanna identified that the RMS is not maintained as required by EP-115, "Equipment Important to Emergency Response," Revision 2, in that 4 of the 16 fixed radiation monitors in the RMS had been out of service since 2013 and the software that displays the RMS does not consistently run in computers in the EOF and TSC. 10 CFR Part 50.54(q) requires that the facility licensee follow and maintain in effect emergency plans which meet the standards in 10 CFR 50.47(b). 10 CFR 50.47(b)(4) requires, in part, that emergency response plans include a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters. Susquehanna's Emergency Plan identifies the RMS as an initiating condition for EALs RG1 and RS1. Specifically, the two thresholds are met if sustained readings on the RMS are above the specified threshold value for greater than 15 minutes. Contrary to the above, the RMS was not maintained as required by the Emergency Plan which could have impacted the ability of Susquehanna to declare an emergency event. Susquehanna entered this issue into the CAP as CR-2015-06706.

The inspectors determined that the finding was more than minor because it was associated with the facilities and equipment attribute of the Emergency Preparedness cornerstone and adversely affected the cornerstone objective to ensure that the licensee is capable of implementing adequate measures to protect the health and safety of the public in the event of a radiological emergency. The inspectors determined, through a review of IMC 0609, Appendix B, "Emergency Preparedness Significance Determination Process," issued September 23, 2014, the finding to be of very low safety significance (Green), because redundant EAL initiating conditions associated with offsite dose assessment would have ensured that Susquehanna maintained a capability to declare the site area and general emergencies affected by the RMS.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION**KEY POINTS OF CONTACT**Licensee Personnel

J. Franke, Site Vice President
 B. Franssen, Plant Manager
 D. Adams, Licensed Operator Requalification Training Supervisor
 J. Barnhardt, Dosimetry Supervisor
 B. Bridge, Radiation Protection Manager
 K. Cimorelli, General Manager- Operations
 T. Creasy, Assistant Operations Manager
 M. Dziedzic, Site Level III and IWE/IWL Program Owner
 N. Giusto, System Engineer
 J. Gorman, Emergency Preparedness Manager
 B. Hyduk, Support Engineer
 T. French, Operations Training Supervisor
 J. Jennings, Regulatory Assurance Manager
 D. Jones, Operations Manager
 A. Kuklis, System Engineer
 C. Manges, Regulatory Assurance
 A. May-Allen, System Engineer
 T. Mogavero, Corrective Action Program Coordinator/Performance Improvement Coordinator
 S. Muntzenberger, Engineering Branch Manager
 B. O'Rourke, Licensing Engineer
 E. OTruba, Radiation Operations Supervisor
 R. Rodrigues-Gilroy, Radiation Operations Supervisor
 T. Roth, Supervisor- Operations Engineering
 P. Scanlan, Station Engineer Manager
 H. Strahley, Assistant Operations Manager
 T. Terryah, ISI Programs Manager
 J. Waclawski, Engineering Branch Manager

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATEDOpened/Closed

05000388/2015004-01	NCV	Failure to Correct a Condition Adverse to Quality Associated with an Inoperable Primary Containment Isolation Valve (Section 1R12)
05000387/2015004-02	NCV	Loss of Safety Function of SBGT and CREOASS due to Concurrently Performing Maintenance on Redundant Trains (Section 1R15)
05000387;388/2015004-03	NCV	Dose Assessment Capabilities in the Technical Support Center(Section 1EP6)
05000387/2015004-04	FIN	Inadvertent Closure of the 'B' Inboard MSIV (Section 40A3)

Closed

05000387; 388/2015001-04

URI

Effectiveness of Declaration Capability of
Abnormal Radiation Level EAL (Section 1EP6)**LIST OF DOCUMENTS REVIEWED****Section 1R01: Adverse Weather Protection**Procedures

NDAP-00-1913, Seasonal Readiness, Revision 3

MT-085-001, Freeze Protection, Process Heat Trace Testing and Maintenance, Revision 24

Condition Reports (*NRC identified)

CR-2015-28670

CR-2015-28662

CR-2015-27014

CR-2014-31063

CR-2014-26667

CR-2015-25485

Maintenance Orders/Work Orders

1841063

1855366

1762768

Miscellaneous

EC 1634054, Fuse Block for Turbine Building HVAC

Section 1R04: Equipment AlignmentProcedures

OP-152-001, HPCI System, Revision 59

OP-258-001, RPS System, Revision 57

OP-150-001, RCIC System, Revision 46

OP-183-001, Automatic Depressurization System and Safety Relief Valves, Revision 18

DP-151-001, Unit 1 Core Spray A & C Drain Procedure While at Power, Revision 18

CL-151-0015, Unit 1 Core Spray System Division 2 Mechanical, Revision 13

CL-151-0014, Unit 1 Core Spray System Division 2 Electrical, Revision 9

Maintenance Orders/Work Orders

1119887

1119886

Drawings

M-155, Unit 1 P&ID High Pressure Coolant Injection, Sheet 1, Revision 58

M-156, Unit 1 P&ID HPCI Turbine-Pump, Sheet 1, Revision 38

M-146, Unit 1 P&ID Control Rod Drive Part A, Sheet 1, Revision 42

M-147, Unit 1 P&ID Control Rod Drive Part B, Sheet 1, Revision 38

M-152, Unit 1 P&ID Core Spray, Revision 40

Miscellaneous

Maintenance Rule Basis Document-System 55, CRD Control Rod Drive Hydraulics

Maintenance Rule Basis Document-System 58, RPS Reactor Protection System

TM-OP-058-ST, Reactor Protection System, Revision 09

CL-183-0011, Unit 1 Safety Relief Valve System, Revision 6

CL-150-0012, Unit 1 Reactor Core Isolation Cooling System, Revision 25

CL-150-0011, Unit 1 RX Core Isolation Cooling System, Revision 11

Section 1R05: Fire ProtectionProcedures

FP-113-103, HPCI Pump Room (I-II) Fire Zone 1-1C Elevation 645'-0", Revision 5
 FP-213-237, Core Spray Pump Room "A" (11-17) Fire Zone 2-1B Elevation 645'-0", Revision 5
 FP-113-102, Core Spray Pump Room "B" (1-10) Fire Zone 1-1B Elevation 645'-0", Revision 4

Miscellaneous

SSES FPRR, Revision 18

Section 1R06: Flood Protection MeasuresMaintenance Orders/Work Orders

1235117 520929

Drawings

C-2727, Unit 1 Reactor Building Station Flood Barrier Plan of Elevation 683'-0", Sheet 1,
 Revision 2

Engineering Calculations

EC-RISK-0539, Internal Flooding Analysis for PRA, Revision 3

Section 1R11: Licensed Operator Requalification ProgramProcedures

LS-1012, Reportable Action Levels for Loss of Emergency Response Capabilities, Revision 0
 OP-AD-002, Standards for Shift Operations, Revision 57
 OP-AD-338, Reactivity Manipulations Standards and Communications Requirements,
 Revision 31
 ANSI/ANS-3.5-2009, Nuclear Power Plant Simulators for Use in Operator Training and
 Examination
 2015 LOR Annual Operating Exam Sample Plan
 OI-AD-044, Return to Shift Duty/Job Promotion (Operator Qualification)
 TQ-106, LOR Program Implementation
 TQ-201, Examination Security and Administration

Condition Reports (*NRC identified)

CR-2015-29146	CR-2015-29141	CR-2015-29164	CR-2015-29150
CR-2014-10388	CR-2015-25851	CR-2015-25889	CR-2015-23700
CR-2015-32652	CR-2015-32787	CR-2015-32816	CR-2015-32786
CR-2015-32788	CR-2015-32652	CR-2015-32670	CR-2015-32702
CR-2015-32940	CR-2015-32922	CR-2015-32721	CR-2015-32725
CR-2015-32706	CR-2015-32710	CR-2015-32889	CR-2015-32866
CR-2015-32648	CR-2015-32782	CR-2015-32784	CR-2015-32838
CR-2015-32650	CR-2015-32654	CR-2015-32650	CR-2015-32831
CR-2015-32649	CR-2015-32924	CR-2015-32733	CR-2015-32781
CR-2015-32776			

Job Performance Measures

00.AD.037.052	04.ON.1203.251	45.OP.4677.152	49.OP.008.101
58.OP.006.201	24.OP.1443.051	49.OP.1877.201	79.OP.006.102
00.AD.3274.103	00.AD.1033.101	50.OP.004.152	

Comprehensive Written Exams (Previously administered in Aug/Sep 2014)

14-06-S2C 14-06-S2A 14-06-S1A

Simulator Scenarios

OP002-503 OP002-205 OP002-514 OP002-610

Simulator TestingTQ-302 Simulator Testing and Documentation
2014 Simulator Physical Fidelity Audit
2015 Simulator Physical Fidelity Audit**Section 1R12: Maintenance Effectiveness**ProceduresNDAP-QA-0413, Implementation of the Maintenance Rule, Revision 14
NSEP-AD-0413D, Maintenance Rule- Performance Monitoring, Revision 3
NSEP-AD-0413E, Maintenance Rule-Dispositioning Between (A)(1) and (A)(2), Revision 2Condition Reports (*NRC identified)

CR-2015-26590	CR-1733145	CR-2014-26599	CR-2015-21156
CR-2015-18650	CR-2015-30133	CR-2015-27360	CR-2015-25881
CR-2015-25539	CR-2015-25428	CR-2015-25426	CR-2015-24221
CR-2015-27220	CR-2015-27222	CR-2015-27224	CR-2015-27225
CR-2015-27226	CR-2015-27227	CR-2015-27228	CR-2015-27229
CR-2015-27230	CR-2015-27231	CR-2015-27232	CR-2014-28492
CR-2015-25539	CR-2015-25881		

Action Requests

AR-1571694 AR-2015-03484

MiscellaneousMaintenance Rule Basis Document- System 64, November 18, 2015
SM-158-001, RPS M-G Set 'A' Electrical Protection Assembly 24 Month Channel Calibration and Functional Test, Revision 15
SM-158-001, RPS M-G Set 'A' Electrical Protection Assembly 24 Month Channel Calibration and Functional Test, Revision 14**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**ProceduresMT-052-002, Unit 1 and Unit 2 HPCI Turbine Maintenance, Revision 14
OP-152-001, HPCI System, Revision 59
PSP-26, Online and Shutdown Nuclear Risk Assessment Program, Revision 15
NDAP-QA-1902, Integrated Risk Management, Revision 20
OP-164-001, Reactor Recirculation System, Revision 81
OP-164-002, Reactor Recirculation System HIMI Operations, Revision 9

Condition Reports (*NRC identified)

CR-1093815	CR-1259874	CR-293289	CR-55991
CR-583298	CR-693556	CR-783341	CR-830292
CR-955607	CR-2015-32134	CR-2015-30101	CR-2015-29858
CR-2015-30215			

Maintenance Orders/Work Orders

1779634

Drawings

M-155, Unit 1 P&ID High Pressure Coolant Injection, Sheet 1, Revision 58
M-156, Unit 1 P&ID HPCI Turbine Pump, Sheet 1, Revision 38
M-156, Unit 1 HPCI Lubricating and Control Oil P&ID, Sheet 2, Revision 10

Miscellaneous

IOM-13, HPCI Vendor Manually, Revision 37

Section 1R15: Operability Determinations and Functionality AssessmentsProcedures

TP-164-045, Local System Leakage Test of Reactor Recirculation Loops A & B, Revision 5
MT-052-002, Unit 1 and Unit 2 HPCI Turbine Maintenance, Revision 14
OP-152-001, HPCI System, Revision 59
NDAP-QA-0312, Controls of LCO's, TRO's and Safety Function Determination Program,
Revision 18
PSP-30, SSES Tactics for Excellence through Accountable Management (Team), Revision 16
SE-030-002B, 24 Month Control Structure Ventilation System Operability Test, Div II, Revision 3
SI-180-306, 24 Month Calibration of RWCU, PCIS, Secondary Containment Isolation, and
CREOASS Initiation on Reactor Vessel Water Level 2 and MSIV Isolation on Reactor
Vessel Water Level 1 for Channels LITS-B21-1N026A&C

Condition Reports (*NRC identified)

CR-1093815	CR-1259874	CR-293289	CR-55991
CR-583298	CR-693556	CR-783341	CR-830292
CR-955607	CR-2015-32134	CR-2015-29412	CR-2015-33033
CR-2015-26455	CR-2015-31181	CR-2015-26475	CR-2015-25476
CR-2015-26442	CR-2015-31802*		

Maintenance Orders/Work Orders

1913719	1630684	1823252	1762531	775211	1755925
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Drawings

M-143, Unit 1 P&ID Reactor Recirculation, Sheet 1, Revision 49
M-143, Unit 1 P&ID Reactor Recirculation, Sheet 2, Revision 14
M-143, Unit 1 P&ID Reactor Recirculation, Sheet 3, Revision 4
M-143, Unit 1 P&ID Reactor Recirculation, Sheet 4, Revision 1
M-144, Unit 1 P&ID Reactor Water Clean-Up, Sheet 1, Revision 45
E-151, Unit 2 Schematic Diagram Reactor Recirculation Pump Discharge Bypass Valve,
Sheet 29, Revision 24
M-155, Unit 1 P&ID High Pressure Coolant Injection, Sheet 1, Revision 58
M-156, Unit 1 P&ID HPCI Turbine Pump, Sheet 1, Revision 38
M-156, Unit 1 HPCI Lubricating and Control Oil P&ID, Sheet 2, Revision 10

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Plan of the day meeting, September 29, 2015 04:42
Plan of the day meeting, September 30, 2015 04:42

Section 1R18: Plant Modifications

Procedures

EO-000-102, RPV Control, Revision 13
EP-DS-002, RPV and Primary Containment Flooding SAG-2, Revision 8
EO-000-102, RPV Control, Revision 12
EP-DS-002, RPV and Primary Containment Flooding, Revision 7
SC-173-101, Unit 1 Primary Containment Activity Prior to Each Purge, Revision 10
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Condition Reports (*NRC identified)

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Engineering Calculations

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Section 1R19: Post-Maintenance Testing

Procedures

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SO-150-004, Quarterly RCIC Valve Exercising, Revision 34
SO-150-015, Two Year RCIC RPI Checks, Revision 12
PSP-29, Post Maintenance Testing Matrix, Revision 20
SO-184-006, MSIV Stroke Timing, Revision 8
SO-151-A02, Core Spray Flow Verification A Loop
DP-151-001, Core Spray A & C Drain Procedure While at Power, Revision 18
SE-159-400, RHR/Core Spray/HPCI/RCIC Component Post-Maintenance Closed System Testing, Revision 5
SO-151-A02, Quarterly Core Spray Flow Verification Division 1, Revision 24
24 Month Core Spray Division 1 System Remote Position Indicator (RPI) Checks, Revision 0
Monthly Core Spray A Loop Discharge Line Filled & Valve Alignment Verification, Revision 1

Condition Reports (*NRC identified)

CR-2015-30958 CR-2015-31072 CR-2015-31012 CR-2015-27216

Maintenance Orders/Work Orders

1789416	1789469	1648924	1852049	1759028	1895241
1891623	1738013	1928363	1930693	1922010	

Engineering Calculations

1946985

Miscellaneous

BOP-PT-15-349, Liquid Penetrant Examination
 BOP-PT-15-345, Liquid Penetrant Examination
 BOP-PT-15-348, Liquid Penetrant Examination
 BOP-PT-15-346, Liquid Penetrant Examination
 BOP-PT-15-347, Liquid Penetrant Examination
 BOP-UT-15-129, UT Thickness Examination
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Section 1R20: Refueling and Other Outage ActivitiesProcedures

GO-100-02, Plant Startup, Heatup and Power Operation, Revision 101
 NDAP-QA-0309, Primary Containment Access and Control, Revision 33
 SO-159-008, 24 Month Personnel Airlock Door Interlocks, Revision 9
 OP-149-002, RHR Shutdown Cooling, Revision 69
 GO-100-005, Plant Shutdown to Hot/Cold Shutdown, Revision 66
 SO-100-011, Reactor Vessel Temperature and Pressure Recording, Revision 26

Condition Reports (*NRC identified)

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CR-2015-30474	CR-2015-30830	CR-2015-30924	CR-2015-30901

Section 1R22: Surveillance TestingProcedures

SO-152-002, Quarterly HPCI Flow Verification, Revision 68

Maintenance Orders/Work Orders

1604740	1758057	1789469	1806752	1824718	1865806
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Section 1EP2: Alert and Notification System EvaluationProcedures

EP-108, Alert Notification System—American Signal Corporation Sirens, Revision 2
 EP-109, Alert Notification System Annual Test—American Signal Corporation Sirens, Revision 1
 EP-110, ANS Problem Solving, Revision 1

Miscellaneous

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 Letter from FEMA Region III Susquehanna Steam Electric Station, dated November 7, 2008
 ANS Maintenance Records, November 2013 – June 2015
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Section 1EP3: Emergency Response Organization Staffing and Augmentation System

Procedures

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EP-00-007, Testing of Emergency Communications Equipment, Revision 2
TQ-210-0310, Emergency Plan Overview (EP-100), Revision 2

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Section 1EP4: Emergency Action Level and Emergency Plan Changes

Procedures

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Susquehanna Emergency Plan, Revision 57
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EP-PS-001, Emergency Planning Forms and Supplementary Instructions, Revision 5
EP-PS-101, TSC Emergency Director, Revision 31
EP-PS-104, Radiation Protection Coordinator, Revision 30
EP-PS-101, TSC Dose Calculator, Revision 23
EP-PS-200, Recovery Manager, Revision 31
EP-PS-244, EOF Dose Assessment Staffer, Revision 16

Section 1EP5: Maintenance of Emergency Preparedness

Procedures

EP-00-007, Testing of Emergency Communications Equipment, Revision 2
EP-00-006, Inventory Inspection and Operational Testing of Emergency Equipment and Supplies, Revision 5
EP-115, Equipment Important to Emergency Response (EITER), Revision 4
EP-102, Review, Revision and Distribution of the SSES Emergency Plan and 50.54(Q) Evaluations, Revision 5
NDAP-QA-0726, 10CFR 50.59 and 10CFR 72.48 Implementation, Revision 17
LS-125, Corrective Action Program, Revision 3

Miscellaneous

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Audit 2015-01394, Emergency Preparedness, March 6, 2015

Section 1EP6: Drill Evaluation

Procedures

EP-PS-105, TSC Dose Calculator, Revision 24
EP-RM-004, MIDAS-NU User's Manual, Revision 1
EP-PS-001-22, EOF Dose Assessment Flowchart, Revision 3
EP-PS-001-25, TSC Dose Assessment Flowchart, Revision 3

Condition Reports (*NRC identified)

CR-2015-03695 CR-2015-04701

Miscellaneous

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Section 2RS1: Access Control to Radiologically Significant Areas

Procedures

NDAP-QA-0623, Radiation Protection Standards and Responsibilities, Revision 1

NDAP-QA-0626, Radiologically Controlled Area Access and Radiation Work Permit (RWP) System, Revision 39

RP-122, Radiation Protection Stop Work Authority, Revision 0

HP-TP-500, Health Physics Radiological Survey Program, Revision 49

Condition Reports (*NRC identified)

2015-25852

Documents

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Unit 2 RB 683' surveys, October 2015

Section 2RS2: Occupational ALARA Planning and Controls

Procedures

HP-AL-400, RWP ALARA Reviews and Evaluations, Revision 19

NDAP-QA-1191, ALARA Program and Policy, Revision 22

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Condition Reports (*NRC identified)

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Documents

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RWP 20152120 RWCU Complex and BWRT Room General Work and Inspections, Revision 0

RWP 20152324 Recirculation Pump 2P401B Motor Replacement, Revision 0

RWP 20152336 Recirculation Pump Work, Revision 0

Water Chemistry Data from 2010-2015

Health Physics Technical Basis AR-2015-03613

Unit 2 16th Outage Report

Unit 2 17th Outage Report

Section 4OA1: Performance Indicator Verification

Procedures

SO-100-07, Daily Surveillance Operating Log, Revision 71

NDAP-QA-0737, Reactor Oversight Process (ROP) Performance Indicators, Revision 15

Condition Reports (*NRC identified)

CR-2015-14721*	CR-2014-34399	CR-2015-19740	CR-2015-20925
CR-2014-07058	CR-2014-10288	CR-2014-12078	CR-2014-20248
CR-2014-32605	CR-2014-32851	CR-2014-32988	CR-2014-37227
CR-2015-05805	CR-2015-06976	CR-2015-07251	CR-2015-07254
CR-2015-17999	CR-2015-18919	CR-2015-19164	CR-2015-19189
CR-2015-20653			

Action Requests

AR-2014-21608	AR-2014-21496	AR-2015-14740	AR-2015-19415
AR-2015-19415			

Drawings

V-178, Logic Diagram Control Structure HVAC Isolation Signals, Sheet 14, Revision 7
V-178, Logic Diagram Control Structure HVAC Emer OA Supply Fans OV-101A&B, Sheet 2, Revision 7
E-214, Common Schematic Diagram Control Structure HVAC Chilled Wtr Sys Chilled Wtr Circ PPS, Sheet 4, Revision 28
M-178, Unit 1 P&ID Control Structure Air Flow Diagram, Sheet 1, Revision 35

Engineering Calculations

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EC-RISK-1165, MSPI Basis Document JUL12R1 Model Data Input, Revision 0

Miscellaneous

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EWR-2015-22825
TM-OP-030-ST, Control Structure HVAC, Revision 11
SSES Unit 1&2 Issuance of Amendment Re: Implementation of Alternative Radiological Source Term (TAC Nos. MC8730 and MC8731), Mr. Britt T. McKinney, January 31, 2007
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NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 7
MSPI Basis Document, Revision 8
DEP PI data, October 2014 – September 2015
ERO Drill Participation PI data, October 2014 – September 2015
ANS Reliability PI data, October 2014 – September 2015

Section 40A2: Problem Identification and ResolutionCondition Reports (*NRC identified)

CR-2015-27105	CR-2015-23100	CR-2015-28486	CR-2015-28232
CR-2015-25208	CR-2015-28612	CR-2016-00564	CR-2016-00551
CR-2015-32988	CR-2015-34009	CR-2015-31976	CR-2015-33482
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 SSES Nuclear Oversight Station Summary Report May 2015 through August 2015,
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Section 40A3: Follow-up of Events and Notices of Enforcement DiscretionProcedures

SI-183-207, Quarterly Test of Main Steam Line C Flow Channels FIS-B21-IN008A&B and
 Main Steam Line D Flow Channels FIS-B21-1N009A&B. Revision 14
 MT-AD-509, Control of Minor Maintenance Activities, Revision 19
 OP-AD-327, Post Reactor Transient/Scram/Shutdown Evaluation, Revision 31

Condition Reports (*NRC identified)

CR-2015-30974	CR-2015-30975	CR-2015-30973	CR-2015-30971
CR-2015-30984	CR-2015-30759	CR-2015-30706	CR-2015-30711
CR-2015-30721	CR-2015-30728	CR-2015-30745	CR-2015-30746
CR-2015-30748	CR-2015-30753	CR-2015-30754	CR-2015-30756
CR-2015-30762	CR-2015-30764	CR-2015-30928	CR-2015-31290
CR-2015-31219	CR-2015-31293	CR-2015-31081	CR-2015-31069
CR-2015-31063	CR-2015-30983	CR-2015-30721	CR-2015-30092

Action Requests

AR-2015-30786

Maintenance Orders/Work Orders

1641281	1945473	1923252	1809437
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Drawings

E-151, Unit 1 Schematic Diagram Reactor Recirculation Pump Trip Anticipated Transient
 without Scram, Sheet 35, Revision 7

Engineering Calculations

EC-INST-1333, I&C Maintenance Calculation for LISB211N025A, Revision 0

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AC	alternating current
ADS	automatic depressurization system
ALARA	as low as is reasonably achievable
ANS	alert and notification system
ARI	alternate rod insertion
Blue Max	station portable diesel generator
CAP	corrective action program
CFR	Code of Federal Regulations
CR	condition report
CREOASS	control room emergency outside air supply system
DC	direct current
EAL	emergency action level
EOF	emergency operations facility
EOP	emergency operating procedure
EP	emergency preparedness
ERF	emergency response facility
ERO	emergency response organization
ESW	emergency service water
FEMA	Federal Emergency Management Agency
FSAR	final safety analysis report
HPCI	high-pressure coolant injection
HRA	high radiation area
I&C	instrument and controls
IMC	Inspection Manual chapter
LCO	limiting condition for operation
MSIV	main steam isolation valve
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NSIR	Office of Nuclear Security and Incident Response
NVLAP	National Voluntary Laboratory Accreditation Program
ODCM	offsite dose calculation manual
OWA	operator workarounds
PCIV	primary containment isolation valve
PI	performance indicator
PMT	post maintenance testing
RB	reactor building
RCIC	reactor core isolation cooling
RCS	reactor coolant system
RG	regulatory guide
RHR	residual heat removal
RHRSW	residual heat removal service water
RP	radiation protection
RPM	radiation protection manager
RPS	reactor protection system
RRP	reactor recirculation pump
RTP	rated thermal power
RWP	radiation work permit

SBGT	standby gas treatment
SCIS	secondary containment isolation system
SDP	significance determination process
SOW	system outage window
SSC	structure, system and component
SSES	Susquehanna Steam Electric Station
TRO	technical requirement for operation
TS	technical specification
TSC	technical support center
UFSAR	Updated Final Safety Analysis Report
VHRA	very high radiation area