



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
2100 RENAISSANCE BOULEVARD, SUITE 100  
KING OF PRUSSIA, PA 19406-2713**

February 13, 2019

Mr. Brad Berryman  
President and Chief Nuclear Officer  
Susquehanna Nuclear, LLC  
769 Salem Blvd., NUCSB3  
Berwick, PA 18603

**SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION – INTEGRATED INSPECTION  
REPORT 05000387/2018004 AND 05000388/2018004**

Dear Mr. Berryman:

On December 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Susquehanna Steam Electric Station (SSES), Units 1 and 2. On January 17, 2019, the NRC inspectors discussed the results of this inspection with Mr. Kevin Cimorelli, Site Vice President and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. Additionally, NRC inspectors documented one Severity Level IV violation with no associated finding. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at SSES. In addition, if you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at SSES.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

***/RA/***

Jonathan E. Greives, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

Docket Numbers: 50-387 and 50-388  
License Numbers: NPF-14 and NPF-22

Enclosure:  
Inspection Report 05000387/2018004 and  
05000388/2018004

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Numbers: 50-387 and 50-388

License Numbers: NPF-14 and NPF-22

Report Numbers: 05000387/2018004 and 05000388/2018004

Enterprise Identifier: I-2018-004-0071

Licensee: Susquehanna Nuclear, LLC (Susquehanna)

Facility: Susquehanna Steam Electric Station, Units 1 and 2

Location: Berwick, Pennsylvania

Inspection Dates: October 1, 2018 to December 31, 2018

Inspectors: L. Micewski, Senior Resident Inspector  
T. Daun, Resident Inspector  
J. DeBoer, Emergency Preparedness Inspector  
J. Furia, Senior Health Physicist  
P. Ott, Operations Engineer  
M. Orr, Reactor Inspector

Approved By: Jonathan E. Greives, Chief  
Reactor Projects Branch 4  
Division of Reactor Projects

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Susquehanna's performance at Susquehanna Steam Electric Station, Units 1 and 2 by conducting the baseline inspections described in this report in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information. NRC-identified and self-revealing findings, violations, and additional items are summarized in the table below.

### List of Findings and Violations

Standby Liquid Control Pump Failed to Achieve Design Flow			
Cornerstone	Significance	Cross-Cutting Aspect	Inspection Results Section
Mitigating Systems	GREEN Finding NCV 05000387/2018-004-01 Closed	H.2 - Field Presence	71111.15
A finding of very low safety significance (Green) and associated non-cited violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) Part 50, Appendix B, Criterion III, "Design Control," were self-revealed when the licensee failed to promptly identify and correct a condition adverse to quality associated with insulation installed on the Unit 1 standby liquid control (SBLC) system piping which prevented a pressure relief valve from fully closing, resulting in reduced system flow.			

Failure to Correct Design Control Inadequacy with LPCI/CS Pressure Indicating Switches			
Cornerstone	Significance	Cross-Cutting Aspect	Inspection Results Section
Mitigating Systems	GREEN Finding NCV 05000387;388/2018-004-02 Closed	H.13 - Consistent Process	71153
A finding of very low safety significance (Green), an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and resultant violations of Technical Specification (TS) 3.3.5.1 and 3.5.1 were self-revealed when Susquehanna did not take adequate corrective action to establish measures to ensure the suitability of equipment that is essential to the safety-related functions of both unit's reactor steam dome low pressure injection permissive for core spray (CS) and low pressure coolant injection (LPCI).			

Work Instructions Insufficient to Maintain Control Room Envelope In-Leakage Within Specification			
Cornerstone	Significance	Cross-Cutting Aspect	Inspection Results Section
Barrier Integrity	Green NCV 05000387(388)/2018004-03 Closed	None	71152
The inspectors documented a self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for work instructions that were not sufficient to ensure the 'A' Control Room Emergency Outside Air Supply System (CREOASS) filter train door gaskets were replaced in a manner that would maintain control room envelope (CRE) in-leakage within specification. This also resulted in an associated violation of TS 3.7.3.			

Unit 1 'D' Outboard Main Steam Isolation Valve Exceeded Individual Valve Leakage Limit Resulting in Condition Prohibited by Technical Specification			
Cornerstone	Significance	Cross-Cutting Aspect	Inspection Results Section
Not Applicable	Severity Level IV NCV 05000387/2018-004-05 Closed	Not Applicable	71153
A Severity Level IV NCV of Unit 1 TS 3.6.1.3 was self-revealed when the outboard 'D' main steam isolation valve (MSIV) exceeded the allowed leakage rate for an individual MSIV of $\leq$ 100 standard cubic feet per hour (scfh). Specifically, during local leak rate testing in April 2018, the outboard 'D' MSIV leakage was measured at 116 scfh.			

### Additional Tracking Items

Type	Issue number	Title	Inspection Results Section	Status
LER	05000387;388/2016-016-00	Bus Synchronizing Select Hand Switch Failure Due to Less than Adequate Life Cycle Management	71153	Closed
LER	05000388;387/2017-001-00	Secondary Containment Declared Inoperable Due to Airlock Doors Open Due to Sticking Door Latch	71153	Closed
LER	05000387;388/2017-004-00	Secondary Containment Declared Inoperable Due to Failure of an Exhaust Fan Breaker	71153	Closed

LER	05000387;388/2017-006-00 and 05000387;388/2017-006-01	Control Room Envelope In-leakage Exceeded the Technical Specification Limit	71153	Closed
LER	05000387;388/2017-007-00 and 05000387;388/2017-007-01	Secondary Containment Declared Inoperable Due to the Opening of a Plenum	71153	Closed
LER	05000388;387/2017-007-00	Secondary Containment Declared Inoperable Due to Supply Air Flow	71153	Closed
LER	05000387/2017-008-00	Core Spray Inoperable Due to Not Meeting Seismic Requirements as a Result of a Human Performance Error	71153	Closed
LER	05000388;387/2018-001-00	Loss of Secondary Containment Differential Pressure During Entry into Unit 2 Zone 3 Exhaust Plenum	71153	Closed
LER	05000388/2017-010-00 and 05000387;388/2018-005-00	Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Switches	71153	Closed
LER	05000387;388/2018-002-00	Loss of Secondary Containment Differential Pressure Following Surveillance Testing	71153	Closed
LER	05000387/2018-003-00 and 05000387/2018-003-01	Main Steam Isolation Valve Leakage Due to Pilot Poppet and Pilot Poppet Seat/Wear/Degradation	71153	Closed
LER	05000387/2018-004-00	Condition Prohibited by Technical Specifications Resulting from Locked Snubber	71153	Closed
LER	05000387/2018-006-00 and 05000387/2018-006-01	Standby Liquid Control Valve Failed Surveillance Test	71153	Closed

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## PLANT STATUS

Unit 1 began the inspection period at 100 percent power. On October 12, 2018, operators reduced power to approximately 69 percent to perform a rod sequence exchange. Full power was achieved again on October 13, 2018. Unit 1 remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. On November 30, 2018, operators lowered power to 80 percent for main condenser waterbox cleaning and rod pattern adjustment. Full power was achieved again on December 3, 2018. On December 7, 2018, operators lowered power to 69 percent to perform a rod sequence exchange. Full power was achieved again on December 8, 2018. On December 14, 2018, operators lowered power to 72 percent to perform a rod pattern adjustment. Full power was achieved again on December 15, 2018. On December 28, 2018, operators lowered power to 72 percent to perform a rod sequence exchange. Full power was achieved again on December 29, 2018 and remained at or near 100 percent power for the remainder of the inspection period.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515, Appendix D, "Plant Status," and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess Susquehanna's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## REACTOR SAFETY

### 71111.01 - Adverse Weather Protection

#### Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the seasonal cold temperatures.

### 71111.04 - Equipment Alignment

#### Partial Walkdown (2 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 2, high pressure coolant injection (HPCI) during reactor core isolation cooling (RCIC) maintenance during week of October 22, 2018

- (2) Unit 2, division 1 residual heat removal (RHR) during division 2 maintenance on November 7, 2018

#### 71111.05A/Q - Fire Protection Annual/Quarterly

##### Quarterly Inspection (5 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Unit 1, valve access area (fire zone 1-5B) on October 24, 2018
- (2) Unit 1, control structure elevation 771' (fire zones 0-28B-II, 0-28K, 0-28L, 0-28I) on November 5, 2018
- (3) Unit 2, equipment access area (fire zones 2-3B-N/W, 2-3C-N/W) on November 5, 2018
- (4) Unit 2, reactor building elevation 749' (fire zones 2-5A-N/W) on November 5, 2018
- (5) Unit 2, control structure elevation 771' (fire zones 0-28A, 0-28D, 0-28E, 0-28G) on November 6, 2018

#### 71111.06 - Flood Protection Measures

##### Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in Unit Common, engineered safeguards service water pump house on December 18, 2018.

#### 71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

##### Operator Requalification (1 Sample)

The inspectors observed licensed operator simulator training during annual operator requalification exams on October 10, 2018.

##### Operator Requalification Exam Results (Annual) (1 Sample)

The inspectors reviewed and evaluated requalification examination results on November 9, 2018.

##### Operator Performance (1 Sample)

The inspectors observed operator response to a spent fuel pool system leak at Unit 1 on December 17, 2018.

#### 71111.12 - Maintenance Effectiveness

##### Routine Maintenance Effectiveness (1 Sample)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Unit 1, reactor building chiller 1K206B failed to pick up load on December 28, 2018

Quality Control (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance issues:

- (1) Commercial-Grade Dedication for Tri-onic time delay fuses for use in safety-related breakers, on December 17, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (3 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Unit Common, yellow risk during division 2 emergency diesel generator (EDG) exhaust plenum work on October 4, 2018
- (2) Unit 1 and 2, fire risk management during Unit 2 'B' RHR system outage window on November 5, 2018
- (3) Unit 1, emergent work control and risk management during failure of division 2 LPCI swing bus automatic transfer switch (ATS) on December 7, 2018

71111.15 - Operability Determinations and Functionality Assessments (3 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Unit Common, diesel fuel oil analysis on October 31, 2018
- (2) Unit 1, division 2 LPCI swing Bus ATS on December 7, 2018
- (3) Unit 1, 'A' SBLC pressure sensing valve failed to close on December 21, 2018

71111.18 - Plant Modifications (4 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Unit 2, open phase detection and protection on October 24, 2018
- (2) Unit Common, concrete repairs on EDG exhaust plenum missile barriers on November 6, 2018
- (3) Unit 1, motor replacement on RHR motor operated valve on December 7, 2018
- (4) Unit Common, removal of Loop 'B' ESW guard pipe drain valve on December 27, 2018

71111.19 - Post Maintenance Testing (3 Samples)

The inspectors evaluated post maintenance testing for the following maintenance/repair activities:

- (1) Unit 2, RCIC following system outage window on October 25, 2018
- (2) Unit Common, 'B' ESW pump following motor maintenance on November 14, 2018
- (3) Unit 1, division 2 LPCI swing Bus ATS following motor replacement on December 7, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (2 Samples)

- (1) Unit 1, drywell fan loss of coolant accident test on December 17, 2018
- (2) Unit Common, 'C' DG monthly surveillance on December 26, 2018

71114.04 - Emergency Action Level and Emergency Plan Changes (1 Sample)

The inspectors verified that the changes made to the emergency plan were done in accordance with 10 CFR 50.54(q)(3), and any change made to the Emergency Action Levels, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan. This evaluation does not constitute NRC approval.

**RADIATION SAFETY**71124.01 - Radiological Hazard Assessment and Exposure ControlsHigh Radiation Area and Very High Radiation Area Controls (1 Sample)

The inspectors reviewed the procedures and controls for high radiation areas, very high radiation areas, and radiological transient areas in the plant.

Radiation Worker Performance and Radiation Protection Technician Proficiency (1 Sample)

The inspectors evaluated radiation worker performance with respect to radiation protection work requirements. The inspectors evaluated radiation protection technicians in performance of radiation surveys and in providing radiological job coverage.

71124.05 - Radiation Monitoring InstrumentationWalkdowns and Observations (1 Sample)

The inspectors conducted walkdowns of plant area radiation monitors and continuous air monitors. The inspectors assessed material condition of these instruments and that the monitor configurations aligned with the Updated Final Safety Analysis Report.

Calibration and Testing Program (1 Sample)

The inspectors reviewed current detector and electronic channel calibration, functional testing results alarm setpoints, and the use of scaling factors. The inspectors reviewed the calibration standards used for portable instrument calibrations and response checks to verify that instruments were calibrated by a facility that used National Institute of Science and Technology traceable sources.

## **OTHER ACTIVITIES – BASELINE**

### 71151 - Performance Indicator Verification

The inspectors verified Susquehanna's performance indicator submittals listed below:  
(6 Samples)

- (1) Unit 1 and Unit 2, MSPI Residual Heat Removal Systems (RHR) (October 1, 2017 through September 30, 2018)
- (2) Unit 1 and Unit 2, MSPI Cooling Water Systems (RHRSW/ESW) (October 1, 2017 through September 30, 2018)
- (3) Occupational Exposure Control Effectiveness (October 1, 2017 through September 30, 2018)
- (4) Radiological Effluent TS/ODCM Radiological Effluent Occurrences (October 1, 2017 through September 30, 2018)

### 71152 - Problem Identification and Resolution

#### Semiannual Trend Review (1 Sample)

The inspectors reviewed Susquehanna's corrective action program (CAP) for trends that might be indicative of a more significant safety issue.

#### Annual Follow-up of Selected Issues (2 Samples)

The inspectors reviewed Susquehanna's implementation of its CAP related to the following issues:

- (1) Condition Report CR-2016-24687, 'A' Recirc Pump Tripped and CR-2017-16089 Unexpected Trip of the Unit 1 'A' Recirc Pump
- (2) Condition Reports CR-2017-17458 and CR-2017-17463, Control Room Envelope Ventilation In-Leakage

### 71153 - Follow-up of Events and Notices of Enforcement Discretion

#### Licensee Event Reports (18 Samples)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000387;388/2016-016-00, *Bus Synchronizing Select Hand Switch Failure Due to Less than Adequate Life Cycle Management* (ADAMS Accession No. ML17012A334). The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER, and therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.
- (2) LER 05000388;387/2017-001-00, *Secondary Containment Declared Inoperable Due to Airlock Doors Open Due to Sticking Door Latch* (ADAMS Accession No. ML17125A030). The inspectors determined that it was not reasonable to foresee or

correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.

- (3) LER 05000387;388/2017-004-00, *Secondary Containment Declared Inoperable Due to Failure of an Exhaust Fan Breaker* (ADAMS Accession No. ML17216A286). The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.
- (4) LER 05000387;388/2017-006-00 and LER 05000387;388/2017-006-01, *Control Room Envelope In-leakage Exceeded the Technical Specification Limit* (ADAMS Accession Nos. ML17338A443 and ML18046A903). The enforcement aspects of this LER are dispositioned in the inspection results section of this report.
- (5) LER 05000387;388/2017-007-00 and LER 05000387;388/2017-007-01, *Secondary Containment Declared Inoperable due to the opening of a plenum* (ADAMS Accession No. ML18025B210). The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.
- (6) LER 05000388;387/2017-007-00, *Secondary Containment Declared Inoperable Due to Supply Air Flow* (ADAMS Accession No. ML17282A019). The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.
- (7) LER 05000387/2017-008-00, *Core Spray Inoperable due to not meeting Seismic requirements as a result of a Human Performance Error* (ADAMS Accession No. ML18092B513). The traditional enforcement aspects of this LER are dispositioned in the inspection results section of this report. The Reactor Oversight Process enforcement aspects of this LER were dispositioned in the inspection results section of NRC Integrated Inspection Report 05000387;388/2018001 (ADAMS Accession No. ML18121A308).
- (8) LER 05000388;387/2018-001-00, *Loss of Secondary Containment Differential Pressure During Entry into Unit 2 Zone 3 Exhaust Plenum* (ADAMS Accession No. ML18101A269). The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.
- (9) LER 05000388/2017-010-00, *Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Switches* (ADAMS Accession No. ML18033A039), LER 05000387;388/2018-005-00, *Condition Prohibited by Technical Specifications Due to Drift of Reactor Pressure Switches* (ADAMS Accession No. ML18214A344). The enforcement aspects of these LERs are dispositioned in the inspection results section of this report.

- (10) LER 05000387;388/2018-002-00, *Loss of Secondary Containment Differential Pressure Following Surveillance Testing* (ADAMS Accession No. ML18150A633). The inspectors determined that it was not reasonable to foresee or correct the cause discussed in the LER therefore no performance deficiency was identified. The inspectors also concluded that no violation of NRC requirements occurred.
- (11) LER 05000387/2018-003-00 and LER 05000387/2018-003-01, *Main Steam Isolation Valve Leakage Due to Pilot Poppet and Pilot Poppet Seat/Wear Degradation* (ADAMS Accession Nos. ML18151B009 and ML18248A058). The enforcement aspects of this LER are dispositioned in the inspection results section of this report.
- (12) LER 05000387/2018-004-00, *Condition Prohibited by Technical Specifications Resulting from Locked Snubber* (ADAMS Accession No. ML18165A461). This LER was withdrawn by Susquehanna (ADAMS Accession No. ML18247A279) based on further engineering evaluation.
- (13) LER 05000387/2018-006-00 and LER 05000387/2018-006-01, *Standby Liquid Control Valve Failed Surveillance Test* (ADAMS Accession No. ML18325A066). The enforcement aspects surrounding this LER are documented in the inspection results section of this report.

**INSPECTION RESULTS**

Standby Liquid Control Pump Failed to Achieve Design Flow			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	GREEN Finding NCV 05000387/2018-004-01 Closed	H.2 - Field Presence	71111.15
<p>A finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," were self-revealed when the licensee failed to promptly identify and correct a condition adverse to quality associated with insulation installed on the Unit 1 SBLC system piping which prevented a pressure relief valve from fully closing, resulting in reduced system flow.</p>			
<p><b>Description:</b> The SBLC system is designed to inject a borated solution of water from a storage tank into the reactor in order to bring the reactor from full power to a subcritical condition without using control rods. It provides a backup capability of reactivity control independent of the normal reactivity control provided by the control rods. The SBLC system consists of a tank of borated solution and two functionally identical subsystems, each containing a pump, and associated piping and valves. Each SBLC pump discharge line is equipped with a pressure relief valve to protect the system from overpressurization.</p> <p>On September 26, 2018, the station performed required technical surveillance testing to verify proper operation of the Unit 1 'A' SBLC system. During this testing, the 'A' SBLC pump is required to achieve a minimum flow rate of 40.0 gallons per minute (gpm) at a discharge pressure of 1260 pounds per square inch (psi). When the test was performed, the pump only achieved 28 gpm at 1260 psi. Investigation revealed that the relief valve was in a lifted position, and appeared unable to automatically reseal. This open valve would have diverted some flow away from the injection line to the reactor and circulated it back to the pump</p>			

suction. The licensee performed bench testing on the valve, and the valve lifted and reset satisfactorily at the required setpoints. Since the SBLC system had been extensively worked during the spring 2018 refueling outage, which required insulation removal and restoration, the licensee concluded that the new insulation had been installed in a way that physically restricted movement on the relief valve manual lifting arm, preventing the valve from reseating. This physical restriction was not noticed by visual observation, either at the time of installation by workers or their supervisors, or during subsequent plant walkdowns by Susquehanna staff and supervisors.

Corrective Action: The insulation was adjusted to ensure no contact was made with the valve reset arm.

Corrective Action References: CR-2018-13637, CR-2018-13755

Performance Assessment:

Performance Deficiency: Inspectors determined that installing insulation on a system in a manner that impedes the operation of the components of the system was a performance deficiency that was reasonably within Susquehanna's ability to foresee and correct and should have been prevented.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the Configuration Control attribute of the Reactor Safety-Mitigating Systems cornerstone and adversely effected the capability of systems to respond to initiating events to prevent undesirable consequences. Specifically, the open relief valve reduced the flow of borated water below limits specified in the accident analysis.

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations," and determined the significance to be Green because each of the screening questions for reactivity control systems was answered "NO." Specifically, it did not affect the reactor protection system, add positive reactivity, or involve mismanagement of reactivity by operators.

Cross-cutting Aspect: H.2 - Field Presence, since senior managers did not ensure supervisory and management oversight of work activities, to ensure that standards were enforced and corrected promptly.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion III requires that measures shall be established to assure the applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, from April 27, 2018, to September 26, 2018, the licensee did not have adequately detailed work instructions to ensure that insulation was installed in a manner that would not inhibit the operation of a component in the SBLC system.

Enforcement Action: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.



Failure to Correct Design Control Inadequacy with LPCI/CS Pressure Indicating Switches			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	GREEN Finding NCV 05000387;388/2018-004-02 Closed	H.13 - Consistent Process	71153
<p>A finding of very low safety significance (Green), an associated NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and resultant violations of Technical Specification (TS) 3.3.5.1 and 3.5.1 were self-revealed when Susquehanna did not take adequate corrective action to establish measures to ensure the suitability of equipment that is essential to the safety-related functions of both unit's reactor steam dome low pressure injection permissive for CS and LPCI.</p>			
<p><u>Description:</u> Susquehanna Steam Electric Station utilizes Barton 288A switches in the reactor steam dome pressure - low channels that provide the injection permissive for the CS system (TS Function 1d) and the LPCI system (TS Function 2d). This logic is required to maintain the CS and LPCI values closed at high pressures but open once the setpoint is reached to allow opening to inject water to the reactor pressure vessel during a design basis accident.</p> <p>In Inspection Report 05000387(388)/2016001, a licensee-identified violation (LIV) was issued for Susquehanna not having design control measures established for the selection and review for suitability for their reactor pressure vessel pressure instrumentation that feeds into the CS/LPCI valve permissive logic following LER 05000388(387)/2015-001-01. Specifically, Susquehanna determined that they had a less than adequate design for these switches since the Barton 288A pressure indicating switches were normally operated above their operating range of 0-550 psig. Corrective actions were initiated to replace the Barton 288As with a new switch that was adequate for the application. A compensatory action was implemented to calibrate the Barton 288As more frequently until an appropriate replacement was identified and installed. In order to address drift issues with the Barton pressure switches, all eight were replaced with Cameron-Barton 288A pressure switches between September 6, 2017 and November 15, 2017. The switches were bench tested prior to installation and calibration checked at the time of installation. Subsequent calibration checks were performed at intervals less than the quarterly TS-required calibrations. During these subsequent calibration checks, the Unit 2 'C' (PIS-B21-2N021C) and Unit 2 'D' (PIS-B21-2N021D) pressure switches were found outside of the TS allowable value. On June 5, 2018, Unit 1 'B' (PIS-B21-1N021B) was found outside of the TS 3.3.5.1 allowable value during testing. On June 6, 2018, Unit 2 'C' (PIS-B21-2N021C) was found outside of the TS 3.3.5.1 allowable value during testing. In all instances, the switch drifted outside of the lower allowable value, which is intended to ensure that the emergency core cooling system injection prevents the fuel peak cladding temperature from exceeding the limits of 10 CFR 50.46. The largest deviation by any switch was by 1.5 psi from the TS allowable value (427.0 psi versus a lower allowable value of 428.5 psi).</p> <p>The inspectors determined that Susquehanna did not correct the performance deficiency associated with the previously issued LIV in Inspection Report 05000387(388)/2016001 in accordance with their CAP. Specifically, the corrective actions created by Susquehanna to address this LIV did not resolve the previously identified performance deficiency, which was not establishing appropriate design control measures for the selection and review for suitability of equipment essential for safety-related functions of systems. Specifically, the</p>			

engineering change created to replace the Barton 288As was cancelled on June 5, 2017, on a decision that replacement with Cameron-Barton 288As would be used to complete the corrective actions. The approved part equivalency for the change made the determination that the design and function of the replacement Cameron-Barton 288As will remain the same.

**Corrective Actions:** An engineering change is being implemented to replace the existing 0-550 psig Cameron-Barton 288A with re-ranged 0-1035 psig Cameron-Barton 288A. As a compensatory action until the replacements of the existing 0-550 psig Cameron-Barton 288As are completed, calibration surveillance frequency has been changed from 90 days to 45 days on Unit 1, and 30 days on Unit 2.

**Corrective Action References:** CR-2018-08976, AR-2018-09404, CR-2018-09041, CR-2018-09363, CR-2015-06243

Performance Assessment:

**Performance Deficiency:** The inspectors determined that the failure to take adequate corrective actions to address the inadequate design of these pressure switches was a performance deficiency reasonably within Susquehanna's ability to foresee and correct, and should have been prevented.

**Screening:** The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and affected the cornerstone objective to ensure the capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, since the permissive setpoints had drifted outside the allowable value, the injection of low pressure from the emergency core cooling system would have been delayed during events for which it was required.

**Significance:** The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations," and determined that since the finding represented a loss of function, a detailed risk assessment was required. In consultation with regional Senior Reactor Analysts, the inspectors determined the finding was of very low safety significance (Green) because the ability to open low pressure emergency core cooling system injection valves manually remained available and engineering analysis for the as-found condition of the switches determined that the resultant delay in automatic response would have a negligible increase in peak central temperature during a design basis accident.

**Cross-Cutting Aspect: H.13 - Consistent Process:** Individuals use a consistent, systematic approach to make decisions. Risk insights are incorporated as appropriate. Specifically, the corrective actions for the previous LIV were cancelled on June 5, 2017, on a decision that replacement with Cameron-Barton 288As would be used to complete the corrective actions, despite the design and function remaining the same.

Enforcement:

**Violation:** 10 CFR Part 50 Appendix B, Criterion XVI, "Corrective Action," requires, in part, "conditions adverse to quality are promptly corrected." Additionally, TS 3.3.5.1 requires four channels of reactor steam dome pressure - low (Injection permissive) for CS (function 1.d) and LPCI (function 2.d) to be operable or to declare CS and LPCI, respectively, inoperable and take the appropriate actions per TS 3.5.1. With one CS and one LPCI subsystem inoperable, entry into Limiting Condition for Operation (LCO) 3.0.3 is required which would

require the unit to enter Mode 2 within 7 hours, Mode 3 within 13 hours, and be in Mode 4 within 37 hours.

Contrary to this, despite identifying a condition adverse to quality in 2015 associated with design control measures related to the Barton 288A pressure switches used for the CS and LPCI permissives, implementation of the CAP did not assure that the condition adverse to quality was promptly corrected. This resulted in multiple occurrences when Susquehanna Unit 1 and 2 remained in Mode 1 when less than the required number of channels were operable:

- Between October 20, 2017 and December 5, 2017, two of four reactor steam dome pressure - low channels on Unit 2 had drifted to below the TS acceptance criteria.
- Between March 6, 2018 and June 5, 2018, one of four reactor steam dome pressure - low channels on Unit 1 had drifted to below the TS acceptance criteria.
- Between May 3, 2018 and June 6, 2018, one of four reactor steam dome pressure - low channels on Unit 2 had drifted to below the TS acceptance criteria.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The disposition of this violation closes LERs 05000388-2017-010-00, 05000388-2017-010-01, and 05000387;388-2018-005-00.

Work Instructions Insufficient to Maintain Control Room Envelope In-Leakage Within Specification			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000387/388/2018004-03 Closed	None	71152
<p>The inspectors documented a self-revealing Green NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for work instructions that were not sufficient to ensure the 'A' CREOASS filter train door gaskets were replaced in a manner that would maintain CRE in-leakage within specification. This also resulted in an associated violation of TS 3.7.3. Specifically, the preventive maintenance activity for replacing filter train fan plenum door gaskets did not ensure the gaskets were fully glued into the entire channel and resulted in the CRE in-leakage not remaining within specification.</p>			
<p><b>Description:</b> The inspectors reviewed CR-2017-17458 and CR-2017-17463 which described the discovery of a condition on October 6, 2017, where the control room habitability envelope did not pass an in-leakage surveillance test and was declared inoperable. Operators completed actions required by the applicable TSs to evaluate the condition and ensure compensatory measures were in place to limit the dose consequence to control room operators in the event of a postulated fuel handling accident or design basis loss of coolant accident. Susquehanna staff completed an engineering evaluation which determined the in-leakage remained within the station's design analysis for toxic chemical release and smoke. Subsequent troubleshooting determined the source of the leak was from one of the 'A' CREOASS filter train fan plenum door gasket joints where the gasket had rolled out of position. The condition was repaired and the in-leakage test was completed with satisfactory results. Susquehanna's subsequent causal evaluation determined that during gasket replacements in 2012/2013, the gaskets were not completely glued onto the surface of the channel, apparently allowing one of the plenum door gaskets to roll out of position as the door was being secured.</p>			

In review of the causal evaluation, the inspectors determined the control structure heating ventilation and air conditioning (HVAC) system maintains the environmental conditions in various control structure areas for personnel habitability and equipment operation during normal, transient, and accident conditions. The HVAC system also isolates the control structure from outside radiological, toxic chemical, and fire hazards through use of the CREOASS.

TS 5.5.14 requires a CRE habitability program be established and implemented to ensure that CRE habitability is maintained such that CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. Susquehanna establishes their CRE habitability program in NDAP-QA-0424. SO-030-150, "72 Month Control Structure Habitability Envelope Walkdown," is the procedure used to implement Section 6.2.1 of NDAP-QA-0424, "CRE Material Condition." Preventive Maintenance (PM) Activity, M1947-03, Control Structure Boundary CREOASS Envelope Smoke Test, is used in SO-030-150 to verify the integrity of ducting, expansion joints, and other components between the filters and fans.

Corrective Actions: The gaskets on the filter train and fan plenum doors were replaced and retested. Additionally, a step was added in the work scope of the PM activities for replacing gaskets to ensure that the gasket is entirely glued into the channel such that the gasket is in contact with the entire channel. Further, Susquehanna entered AR-2017-20100 into their CAP to perform an after-action review and enhance the surveillance and/or testing methodologies.

Corrective Action References: CR-2017-17463, AR-2017-20100

Performance Assessment:

Performance Deficiency: Performing quality activities with insufficiently-detailed instructions and procedures did not ensure the 'A' CREOASS train in-leakage was maintained to meet TS 3.7.3. Specifically, Work Orders 1646642 and 1646645, completed on November 27, 2013, did not include adequate instructions to ensure the 'A' CREOASS filter train fan plenum door gaskets were entirely glued into the door channels such that the gaskets were in contact with the entire channel. This performance deficiency was reasonably within Susquehanna's ability to foresee and correct, and should have been prevented.

Screening: The inspectors determined the performance deficiency was more than minor because it adversely affected the Barrier Performance attribute of the Barrier Integrity cornerstone and its objective to maintain radiological barrier functionality of the control room.

Significance: The inspectors assessed the significance of the finding using IMC 0609.04, "Initial Characterization of Findings," and IMC 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions." The inspectors determined that this finding was a deficiency representing a degradation of the radiological barrier function provided for the control room. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

Cross-Cutting Aspect: Since the underlying performance deficiency occurred in 2013, the inspectors determined that the performance characteristic is not reflective of current performance.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires "activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

Contrary to the above, on November 27, 2013, work order instructions utilized to replace the gaskets on the 'A' CREOASS filter train were not appropriate to the circumstances to ensure the gaskets were fully glued into the channel to ensure they maintained their design function.

The inspectors noted this violation is also associated with a violation of TS 3.7.3, "Control Room Emergency Outside Air Supply (CREOAS) System," which requires two CREOAS subsystems to be operable in Modes 1, 2, and 3. With one or more CREOAS subsystems inoperable due to an inoperable CRE boundary in Modes 1, 2, and 3, the CRE boundary is required to be restored to an operable status within 90 days or both units must be in Mode 3 within 12 hours and Mode 4 within 36 hours.

Contrary to this, the CRE boundary was inoperable from November 27, 2013, and the station remained in Mode 1. It is noted that there were periods between these dates that the station was not in Mode 1, 2, or 3 as well as periods in which Mode 1, 2, or 3 were entered from a Mode in which TS 3.7.3 was not applicable. It is also noted that there were various times between November 27, 2013, to October 6, 2017, in which the movement of irradiated fuel assemblies in the secondary containment occurred, core alterations occurred, and operations with the potential for draining the reactor vessel occurred with the CRE boundary inoperable. Susquehanna reported this condition in accordance with 10 CFR 50.73(a)(2)(i)(B) per LER 05000387/388-2017-006-01.

Disposition: These violations are being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

The disposition of this violation closes LER 05000387/388-2017-006-00 and LER 05000387/388-2017-006-01.

Unit 1 'D' Outboard Main Steam Isolation Valve Exceeded Individual Valve Leakage Limit Resulting in Condition Prohibited by Technical Specification			
Cornerstone	Severity	Cross-Cutting Aspect	Report Section
Not Applicable	Severity Level IV NCV 05000387/2018-004-04 Closed	Not Applicable	71153
A Severity Level IV NCV of Unit 1 TS 3.6.1.3 was self-revealed when the outboard 'D' MSIV exceeded the allowed leakage rate for an individual MSIV of $\leq$ 100 standard cubic feet per hour (scfh). Specifically, during local leak rate testing in April 2018, the outboard 'D' MSIV leakage was measured at 116 scfh.			
<u>Description:</u> During local leak rate testing conducted during the Unit 1 refueling outage, combined as-found leakage through the inboard MSIV (HV141F022D) and outboard MSIV (HV141F028D) in the 'D' main steam line was 167 standard cubic feet per hour (scfh).			

Subsequent testing on April 5, 2018, measured the leakage through HV141F028D as 116 scfh, which exceeded the TS 3.6.1.3 limit of 100 scfh for individual valve leakage.

As-found inspection identified guide rib degradation, pilot poppet seating surface degradation, and minor in-body seat indications. As-found valve internal mapping data measured a relatively flat in-body seating surface, with a 0.001" high spot at the 270° seat location. As-found blue check of the pilot poppet seating surface identified seat distortion (wide and uneven contact line). Pilot poppet and pilot poppet seat degradation were determined to be the main source of the as-found leakage.

Inspectors reviewed previous test results and did not identify any trend that was indicative of valve degradation. Additionally, inspectors reviewed the maintenance practices for the MSIV and determined they appropriately incorporated industry standards and operating experience available at the time.

Corrective Actions: HV141F028D internal inspection and repair was performed. Based on discussions and evaluation with the original equipment manufacturer, a repair plan was developed that included lapping of the in-body seat, lapping of the pilot poppet and seating surface, skim cut of the main poppet hard face surface, and clean-up of the identified guide rib degradation. Post-repair leakage through HV141F028D was 61 scfh.

Corrective Action References: CR-2018-05211, CR-2018-05082, CR-2018-05752, CR-2018-05744

Performance Assessment: The inspectors determined the failure to maintain leakage through the 'D' inboard MSIV within limits was not reasonably foreseeable and preventable by the licensee and therefore is not a performance deficiency.

Enforcement: The Reactor Oversight Process' significance determination process does not specifically consider a violation without a finding in its assessment of licensee performance. Therefore, it is necessary to address this violation which does not have an associated performance deficiency using traditional enforcement to adequately deter non-compliance.

Violation: TS 3.6.1.3, "Primary Containment Isolation Valves," LCO requires each primary containment isolation valve shall be operable. Surveillance Requirement 3.0.1 states, in part, "failure to meet a surveillance shall be failure to meet the LCO."

Contrary to the above, there is firm evidence that the leakage through the outboard 'D' MSIV exceeded Surveillance Requirement 3.6.1.3.12 leakage limit sometime during the operating cycle between April 2016 and April 2018 without either isolating the affected flow path by closing and deactivating the inboard MSIV or placing Unit 1 in least hot shutdown within 12 hours or in cold Shutdown within 36 hours.

Severity: The NRC Enforcement Policy, Section 2.2.1 states, in part, that, whenever possible, the NRC uses risk information in assessing the safety significance of violations. The inspectors evaluated the issue using IMC 0609.04, "Initial Characterization of Finding," and IMC 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions."

The inspectors determined that the issue did not represent an actual open pathway in the physical integrity of reactor containment since the containment isolation logic would have closed both MSIVs and the inboard MSIV leak rate was within the TS requirements so the issue could be screened to Green. The inspectors determined that the issue is of very low

safety significance and concluded that the violation would be best characterized as Severity Level IV.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

The disposition of this violation closes LERs 05000387-2018-003-00 and 05000387-2018-003-01.

Minor Violation	71153
<p>Minor Violation: On April 2, 2018, Susquehanna submitted LER 05000388-2017-008 for a condition prohibited by TSs that occurred on December 3, 2017. In NRC Inspection Report 05000387(388)/2018001, a LIV was issued for the underlying performance deficiency associated with the issue. 10 CFR 50.73 states, in part, that “a nuclear power plant shall submit an event report within 60 days after the discovery of a condition which was prohibited by the Plant’s Technical Specification.” Contrary to this, Susquehanna did not issue an event report within 60 days for a condition that was prohibited by TSs.</p> <p>Screening: The inspectors determined the performance deficiency was minor because, while the station made the report late, it did not impact the regulatory oversight function. The NRC’s Enforcement Policy provides an example of a Severity Level IV violation as a failure to make a report required by 10 CFR 50.73. However, it also states that the severity level of an untimely report, in contrast to no report, may be reduced depending on the circumstances. In this case, Susquehanna had actions in the CAP to evaluate the reportability of the issue and, through an administrative error, did not complete the action in a timely manner consistent with the requirements of 10 CFR 50.73. However, inspectors determined that the additional time that Susquehanna took to make the report did not impact the regulatory oversight function and represented a minor violation of 10 CFR 50.73. The underlying performance issue had been previously documented as a Green LIV in Inspection Report 05000387(388)/2018001.</p> <p>Enforcement: This failure to submit the report within 60 days as required by 10 CFR 50.73 constitutes a minor violation that is not subject to enforcement action in accordance with the NRC’s Enforcement Policy.</p> <p>The disposition of this violation closes LER 05000387/388-2017-008-00.</p>	

Observations	71152- Semiannual Trend Review
<p>The inspectors performed a semi-annual review of site issues to identify trends that might indicate the existence of more significant safety concerns. As part of this review, the inspectors included repetitive or closely-related issues documented by Susquehanna in the CAP database, trend reports, site performance indicators, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or CAP backlogs. The inspectors also reviewed how Susquehanna’s CAP evaluated and responded to individual issues identified by the NRC inspectors during routine plant walkdowns and daily condition report reviews.</p> <p><u>Use of Stop Work Criteria.</u> The inspectors observed how the station used the human performance tool of “stop work criteria.” Over the past several years there have been</p>	

instances of unplanned plant transients caused in part by human errors during work activities that could have been prevented by stopping work in order to gain supervisory or peer guidance, procedure clarification, or to address questions or concerns that emerged in the field. Stop work criteria provide guidance to plant staff as to which situations they must stop in the face of uncertainty, as well as the requirements in order to proceed with work. Not only is this practice a key factor in preventing unwanted consequences, such as equipment damage or an unplanned reactor power transient, but it is a key element of a site's safety culture, as it is a manifestation of the "questioning attitude," "decision making," and "environment for raising concerns" safety culture attributes. By empowering employees to stop work when unsure, and giving positive feedback for having averted a potentially negative outcome, the cultural norm is established and strengthened that workers can raise safety concerns and that there is not schedule pressure to get the job done if they are unsure how to proceed. The inspectors noted numerous positive examples of the use of stop work criteria, including an example of an operator identifying a discrepancy between a system print and actual system configuration. By applying stop work criteria, the discrepancy was resolved and the system configuration and expected response were understood prior to manipulating any components. In another example, a maintenance technician raised a question about the accuracy of a test set up and whether it could be performed as written, and would meet the intent of testing. By using stop work criteria, the maintenance team was able to discuss the test requirements with the control room operators and determine the proper testing, as well as the appropriate test procedure, to satisfy surveillance requirements. In another example, the control room team used stop work criteria during a reactor startup when they realized that, unexpectedly, the operator at the controls had been issued the wrong revision of the control rod pull sheet. This use of stop work criteria enabled the entire team, including licensed reactor operators and engineers, to evaluate plant conditions, confirm that the rods had been pulled in the proper sequence up to that point, and determine that the correct and intended pull sheets were being used for the rest of the startup.

Housekeeping in the plant affecting seismic qualification. The inspectors continued to monitor for the presence of unrestrained items being left in locations where they could adversely impact installed plant equipment. Based on previous observations by the inspectors, the licensee instituted an action in their CAP to evaluate, correct, and monitor the trend of housekeeping issues. The licensee updated their station procedure NDAP-QA-0503, "General Housekeeping, Transient Material and Internal Cleanliness," to specify that all transient material shall be located such that it will not impact any plant equipment, and issued a station communication to all personnel to share information about this procedure change as well as to emphasize housekeeping expectations.

During a plant walkdown, the inspectors noted one recent example of improperly stowed ladders left in the vicinity of RHR system components in Unit 1. The ladder was promptly stowed appropriately, and a condition report was generated so that the configuration could be assessed for its potential impact on operability of the system. Notwithstanding this, the inspectors noted an overall trend of fewer housekeeping issues during their routine plant walkdowns over the past several months. The inspectors also noted several examples during their daily CAP review of proactive efforts by station managers, supervisors, and other staff to find and self-correct any instances of improperly stowed items. The inspectors also noted that the station's response has evolved from simply correcting the housekeeping issues as they find them to identifying actions to prevent the issues from occurring in the future, such as a manager documenting in a corrective action report all the recommended locations to permanently install additional ladder racks.



Observations	71152 Annual Follow-up of Selected Issues
<p data-bbox="203 296 1414 359"><u>Condition Report CR-2016-24687, 'A' Recirc Pump Tripped and CR-2017-16089, Unexpected Trip of the Unit 1 'A' Recirc Pump</u></p> <p data-bbox="203 396 1406 558">During 2016 and 2017, there were multiple trips of the Unit 1 'A' reactor recirculation pump that resulted in significant and unexpected transients on the plant. The reactor recirculation pump trips were unrelated to each other. The inspectors reviewed these events to determine if a larger issue exists with the maintenance and operation of reactor recirculation pumps at the station.</p> <p data-bbox="203 598 1409 760">Susquehanna performed a cause analysis on the events under CR-2016-24687 and CR-2017-16089. The causal evaluations determined that the direct causes of both these trips were unrelated. Corrective actions taken by Susquehanna addressed the individual, and unrelated, causes of these trips which included improving breaker maintenance practices and replacing faulty trip relays.</p> <p data-bbox="203 800 1385 890">The inspectors reviewed the technical adequacy and depth of evaluations performed by the licensee for these issues. The inspectors also evaluated the licensee's development and implementation of corrective actions in this area and concluded that they were reasonable.</p>	

Observations	71152 Annual Follow-up of Selected Issues
<p data-bbox="203 1037 1406 1199">The inspectors performed an in-depth review of Susquehanna's evaluations and corrective actions associated with CR-2017-17458 and CR-2017-17463 for in-leakage into the Control Structure HVAC system with CREOASS 'A' in-service exceeding the TS 3.7.3 limit of 500 cubic feet per minute (cfm). On October 6, 2017, the unfiltered in-leakage was determined to be 222 cfm plus an uncertainty of 458 cfm for a total of 680 cfm.</p> <p data-bbox="203 1239 1393 1400">The inspectors interviewed engineering staff and reviewed Susquehanna's evaluation, the applicable LER and supplement, and past maintenance activities to assess the cause of the in-leakage. The inspectors noted that operators implemented and verified mitigating actions and restored the CRE boundary to an operable condition per TS requirements following the failed surveillance.</p> <p data-bbox="203 1440 1393 1570">The inspectors observed the testing methodology had a high uncertainty value added to the measured in-leakage during the October 6, 2017 tracer gas testing (SO-030-151). The inspectors noted that Susquehanna has this item tracked under AR-2017-20100 as an after-action review to enhance their testing methodologies.</p> <p data-bbox="203 1610 1414 1871">The inspectors determined that Susquehanna may have missed opportunities to detect and correct the problem with the filter plenum door gaskets prior to the 2017 testing. In review of documentation, the inspectors determined that in 2014, during performance of procedure SO-030-150, Susquehanna staff did not perform smoke tests under PM activity M1947-03 per procedure step 5.1, because a note was entered that indicated the smoke test was performed during SE-030-A09 (RTPM 1297110) and SE-030-B09 (RTPM 1034529). However, the inspectors determined this was in error because the referenced RTPMs involved the 'A' and 'B' CREOASS HEPA and Charcoal Adsorber Filter Flow Tests performed in 2012 and 2008</p>	

respectively, and the inspectors' review indicated these PMs did not include a smoke test activity. The inspectors noted this issue was missed in the causal evaluation, but is an observation because it was not a cause of the violations.

The inspectors observed that work package RTPM 1830382, M1947-03, Control Structure Boundary A – CREOASS Envelope Smoke Test, performed in August 2015, included a statement that indicated the 'A' CREOASS boundary areas identified in the work order and by walk down with an engineer were smoke tested and did not identify any leaks. It was not clear why this was unsuccessful in identifying the problem at that time. The inspectors noted Susquehanna's action tracked under AR-2017-20100 was intended to review and to enhance testing methodologies.

Finally, the inspectors noted comments in Work Package 1830328, which indicated Susquehanna staff found difficulty with the instructions and were looking for clearer directions as to where to perform the smoke tests. Consistent with this feedback included in the work package, the inspectors observed that work order instructions with titles for 'B' CREOASS door seal replacement maintenance activities in 2012 and 2014 (1584182, 1651344, and 1651349) contained text in the scope referring to replacing all Access Door seals (gaskets) on 'A' CREOASS filters, fan, and duct heater, which is not the correct component for the activity.

#### **EXIT MEETINGS AND DEBRIEFS**

The inspectors verified no proprietary information was retained or documented in this report.

- On January 17, 2018, the inspectors presented the quarterly resident inspector inspection results to Mr. Kevin Cimorelli, Site Vice President, and other members of the Susquehanna staff.

**DOCUMENTS REVIEWED****71111.01**Procedures

NDAP-00-1913, Seasonal Readiness, Revision 12

Condition Reports

CR-2018-12177      CR-2018-15394      CR-2018-16062

**71111.04**Drawings

M-2156, Unit 2 P&ID HPCI Lubricating and Control Oil, Sheet 2, Revision 11

M-2156, Unit 2 P&ID HPCI Turbine Pump, Sheet 1, Revision 31

**71111.06**Miscellaneous

EC-FLOD-0001, Internal Flooding Evaluations for Moderate Energy Pipe Cracks and Sprinkler system Actuators, Revision 3

**71111.12**Condition Reports

CR-2017-17183      CR-2018-12662

Action Requests

AR-2018-03388

Work Orders

2041262

Miscellaneous

EDU-FUS-0044, Ferraz/Gould-Shawmut Tri-ionic Delay Fuse, Revision 1

**71111.13**Condition Reports

CR-2018-13966      CR-2018-13692      CR-2018-14769

Action Requests

AR-2018-09241      AR-2018-09244      AR-2018-09246      AR-2018-12293

Drawings

C-905, Diesel Generator Building Floor Plan El. 723'0" Areas 43 &44, Sheet 1, Revision 10

Miscellaneous

Yellow CDF Risk RMA's for the Week of 10/1/18, 10/15/18 and 10/29/18

Dedication Document CDU-CON-0002-L, Proprietary Concrete, Revision 2

**71111.15**Procedures

NDAP-QA-0633, Diesel Fuel Oil Testing Program, Revision 9  
 CH-CC-088, Diesel Fuel Oil Particulate Contaminant Test, Revision 5  
 SC-023-003, 31 Day Particulate Analysis and Water Check on 'A' EDG Fuel Oil Storage Tank,  
 Revision 14  
 SC-023-003, 31 Day Particulate Analysis and Water Check on 'A' EDG Fuel Oil Storage Tank,  
 Revision 13  
 SO-153-004, Quarterly SBLC Flow Verification, Revision 45

Condition Reports

CR-2018-03082	CR-2018-03094	CR-2018-13637	CR-2018-13691
CR-2018-13755	CR-2018-13784	CR-2018-14871	CR-2018-15106

Action Requests

AR-1145281	AR-2018-06725	DI-2018-03328
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Miscellaneous

NDAP-QA-0633, Attachment A, Revision 9  
 Regulatory Guide 1.137, Fuel Oil Systems for Emergency Power Supplies, Revision 2  
 Regulatory Guide 1.137, Fuel Oil Systems for Standby Diesel Generators, Revision 1  
 CH-024-002, Em Fuel Oil, Revision 16  
 ASTM, D6217-18, Standard Test Method for Particulate Contamination in Middle Distillate Fuels  
 by Laboratory Filtration  
 ASTM, D4176-93, Standard Test Method for Free Water and Particulate Contamination in  
 Distillate Fuels (Visual Inspection Procedures)  
 ASTM, D975-10c, Standard Specification for Diesel Fuel Oils  
 EC-PUPC-20902, EPU Task Report T0902- Anticipated Transients Without Scram, Revision 1

**71111.18**Procedures

TP-003-014A, Open Phase Protection System- Commissioning Test, Revision 0

Condition Reports

CR-2018-05541	CR-2018-14684
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Action Requests

DI-2016-24039	AR-2018-05669	AR-2018-08036	AR-2018-08158
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Work Orders

2187755	2195690
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Drawings

FF61607, OA/FA/FA Transformer UTT Tap Changer Control Wiring Diagram, Sheet 13  
 FF62000, Nozzle Type Relief Valve, Sheet, 229, Revision 1

Miscellaneous

EC 1936652, Open Phase Detection Unit 2- T20

IEEE Std. 308-1974, IEEE Standard Criteria for Class IE Power Systems for Nuclear Power  
 Generating Stations  
 EC 2167267, Replacement Motor for HV151F021A  
 EC-PIP-1286, Revision 4  
 EWR-2018-05624  
 EC-049-1034, Maximum Thrust and Seismic Analysis for MOV Limiting Component Analysis for  
 HV151F021A/B, HV251F021A/B, Revision 2  
 EC-VALV-1073, Actuator Sizing and Diagnostic Test Acceptance Criteria for GL-89-10AC (Unit  
 1) Rising Stem MOVs, Revision 47  
 Design Change Package, Delete the LOOP B ESW Guard Pipe Drain Vlv 011018 and repair  
 Penetration X-56-1-40, Revision 0  
 DBD042, Standby Liquid Control System DBD042, Revision 4

### **71111.19**

#### Procedures

SO-250-002, Quarterly RCIC Flow Verification, Revision 54

#### Work Orders

2214478      2222800      2222838      2223210      2223229      2223232

### **71111.22**

#### Procedures

SO-024-001C, Monthly Diesel Generator 'C' Operability Test, Revision 28  
 SO-160-001, Quarterly LOCA Test of Drywell Area Unit Cooler/Fans, Revision 18

#### Work Orders

2215282

### **71114.04**

#### Emergency Action Level and Emergency Plan Changes

E2018-03-21-01, Unit 1 Hardened Containment Vent Modification EAL Basis  
 S2018-04-07-01, EP115 EITER Program Revision 12  
 E2018-04-26-01, Remove onsite Siren Base Station  
 S2018-05-16-01, Remove the Assistant Recovery Manager from the Emergency Response  
 Organization

### **71124**

#### Miscellaneous

Shipments: 17-046; 17-047; 18-043; 18-047; 18-057

### **71151**

#### Action Requests

DI-2016-25419      DI-2016-27382      DI-2017-19307      DI-19313

**71152**Calculations

EC-030-1018, Response to NEI 99-03 Control Room Habitability Guidance; Appendix A Smoke Evaluation, Revision 0  
 EC-030-1019, SSES Control Room Habitability Envelope Hazardous Chemical Analysis, Revision 2  
 EC-RADN-1125, CRHE and Off Site Post LOCA Doses, Revision 6

Completed Surveillance, Performance, and Functional Tests

RTPM 1034529, SE-030-B09, "B" CREOASS HEPA Filter and Charcoal Adsorber In-Place Leak Test, performed 9/24/08  
 RTPM 1297110, SE-030-A09, "A" CREOASS HEPA Filter and Charcoal Adsorber In-Place Leak Test, performed 8/3/12  
 RTPM 1830382, M1947-03, Control Structure Boundary A – CREOASS Envelope Smoke Test, performed 8/26/15  
 SO-130-150, 72 Month Control Structure Habitability Envelope Walkdown, performed 12/21/12, 10/23/14  
 SO-030-151, Control Structure Boundary Envelope Air In-Leakage Via Tracer Gas Testing, performed on 10/3/17 and 12/3/17  
 SO-030-A01, Monthly Control Room Emergency Outside Air Supply System A Operability Test, performed on 9/19/18

Condition Reports

1537511                      2017-17458                      2017-17463

Drawings

E106683, Sht. 1, Common P&ID HVAC Control Diagram, Control Structure, Revision 38  
 E106683, Sht. 2, Common P&ID HVAC Control Diagram, Control Structure, Revision 22

Miscellaneous

2012 Apparent Cause Evaluation for CR 1537511, 'B' CREOASS Filter Train Access Door Leak, Revision 2  
 RG 1.197, Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors, May 2003  
 RG 1.52, Design, Testing, and Maintenance Criteria for Post-Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Absorption Units of Light Water Cooled Nuclear Power Plants, Revision 2  
 RG 1.78, Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release, Revision 1

Work Orders

1584182            1646642            1646645            1651344            1651349

PMs

M1947-03 Control Structure Boundary CREOASS Envelope Smoke Test, performed 3/1/12, 8/26/15, 9/27/18

Procedures

NDAP-QA-0424, Control Room Envelope Habitability Program, Revision 3

**71153**Condition Reports

CR-2015-06243	CR-2016-25806	CR-2017-20327	CR-2017-20328
CR-2018-05211	CR-2018-08976		

Action Requests

AR-2016-02379	AR-2016-26848	AR-2017-20607	AR-2018-13682
AR-2018-02286	AR-2018-07962		

Work Orders

2016086

Miscellaneous

EC-RADN-1183, CRHE Dose Analysis Input for LER 50-387/2018-003-00 for U1-20RIO D MSIV  
Leakage Testing, Revision 0