



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
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August 11, 2022

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

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 – BIENNIAL
PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT
05000387/2022010 AND 05000388/2022010

Dear Brad Berryman:

On June 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution inspection at your Susquehanna Steam Electric Station, Units 1 and 2 and discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspection team reviewed the station's problem identification and resolution program and the station's implementation of the program to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC regulations and licensee standards for problem identification and resolution programs. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

The team also evaluated the station's processes for use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

Finally, the team reviewed the station's programs to establish and maintain a safety-conscious work environment, and interviewed station personnel to evaluate the effectiveness of these programs. Based on the team's observations and the results of these interviews the team found no evidence of challenges to your organization's safety-conscious work environment. Your employees appeared willing to raise nuclear safety concerns through at least one of the several means available.

Four findings of very low safety significance (Green) are documented in this report. Two of these findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations documented in this inspection report, 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 Susquehanna Steam Electric Station, Units 1 and 2.

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 Susquehanna Steam Electric Station, Units 1 and 2.

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 at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

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

Docket Nos. 05000387 and 05000388
License Nos. NPF-14 and NPF-22

Enclosure:
As stated

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SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 – BIENNIAL
PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT
05000387/2022010 AND 05000388/2022010 DATED AUGUST 11, 2022

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers: 05000387 and 05000388

License Numbers: NPF-14 and NPF-22

Report Numbers: 05000387/2022010 and 05000388/2022010

Enterprise Identifier: I-2022-010-0014

Licensee: Susquehanna Nuclear, LLC

Facility: Susquehanna Steam Electric Station, Units 1 and 2

Location: Berwick, PA

Inspection Dates: June 6, 2022 to June 24, 2022

Inspectors: L. Casey, Senior Project Engineer
M. Rossi, Resident Inspector
R. Vadella, Project Engineer
G. Walbert, Project Engineer

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

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a biennial problem identification and resolution inspection at Susquehanna Steam Electric Station, Units 1 and 2, 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.

List of Findings and Violations

Failure to Implement Relevant Operating Experience Results in Reactor Scram			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000387/2022010-01 Open/Closed	None (NPP)	71153
A self-revealed Green finding was identified when Susquehanna Unit 1 scrambled due to a main turbine trip caused by a ground fault and subsequent investigation revealed a failure to implement relevant operating experience. Specifically, Susquehanna failed to evaluate industry operating experience regarding the susceptibility of isophase baffles to experience fatigue failures due to increased airflow and the need for more intrusive inspections of the isophase baffles in sufficient depth to ensure all applicable aspects were considered.			

Failure to Take Timely Corrective or Mitigative Actions Results in a Reactor Scram			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000387/2022010-02 Open/Closed	[P.2] - Evaluation	71153
A Green finding was self-revealed when Susquehanna Unit 1 scrambled after the fast closure of control valve 4 (CV-4) during turbine stop valve testing. Subsequent investigation revealed that a similar condition occurred during the previous performance of turbine stop valve testing, but Susquehanna failed to perform timely troubleshooting to understand the issue or implement mitigating/bridging strategies prior to the next performance of turbine stop valve testing.			

Failure to Identify Damage to Residual Heat Removal Service Water Pump Cabling Resulting in Inoperability Longer Than Allowed by Technical Specifications			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000387/2022010-03 Open/Closed	[H.11] - Challenge the Unknown	71153
A self-revealed Green finding and associated non-cited violation (NCV) was identified when the 1B residual heat removal service water (RHRSW) pump cabling was damaged during excavation work but was not promptly identified and corrected. Specifically, Susquehanna did not promptly identify that one train of RHRSW had become inoperable due to inadequate investigation into the damage that occurred to a conduit and cable during site excavation to support an unrelated maintenance activity.			

Failure to Correct a Degrading Trend Caused Unit 2 'B' Reactor Protection System and Containment Isolation System to Be Inoperable for Longer Than Allowed by Technical Specifications			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000388/2022010-04 Open/Closed	[H.5] - Work Management	71153
A self-revealed Green finding and associated NCV was identified when the Unit 2 'B' reactor vessel water level narrow range, LIS-B21-2N024B, microswitch 1A adverse performance trend was not corrected prior to the 1A microswitch being declared inoperable on December 15, 2021. Specifically, Susquehanna identified an adverse trend in the 1A microswitch surveillance test performance and created a work order to replace the microswitch, but never scheduled and performed the work order.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000387/2021-003-00	LER 2021-003-00 for Susquehanna Steam Electric Station, Unit 1, Automatic Reactor Scram Due to Main Turbine Trip	71153	Closed
LER	05000387/2021-003-01	LER 2021-003-01 for Susquehanna Steam Electric Station, Automatic Reactor Scram Due to Main Turbine Trip Caused by a 'C' Isophase Bus Ground Fault	71153	Closed
LER	05000388/2021-002-00	LER 2021-002-00 for Susquehanna Steam Electric Station re Loss of Secondary Containment	71153	Closed
LER	05000388/2021-005-00	LER 2021-005-00 for Susquehanna Steam Electric Station Unit 2, Condition Prohibited by Technical Specification Due to Setpoint Drift	71153	Closed
LER	05000387/2021-005-00	LER 2021-005-00 for Susquehanna Steam Electric Station, Unit 1, Automatic Reactor Scram Due to Turbine Control Valve Fast Closure	71153	Closed
LER	05000388/2021-005-01	LER 2021-005-01 for Susquehanna Steam Electric Station, Unit 2, Condition Prohibited by Technical	71153	Closed

		Specification Due to Setpoint Drift Attributed to Age Related Degradation		
LER	05000388/2021-002-01	LER 2021-002-01 for Susquehanna Steam Electric Station, Unit 2, Loss of Secondary Containment Due to Failed Differential Pressure Transmitter	71153	Closed
LER	05000387/2021-004-00	LER 2021-004-00 for Susquehanna, Unit 1, Loss of 1B RHRSW Pump due to Cable Damage During Excavation Activities	71153	Closed
LER	05000387/2021-004-01	LER 2021-004-01 for Susquehanna Unit 1, Loss of 1B RHRSW Pump Due to Cable Damage During Excavation Activities	71153	Closed
LER	05000387/2021-005-01	LER 2021-005-01 for Susquehanna Steam Electric Station, Unit 1, Automatic Reactor Scram due to Turbine Control Valve Fast Closure	71153	Closed

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 reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES – BASELINE

71152B - Problem Identification and Resolution

Biennial Team Inspection (IP Section 03.04) (1 Sample)

- (1) The inspectors performed a biennial assessment of the effectiveness of Susquehanna's problem identification and resolution program, use of operating experience, self-assessments and audits, and safety-conscious work environment.
 - Problem Identification and Resolution Effectiveness: The inspectors assessed the effectiveness of Susquehanna's problem identification and resolution program in identifying, prioritizing, evaluating, and correcting problems. The inspectors also conducted a 5-year review of the Unit Common RHRSW and emergency service water systems.
 - Operating Experience: The inspectors assessed the effectiveness of Susquehanna's processes for use of operating experience.
 - Self-Assessments and Audits: The inspectors assessed the effectiveness of Susquehanna's identification and correction of problems identified through audits and self-assessments.
 - Safety-Conscious Work Environment: The inspectors assessed the effectiveness of the station's programs to establish and maintain a safety-conscious work environment.

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (5 Samples)

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

- (1) LER 05000387/2021-003-00, Automatic Reactor Scram Due to Main Turbine Trip (ADAMS Accession No. ML21343A422), and supplement LER 05000387/2021-003-01, Automatic Reactor Scram Due to Main Turbine Trip Caused by a 'C' Isophase Bus Ground Fault (ADAMS Accession No. ML21315A010). The inspection conclusions associated with this LER are documented in this report under the Inspection Results Section, FIN 05000387/2022010-01.
- (2) LER 05000388/2021-002-00, Loss of Secondary Containment (ADAMS Accession No. ML21301A000), and supplement LER 05000388/2021-002-01, Loss of

Secondary Containment Due to Failed Differential Pressure Transmitter (ADAMS Accession No. ML22039A022). 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 did not identify a violation of NRC requirements.

- (3) LER 05000388/2021-005-00, Condition Prohibited by Technical Specification Due to Setpoint Drift (ADAMS Accession No. ML22042A673), and supplement LER 05000388/2021-005-01, Condition Prohibited by Technical Specification Due to Setpoint Drift Attributed to Age Related Degradation (ADAMS Accession No. ML22101A186). The inspection conclusions associated with this LER are documented in this report under the Inspection Results Section, NCV 05000387/2022010-03.
- (4) LER 05000387/2021-005-00, Automatic Reactor Scram Due to Turbine Control Valve Fast Closure (ADAMS Accession No. ML22026A512), and supplement LER 05000387/2021-005-01, Automatic Reactor Scram Due to Turbine Control Valve Fast Closure (ADAMS Accession No. ML22089A238). The inspection conclusions associated with this LER are documented in this report under the Inspection Results Section, FIN 05000387/2022010-02.
- (5) LER 05000387/2021-004-00, Loss of 1B RHRSW Pump Due to Cable Damage During Excavation Activities (ADAMS Accession No. ML21335A100), and supplement LER 05000387/2021-004-01, Loss of 1B RHRSW Pump Due to Cable Damage During Excavation Activities (ADAMS Accession No. ML22080A216). The inspection conclusions associated with this LER are documented in this report under the Inspection Results Section, NCV 05000387/2022010-04.

INSPECTION RESULTS

Assessment	71152B
<p>The inspectors determined that the corrective action program (CAP) for Susquehanna Steam Electric Station, Units 1 and 2, was generally effective and adequately supported nuclear safety and security.</p> <p><u>Problem Identification:</u> The inspectors determined that, in general, Susquehanna identified issues and entered them into the CAP at a low threshold.</p> <p><u>Problem Prioritization and Evaluation:</u> Based on the samples reviewed, the inspectors determined that, in general, Susquehanna appropriately prioritized and evaluated issues commensurate with the safety significance of the identified problem. In most cases, Susquehanna appropriately screened condition reports (CRs) for operability and reportability, categorized CRs by significance, and assigned actions to the appropriate department for evaluation and resolution.</p> <p><u>Corrective Actions:</u> The inspectors determined that, in general, the overall CAP performance related to resolving problems was effective. In most cases, Susquehanna implemented corrective actions to resolve problems in a timely manner.</p>	
Assessment	71152B
<p>Use of Operating Experience: The team determined that, in general, Susquehanna appropriately evaluated industry operating experience for its relevance to the facility. In most cases, Susquehanna appropriately incorporated both internal and external operating</p>	

experience into plant procedures and processes, as well as lessons learned for training and pre-job briefs.

Self-Assessments and Audits: The team reviewed a sample of self-assessments and audits to assess whether Susquehanna was identifying and addressing performance trends. The team concluded that Susquehanna had an effective self-assessment and audit process.

Assessment	71152B
<p>The team interviewed approximately 26 individuals. The purpose of these interviews was to evaluate the willingness of licensee staff to raise nuclear safety issues, to evaluate the perceived effectiveness of the CAP at resolving identified problems, and to evaluate the licensee's safety-conscious work environment. The personnel interviewed were randomly selected by the team from the Operations, Engineering, Maintenance, Site Support Services, Security, Chemistry, Radiation Protection, and Emergency Preparedness work groups. To supplement these discussions, the team interviewed the employee concerns program (ECP) representative to assess his perception of the site employees' willingness to raise nuclear safety concerns. The team also reviewed the ECP case log and select case files.</p> <p>All individuals interviewed indicated that they would raise safety concerns. All individuals felt that their management was receptive to receiving safety concerns and generally addressed them promptly, commensurate with the significance of the concern. Interviewees indicated they were adequately trained and proficient on initiating CRs. All interviewees were aware of the licensee's ECP, stated they would use the program if necessary, and expressed confidence that their confidentiality would be maintained if they brought issues to the ECP. When asked whether there have been any instances where individuals experienced retaliation or other negative reaction for raising safety concerns, all individuals interviewed stated that they had neither experienced nor heard of an instance of retaliation at the site. The team determined that the processes in place to mitigate potential safety-conscious work environment issues were adequately implemented.</p>	

Failure to Implement Relevant Operating Experience Results in Reactor Scram			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000387/2022010-01 Open/Closed	None (NPP)	71153
<p>A self-revealed Green finding was identified when Susquehanna Unit 1 scrambled due to a main turbine trip caused by a ground fault and subsequent investigation revealed a failure to implement relevant operating experience. Specifically, Susquehanna failed to evaluate industry operating experience regarding the susceptibility of isophase baffles to experience fatigue failures due to increased airflow and the need for more intrusive inspections of the isophase baffles in sufficient depth to ensure all applicable aspects were considered.</p> <p><u>Description:</u> On July 21, 2021, Susquehanna Unit 1 scrambled due to a main turbine trip. The cause of the event was a dislodged de-ionizing baffle plate that contacted the 'C' isophase bus causing a ground fault. The root cause was determined to be accelerated wear of the di-ionizing baffle tack welds due to increased isophase bus forced air.</p> <p>In 2004, Susquehanna reviewed significant event report (SER) 4-04 and evaluated the operating experience under department initiative (DI) 602759. This document described the potential of isophase baffles to experience fatigue failures due to increase airflow. However,</p>			

the review did not specifically call out the recommendations contained, therein, nor identify appropriate actions that should be taken due to increased airflow following the subsequent power uprate.

In 2010, Susquehanna reviewed additional operating experience, captured in DI 1308051 and AR 1326975. The operating experience provided insights into the need for more intrusive examinations and inspections of the isophase baffle system to ensure potential failures would be identified. In this review, the station determined that the operating experience was relevant. However, Susquehanna closed the document to actions taken, and did not take any additional actions to perform intrusive inspections of the isophase baffles.

Both instances of operating experience were not fully incorporated into Susquehanna's inspection program for the isophase baffles, which resulted in the 2021 Unit 1 scram.

Corrective Actions: Corrective actions included replacement and tack welding the dislodged and loose baffle plates and implementing an engineering change to modify the Unit 1 main generator-end 'A' and 'C' isophase bus de-ionizer baffle plates to install an aluminum retaining rod to secure the baffle plates together.

Corrective Action References: CR-2021-11002

Performance Assessment:

Performance Deficiency: NDAP-QA-0725, "Operating Experience Review Program," Revision 7 (the procedure that was in effect at the time), section 6.1.5.b.2.a, specified that the station evaluate applicable industry operating experience "in sufficient depth to ensure all applicable aspects discussed in the event report are considered." Contrary to the above, Susquehanna did not evaluate operating experience in sufficient depth to ensure all applicable aspects were considered. Specifically, in 2004 under DI 602759 and again in 2010 under AR 1326975, Susquehanna determined that operating experience was applicable but failed to implement the learnings into their program and develop corrective actions.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Procedure Quality attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to implement changes to the preventive maintenance strategy based on relevant operating experience resulted in a Unit 1 scram in 2021.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding screened to Green because it did not cause a reactor trip AND the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: Not Present Performance. No cross-cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

The disposition of this finding closes LER 05000387/2021-003-00 and 05000387/2021-003-01, Automatic Reactor Scram Due to Main Turbine Trip Caused by a 'C' Isophase Bus Ground Fault.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Failure to Take Timely Corrective or Mitigative Actions Results in a Reactor Scram

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000387/2022010-02 Open/Closed	[P.2] - Evaluation	71153
<p>A Green finding was self-revealed when Susquehanna Unit 1 scrambled after the fast closure of control valve 4 (CV-4) during turbine stop valve testing. Subsequent investigation revealed that a similar condition occurred during the previous performance of turbine stop valve testing, but Susquehanna failed to perform timely troubleshooting to understand the issue or implement mitigating/bridging strategies prior to the next performance of turbine stop valve testing.</p>			
<p><u>Description:</u> On November 30, 2021, while Operations was performing turbine stop valve testing under SO-193-001, a Unit 1 division II reactor protection system (RPS) half scram signal was introduced after the fast closure of control valve 4 (CV-4) while main stop valve 4 (SV-4) was being stroked for testing. An emergency trip system (ETS) pressure perturbation in the electro-hydraulic control system resulted when both CV-4 and SV-4 simultaneously fast closed. The pressure drop in the ETS header resulted in an actuation of one of the two division I RPS low pressure switches that sense control valve fast closures on control valve 1 (CV-1) or control valve 3 (CV-3). This resulted in a half scram on Division I of RPS which then initiated a full scram. All control rods inserted, and operators placed the mode switch to shutdown.</p> <p>Investigations into the cause of the fast closure of CV-4 identified that transient voltage from a ground fault on the CV-4 fast acting solenoid valve (FASV), SV10150D, field wiring energized the solenoid causing CV-4 to fast close.</p> <p>During the most recent previous performance of SO-193-001, "Turbine Valve Cycling," on July 24, 2021, during a forced outage, CV-4 inadvertently fast closed during the test. The test was reperformed satisfactorily, and the issue did not repeat. CR-2021-11142 was generated to document the issue on CV-4 inadvertent closure with an engineering comment that a similar occurrence during online testing could potentially lead to a scram. Although the station identified the potential consequence of a repeat condition, the CR was misclassified as having negligible risk. Due to the misclassification of the risk associated with the condition, the station did not perform troubleshooting to identify the material deficiency or develop mitigating strategies to avoid any potential adverse consequences before the next performance of SO-193-001.</p> <p><u>Corrective Actions:</u> The licensee determined that a transient voltage from a ground fault on the CV-4 FASV, SV10150D, field wiring energized the solenoid causing CV-4 to fast close and subsequently replaced the cable. Additionally, the licensee installed P-port orifices on</p>			

the main turbine control valves and stop valves FASVs to mitigate pressure drops in the ETS header during turbine valve testing evolutions.

Corrective Action References: CR-2021-16804

Performance Assessment:

Performance Deficiency: LS-120, "Issue Identification and Screening Process," Revision 14, section 5.1.1, states that "Personnel should proactively identify and correct problems as soon as practical before consequential events occur." Contrary to the above, after the unexpected CV-4 fast closure during turbine valve testing while the unit was offline in July 2021, Susquehanna failed to proactively correct the cause of the CV-4 fast closure. Specifically, although they had determined that had the condition occurred at power it could have resulted in a scram, Susquehanna failed to perform timely troubleshooting to understand the issue or implement mitigating/bridging strategies prior to the next performance of SO-193-001 at power on November 30, 2021. This was within the licensee'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 Equipment Performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the licensee's failure to correct the issue identified after the previous performance of SO-193-001 or to develop mitigating/bridging strategies prior to the next performance of the surveillance test on November 30, 2021, led to a reactor scram.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding screened to Green because it did not cause a reactor trip AND the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: P.2 - Evaluation: The organization thoroughly evaluates issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance.

The disposition of this finding closes LER 05000387/2021-005-00 and 05000387/2021-005-01, Automatic Reactor Scram Due to Turbine Control Valve Fast Closure.

Enforcement: Inspectors did not identify a violation of regulatory requirements associated with this finding.

Failure to Identify Damage to Residual Heat Removal Service Water Pump Cabling Resulting in Inoperability Longer Than Allowed by Technical Specifications

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000387/2022010-03 Open/Closed	[H.11] - Challenge the Unknown	71153

A self-revealed Green finding and associated non-cited violation (NCV) was identified when the 1B RHRSW pump cabling was damaged during excavation work but was not promptly

identified and corrected. Specifically, Susquehanna did not promptly identify that one train of RHRSW had become inoperable due to inadequate investigation into the damage that occurred to a conduit and cable during site excavation to support an unrelated maintenance activity.

Description: On September 13, 2021, excavation started for repairs of the Unit 1B emergency service water system. On September 23, 2021, during the excavation work, the licensee punctured an unidentified 4-inch steel conduit in three locations with a jackhammer. When this occurred, the licensee stopped work and attempted to identify the conduit that was punctured but was unsuccessful in doing so. Subsequently, the licensee used a borescope to attempt to identify any damage to the cable inside the conduit, however the borescope inspection could not obtain full coverage of the damaged area. Due to limited access through the punctures as well as environmental challenges due to rain, the licensee did not identify any damage. The limitations associated with the borescope inspection were not communicated to site management. As a result, site management supported the determination made by site personnel that the unidentified cables were functional and work could continue. After applying duct seals to the penetrations to prevent water intrusion, excavation work resumed on September 29, 2021.

On October 7, 2021, the 1B RHRSW pump was being run for testing due to work unrelated to the excavation. Approximately 1 hour into the 1B RHRSW pump's post-maintenance test it experienced a ground fault. It was determined that the ground fault was due to the damage that was caused due to puncturing cabling to the 1B RHRSW pump during the excavation work that was not identified during the licensee's prior investigation. The 1B RHRSW pump was determined to be inoperable from the time the conduit was punctured on September 23, 2021. Repairs were made and the 1B RHRSW pump was returned to service on October 11, 2021.

Corrective Actions: The licensee repaired the RHRSW cabling and the 1B RHRSW pump was returned to service on October 11, 2021.

Corrective Action References: CR-2021-14625, CR-2021-13913

Performance Assessment:

Performance Deficiency: LS-120, "Issues Identification and Screening Process," Revision 14, section 5.1.1, states that "Personnel should proactively identify and correct problems as soon as practical before consequential events occur." Contrary to the above, Susquehanna did not identify the conduit that was damaged and the damage that had occurred to the 1B RHRSW pump cable prior to the 1B RHRSW pump test 15 days after the damage occurred which resulted in inoperability of one train of RHRSW for greater than its technical specification allowed outage time. This was within the licensee'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 Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee did not promptly identify that one train of the RHRSW had become inoperable due to poor investigation into the damage that had been caused during excavation.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors determined that the degraded condition represented a loss of the PRA function of one train of a multi-train technical specification system for longer than its allowed technical specification outage time and required a detailed risk evaluation (DRE). Specifically, the 1B RHRSW pump was considered inoperable for a total period of 18 days due to the degraded condition.

The senior reactor analyst (SRA) used the Systems Analysis Programs for Hands-On Evaluation (SAPHIRE), Revision 8.2.6, Susquehanna Standardized Plant Analysis Risk (SPAR) Model, version 8.67 to perform the DRE. The basic event, RSW-MDP-FR-PUMP1B, RHRSW Pump 1B fails to run, was set to TRUE. This was performed to invoke common cause failure potential for the evaluation of the performance deficiency. The SRA also performed a detailed review of one of the dominant basic event contributors to risk relative to the degraded condition. The SRA reviewed Talen calculation EC-RISK-1154, Revision 1, containment isolation and vent system notebook, and noted a value of $3E-3$ was determined for the failure of operators to locally vent containment. This was determined to be reasonable however a value of 0.1 was used to account for uncertainty and provide a bounding value. Therefore, SPAR basic event CVS-XHE-XM-VENTL, Operator fails to vent containment locally, was modified to 0.1 for the base and conditional case.

An 18 day exposure time was used to bound the degraded condition and performance deficiency which included the repair time of the 1B RHRSW pump. The increase in core damage frequency (CDF) for the conditional increased failure to run was calculated to be $7.7E-8$ /year for the internal risk contribution. The dominant core damage sequence consisted of a postulated loss of the instrument air system, with a common cause failure of all of the RHRSW pumps to run, with failure to vent the containment locally. IMC 0609, Appendix A, "Significance Determination Process (SDP) For Findings At-Power," does not require a detailed evaluation of external risk contribution for internal event CDF increases below a $1E-7$ /yr threshold. Additionally, the impact on large early release frequency would not change this risk determination. This issue was determined to be of very low safety significance (Green) for the calculated increase in CDF/yr due to the degraded condition.

Cross-Cutting Aspect: H.11 - Challenge the Unknown: Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected."

Technical Specification 3.7.1 states, in part, that "Two RHRSW subsystems shall be OPERABLE." Condition B states, in part, that with "One Unit 1 RHRSW subsystem inoperable" the licensee is to "Restore the Unit 1 RHRSW subsystem to OPERABLE status within 7 days." Condition D states, in part, that if the "Required Action and associated Completion Time is not met, be in Mode 3 in 12 hours and Mode 4 within 36 hours."

LS-120, "Issues Identification and Screening Process," Revision 14, section 5.1.1, states that "Personnel should proactively identify and correct problems as soon as practical before consequential events occur."

Contrary to the above, on September 23, 2021, Susquehanna did not use established measures to promptly identify and correct a condition adverse to quality. Specifically, Susquehanna did not proactively identify that they had damaged cabling to the 1B RHRSW pump during excavation that caused the pump to be inoperable from September 23 to October 11, 2021. The licensee did not restore the 1B RHRSW pump to an operable status within 7 days and did not place Unit 1 in Mode 3 within 12 hours and in Mode 4 within 36 hours in accordance with the sites Technical Specifications. The 1B RHRSW pump was inoperable for a period of 18 days and Unit 1 remained in Mode 1.

The disposition of this violation closes LER 05000387/2021-004-00 and 387/2021-004-01, Loss of 1B RHRSW Pump Due to Cable Damage During Excavation Activities.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Correct a Degrading Trend Caused Unit 2 'B' Reactor Protection System and Containment Isolation System to Be Inoperable for Longer Than Allowed by Technical Specifications

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000388/2022010-04 Open/Closed	[H.5] - Work Management	71153

A self-revealed Green finding and associated NCV was identified when the Unit 2 'B' reactor vessel water level narrow range, LIS-B21-2N024B, microswitch 1A adverse performance trend was not corrected prior to the 1A microswitch being declared inoperable on December 15, 2021. Specifically, Susquehanna identified an adverse trend in the 1A microswitch surveillance test performance and created a work order to replace the microswitch, but never scheduled and performed the work order.

Description: On December 15, 2021, Unit 2 'B' reactor vessel water level narrow range, LIS-B21-2N024B, microswitch 1A was found outside of the technical specification allowable value (TSAV) during quarterly calibration of reactor vessel water level. As a result, reactor vessel water level-low, Level 3, was declared inoperable and Limiting Condition for Operation (LCO) 3.3.1.1, "RPS Instrumentation," Condition A, for one required channel inoperable and LCO 3.3.6.1, "Primary Containment Isolation Instrumentation," Condition A for one required channel inoperable were entered and exited approximately 2 hours later after microswitch 1A was recalibrated. During the evaluation of the event, it was discovered that there was a trend of microswitch 1A being outside of the TSAV during three of the past four December quarterly tests, which was attributed to a known influence of climate on the switches. After a 2019 surveillance test found the switch outside of the TSAV, Work Order 2312635-0 was created to replace the microswitch based on an engineering evaluation, AR-2020-00430, which identified the adverse trend in microswitch 1A performance compared to other microswitches. Despite engineering recommending that the work order be completed within 1 to 3 weeks and before the next quarterly surveillance, the significance of AR-2020-00430 was downgraded and Work Order 2312635-0 was never scheduled.

Corrective Actions: Upon discovery of the issue the licensee scheduled the work order and the microswitch was replaced in March 2022.

Corrective Action References: CR-2019-15165

Performance Assessment:

Performance Deficiency: Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected." Contrary to the above, Susquehanna failed to correct an adverse trend in the 1A microswitch set point surveillances and replace the switch prior to failure. This was within the licensee'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 Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the site did not promptly identify and correct a potential adverse trend in the set point for microswitch 1A which resulted in the inoperability of the reactor vessel water level-low, Level 3, instrumentation and subsequent entry into LCO 3.3.1.1, Condition A, and LCO 3.3.6.1, Condition A.

Significance: The inspectors assessed the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Specifically, the inspectors utilized IMC 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions" under Section C, "Reactor Protection System (RPS)." As a result, the inspectors determined the finding was of very low safety significance (Green) because the finding did not affect a single RPS trip signal to initiate a reactor scram and the function of other redundant trips or diverse methods of reactor shutdown.

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that "measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected."

Technical Specification 3.3.6.1 states, in part, that "The primary containment isolation instrumentation for each Function in Table 3.3.6.1-1 shall be OPERABLE." Table 3.3.6.1-1 states, in part, that "Function 2.a/7.a Reactor Vessel Water Level – Low, Level 3" is required to have two "Channels per Trip system." Condition A states, in part, that with "One or more required channels inoperable" the licensee is to "Place the channel in trip within 12 hours." Condition C states, in part, that if the "Required Action and associated Completion Time of Condition A is not met, enter Condition referenced in Table 3.3.6.1-1 for the channel immediately." Table 3.3.6.1-1 states, in part, that "for Function 2.a, Condition referenced from required action C.1 is H" and "for Function 7.a, Condition referenced from required action C.1 is G." Condition H states, in part, "As required by Required action C.1 and referenced in Table 3.3.6.1-1, be in Mode 3 in 12 hours and be in Mode 4 in 36 hours." Condition G states,

in part, "As required by Required action C.1 and referenced in Table 3.3.6.1-1, isolate the affected penetration flow path(s) in 24 hours."

Technical Specification 3.3.1.1 states, in part, that "The RPS instrumentation for each Function in Table 3.3.1.1-1 shall be OPERABLE." Table 3.3.1.1-1 states, in part, that "Function 4 Reactor Vessel Water Level – Low, Level 3" is required to have two "Channels per Trip system." Condition A states, in part, that with "One or more required channels inoperable" the licensee is to "Place the channel in trip within 12 hours." Condition D states, in part, that if the "Required Action and associated Completion Time of Condition A is not met, enter Condition referenced in Table 3.3.1.1-1 for the channel immediately." Table 3.3.1.1-1 states, in part, that "for Function 3, Condition referenced from required action D.1 is G." Condition G states, in part, "As required by Required action D.1 and referenced in Table 3.3.1.1-1, be in Mode 3 in 12 hours."

Contrary to the above, Susquehanna failed to correct a condition adverse to quality. Specifically, Susquehanna failed to correct an adverse trend in the LIS-B21-2N024B microswitch set point surveillances and replace the switch prior to failure. As a result, on December 17, 2021, the Unit 2 LIS-B21-2N024B switch 1A was found outside of the TSAV. Based on previous trending, one channel of Reactor Vessel Water Level – Low, Level 3 was inoperable and the licensee did not place the channel in trip within 12 hours and did not place Unit 1 in Mode 3 in 12 hours and in Mode 4 in 36 hours and did not isolate the affected penetration flow path in 24 hours in accordance with the sites Technical Specifications.

The disposition of this violation closes LER 05000388/2021-005-00 and 05000388/2021-005-01, Condition Prohibited by Technical Specification Due to Setpoint Drift Attributed to Age Related Degradation.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

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

- On June 30, 2022, the inspectors presented the biennial problem identification and resolution inspection results to Brad Berryman, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152B	Corrective Action Documents Resulting from Inspection	CR-2022-09606		
71153	Corrective Action Documents	CR-2021-11002	Main Turbine Supervisory System Trouble Alarmed on Unit 1 Followed by Reactor Scram	07/21/2021
		CR-2021-11142	During MSV-4 Valve Test, Received Unexpected CV-4 FAST CLOSURE Alarm	07/24/2021
		CR-2021-16804	Unit 1 Scrammed	11/30/2021
	Procedures	NDAP-QA-0725	Operating Experience Review Program	Revision 7