



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
475 ALLENDALE RD, STE 102  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

May 13, 2024

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 –  
INTEGRATED INSPECTION REPORT 05000387/2024001 AND  
05000388/2024001

Dear Brad Berryman:

On March 31, 2024, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Susquehanna Steam Electric Station, Units 1 and 2. On April 29, 2024, the NRC inspectors discussed the results of this inspection with Edward Casulli, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

No findings or violations of more than minor significance were identified during this inspection.

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* (10 CFR) 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

cc w/ encl: Distribution via LISTSERV

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 –  
 INTEGRATED INSPECTION REPORT 05000387/2024001 AND  
 05000388/2024001 DATED MAY 13, 2024

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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: 05000387/2024001 and 05000388/2024001

Enterprise Identifier: I-2024-001-0053

Licensee: Susquehanna Nuclear, LLC

Facility: Susquehanna Steam Electric Station, Units 1 and 2

Location: 769 Salem Blvd., Berwick PA

Inspection Dates: January 1, 2024 to March 31, 2024

Inspectors: J. England, Senior Resident Inspector  
E. Brady, Resident Inspector  
H. Anagnostopoulos, Senior Health Physicist  
A. Kostick, Health Physicist

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 an integrated 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**

No findings or violations of more than minor significance were identified.

### **Additional Tracking Items**

None.

## PLANT STATUS

Unit 1 began the inspection period at rated thermal power and was at or near full rated thermal power with the following exceptions. On January 19, 2024, the unit was down powered to 85 percent for a rod pattern adjustment and returned to rated thermal power. On February 2, 2024, the unit was down powered to approximately 81 percent for a rod pattern adjustment and channel distortion testing and returned to rated thermal power. On February 9, 2024, the unit was down powered to approximately 83 percent for a rod pattern adjustment and returned to rated thermal power. On February 23, 2024, the unit was down powered to approximately 92 percent for a rod pattern adjustment and returned to rated thermal power. On February 24, 2024, the unit commenced coast down and shut down for the refueling outage on March 25, 2024, and remained shut down for the remainder of the inspection period.

Unit 2 began the inspection period at rated thermal power and was at or near full rated thermal power with the following exception. On March 22, 2024, the unit was down powered to approximately 59 percent for a rod sequence exchange. The unit was returned to rated thermal power on March 23, 2024, and remained at or near rated thermal 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 activities described in IMC 2515, Appendix D, "Plant Status," conducted routine reviews using IP 71152, "Problem Identification and Resolution," observed risk significant activities, and completed on-site portions of IPs. 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.

## REACTOR SAFETY

### 71111.04 - Equipment Alignment

#### Partial Walkdown (IP Section 03.01) (3 Samples)

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

- (1) Unit 1 residual heat removal on January 4, 2024
- (2) Unit 2 'A' core spray during 'B' core spray surveillance testing on January 11, 2024
- (3) Unit 1 standby gas treatment during 'C' essential service supply bus work and fuel moves (Yellow risk) on March 31, 2024

## 71111.05 - Fire Protection

### Fire Area Walkdown and Inspection (IP Section 03.01) (5 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Unit Common control structure, 806-foot elevation, standby gas treatment room, fire zone (FZ) 0-30A, on January 3, 2024
- (2) Unit 1 reactor building, 749-foot elevation, FZ 1-5A-N, 1-5A-S, and 1-5A-W, on January 8, 2024
- (3) Units 1 and 2 reactor building, 818-foot elevation, refueling bay, FZ 0-8A, on January 24, 2024
- (4) Unit 2 reactor building, 645-foot elevation, high-pressure coolant injection pump room, FZ 2-1C, on February 21, 2024
- (5) Unit 1 turbine building, 656, 676, and 699-foot elevations, condenser gallery, mezzanine, pad 1 and 2, FZ 1-31D, 1-32D, and 1-33C on March 27, 2024

### Fire Brigade Drill Performance (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated fire brigade performance during an unannounced fire drill on February 28, 2024.

## 71111.07A - Heat Exchanger/Sink Performance

### Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

- (1) Unit 1 'A' residual heat removal heat exchanger

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

### Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the control room during shutdown and cooldown for the Unit 1 planned refueling outage on March 24 and 25, 2024.

### Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed Unit 1 simulator and classroom training for plant shutdown and cooldown on March 20, 2024.

### 71111.12 - Maintenance Effectiveness

#### Maintenance Effectiveness (IP Section 03.01) (1 Sample)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components remain capable of performing their intended function:

- (1) Unit Common 'E' emergency diesel generator on January 22, 2024

### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

#### Risk Assessment and Management (IP Section 03.01) (4 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Unit 1 division 1 planned work on core spray system on January 9, 2024
- (2) Unit 2 division 1 planned work on residual heat removal heat exchanger bypass valve during the week of January 29, 2024
- (3) Unit 1 elevated risk during reactor vessel disassembly during the week of March 25, 2024
- (4) Unit 1 bus outage on 1A203 on March 30 and 31, 2024

### 71111.15 - Operability Determinations and Functionality Assessments

#### Operability Determination or Functionality Assessment (IP Section 03.01) (3 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Unit 1 high-pressure coolant injection with water in lube oil system on January 11, 2024
- (2) Unit 2 'B' core spray pump due to breaker instantaneous overcurrent flag on January 12, 2024
- (3) Unit Common loss of 1D240 due to failure of uninterruptable power supply battery bank on March 28, 2024

### 71111.20 - Refueling and Other Outage Activities

#### Refueling/Other Outage Sample (IP Section 03.01) (1 Partial)

- (1) (Partial)  
The inspectors evaluated Unit 1 refueling outage U123RIO activities from March 25 to 31, 2024. The inspectors completed sections a., b.1, b.2, c.3, c.4, c.6, c.7, and c.8.

### 71111.24 - Testing and Maintenance of Equipment Important to Risk

The inspectors evaluated the following testing and maintenance activities to verify system operability and/or functionality:

Post-Maintenance Testing (IP Section 03.01) (2 Samples)

- (1) Unit Common 'C' emergency diesel generator planned maintenance and unplanned fuel line replacement on January 25, 2024
- (2) Unit Common emergency service water pipe replacement on February 15, 2024

Surveillance Testing (IP Section 03.01) (3 Samples)

- (1) Unit 1 SO-150-016, Reactor Core Isolation Cooling Functional Test at Remote Shutdown Panel (1C201A), on February 20, 2024
- (2) Unit 1 SI-180-305, Quarterly Calibration of Reactor Vessel Water Level Channels LIS-B21-1N024 A, B, C, D, on February 27, 2024
- (3) Unit 1 SO-124-117, Division I Diesel Generator Loss-of-Coolant Accident Loss of Offsite Power Test (Infrequently Performed Test or Evolution), on March 27 and 28, 2024

Inservice Testing (IP Section 03.01) (1 Sample)

- (1) Unit 2 SO-250-002, Quarterly Reactor Core Isolation Cooling Flow Verification, on January 25, 2024

Containment Isolation Valve Testing (IP Section 03.01) (1 Sample)

- (1) Unit 1 SE-159-023, Local Leak-Rate Test of Main Steam Line Isolation Valves Penetration Number X-7C, on March 25, 2024

71114.06 - Drill Evaluation

Required Emergency Preparedness Drill (1 Sample)

- (1) The inspectors evaluated the conduct of an emergency preparedness drill including a dropped fuel rod and a leak in the spent fuel pool on February 21, 2024.

**RADIATION SAFETY**

71124.03 - In-Plant Airborne Radioactivity Control and Mitigation

Permanent Ventilation Systems (IP Section 03.01) (1 Sample)

The inspectors evaluated the configuration of the following permanently installed ventilation systems:

- (1) Unit 1 reactor building, zone 3, high-efficiency particulate air and charcoal filter units 1F216A, 1F217A, and 1F218A

Temporary Ventilation Systems (IP Section 03.02) (1 Sample)

The inspectors evaluated the configuration of the following temporary ventilation systems:

- (1) High-efficiency particulate air ventilation unit servicing the down-draft step off pad system on the 818-foot elevation of the refueling floor



Use of Respiratory Protection Devices (IP Section 03.03) (1 Sample)

- (1) The inspectors evaluated the licensee's use of respiratory protection devices.

Self-Contained Breathing Apparatus for Emergency Use (IP Section 03.04) (1 Sample)

- (1) The inspectors evaluated the licensee's use and maintenance of self-contained breathing apparatuses.

71124.04 - Occupational Dose Assessment

Source Term Characterization (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated licensee performance as it pertains to radioactive source term characterization.

External Dosimetry (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated how the licensee processes, stores, and uses external dosimetry.

Internal Dosimetry (IP Section 03.03) (2 Samples)

The inspectors evaluated the following internal dose assessments:

- (1) Internal dose calculation for employee K"xxxxx6" for an event on April 15, 2023
- (2) Internal dose calculation for employee J"xxxxxxxxx2" for an event on April 15, 2023

Special Dosimetric Situations (IP Section 03.04) (2 Samples)

The inspectors evaluated the following special dosimetric situations:

- (1) Licensee procedures for limiting exposures for declared pregnant workers, including a review of completed declarations
- (2) Shallow dose equivalent evaluation for a personnel contamination event on March 31, 2023

**OTHER ACTIVITIES – BASELINE**

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours (IP Section 02.01) (2 Samples)

- (1) Unit 1 January 1, 2023 through December 31, 2023
- (2) Unit 2 January 1, 2023 through December 31, 2023

IE03: Unplanned Power Changes per 7000 Critical Hours (IP Section 02.02) (2 Samples)

- (1) Unit 1 January 1, 2023 through December 31, 2023
- (2) Unit 2 January 1, 2023 through December 31, 2023

IE04: Unplanned Scrams with Complications (IP Section 02.03) (2 Samples)

- (1) Unit 1 January 1, 2023 through December 31, 2023
- (2) Unit 2 January 1, 2023 through December 31, 2023

BI01: Reactor Coolant System Specific Activity (IP Section 02.10) (2 Samples)

- (1) Unit 1 January 1, 2023 through December 31, 2023
- (2) Unit 2 January 1, 2023 through December 31, 2023

BI02: Reactor Coolant System Leak Rate (IP Section 02.11) (2 Samples)

- (1) Unit 1 January 1, 2023 through December 31, 2023
- (2) Unit 2 January 1, 2023 through December 31, 2023

**INSPECTION RESULTS**

No findings were identified.

**EXIT MEETINGS AND DEBRIEFS**

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

- On February 7, 2024, the inspectors presented the in-plant airborne radioactivity control and mitigation inspection results to Derek Jones, Plant Manager, and other members of the licensee staff.
- On February 7, 2024, the inspectors presented the occupational dose assessment inspection results to Derek Jones, Plant Manager, and other members of the licensee staff.
- On April 29, 2024, the inspectors presented the integrated inspection results to Edward Casulli, Site Vice President, and other members of the licensee staff.

**DOCUMENTS REVIEWED**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
Plant Status	Corrective Action Documents Resulting from Inspection	AR-2024-02277 CR-2024-01430 CR-2024-02110 CR-2024-03947 CR-2024-03949 CR-2024-03951 CR-2024-03952 CR-2024-03953 CR-2024-04823 CR-2024-04824 CR-2024-06207		
71111.04	Corrective Action Documents Resulting from Inspection	CR-2024-05081 CR-2024-05082		
	Drawings	E106256	Susquehanna SES Unit 1 P&ID Residual Heat Removal	Revision 72
		E106680	P&ID HVAC Control Diagram Reactor Building Standby Gas Treatment System, Sheet 3	Revision 35
		M-2152	Unit 2 Core Spray P&ID	Revision 31
	Procedures	CL-070-0012	Standby Gas Treatment System Mechanical	Revision 11
SO-251-001A		Monthly Core Spray A Loop Discharge Line Filled and Valve Alignment Verification	Revision 2	
71111.05	Corrective Action Documents	CR-2024-03071		
	Corrective Action Documents Resulting from Inspection	CR-2024-00490 CR-2024-01447 CR-2024-02789		

71111.05	Fire Plans	FP-1-CS-806-A	Control Structure - El. 806	Revision 0
		FP-1-RB-749	Susquehanna SES Prefire Plan Unit 1 749	Revision 0
		FP-1-RB-818	Susquehanna Prefire Plan	Revision 0
		FP-1-TB-656-13	Condenser Pad 1 (FZ 1-31D)	Revision 0
		FP-1-TB-656-14	Condenser Pad 2 (FZ 1-31D)	Revision 0
		FP-1-TB-676-12	Condenser Gallery (FZ 1-32D)	Revision 0
		FP-1-TB-699-8	Condenser Mezzanine (FZ 1-33C)	Revision 0
		FP-2-RB-818	Susquehanna Prefire Plan	Revision 0
	Procedures	NDAP-QA-0409	Door Floor, Plug, and Hatch Control	Revision 24
NDAP-QA-0440		Control of Transient/Combustible/Hazardous Material	Revision 28	
71111.07A	Corrective Action Documents Resulting from Inspection	CR-2024-04915		
	Procedures	M-1453	Nuclear Engineer Specification for Heat Exchanger Tube Plugging	Revision 9
		MT-116-002	RHR Heat Exchanger Cleaning, Inspection, and Repair	Revision 17
	Work Orders	2576462		
71111.11Q	Procedures	GO-100-004	Plant Shutdown to Minimum Power	Revision 91
		GO-100-005	Plant Shutdown to Hot/Cold Shutdown	Revision 75
		OP-103-001	13.8 KV Electrical System	Revision 38
		SI-178-215A	Functional Test and Signal to Noise Ratio Test of Source Range Monitor (SRM) Channel 1A (SRM-C51-1K600A)	Revision 13
		SO-156-009	Reactor Mode Switch in Shutdown Control Rod Withdrawal Block Channel Functional Test	Revision 5
71111.12	Corrective Action Documents	CR-2024-01248 CR-2024-01353 CR-2024-03014		
71111.13	Corrective Action Documents	CR-2024-04720 CR-2024-04791 CR-2024-05203		

71111.13	Procedures	NDAP-QA-0340	Protected Equipment Program	Revision 43
		ON-YPNL-101	Loss of Instrument Bus	Revision 14
		Tagout 03-001	Outage Offsite Power - U123RIO	
		Tagout 04-001	1A203 - ESS Bus 1C OOS - U123RIO	
		Tagout 16-001	RHRSW 1B Pump - U123RIO	
		Tagout 24-001	'D' Emergency DG - U123RIO	
		Tagout 24-001	'B' Emergency DG - U123RIO	
71111.15	Corrective Action Documents	CR-2023-15041 CR-2024-00849 CR-2024-00919		
	Corrective Action Documents Resulting from Inspection	CR-2024-01752 CR-2024-04123		
	Drawings		E-156 Susquehanna SES Unit 2 Schematic Diagram Core Spray Pump 2B	Revision 19
	Miscellaneous	HPCI HV-155-F001	Adverse Condition Monitoring and Contingency Plan Unit 1 (Steam Admission Valve) Seat Leakage	Revision 6
	Work Orders	2261092		
71111.20	Corrective Action Documents Resulting from Inspection	CR-2024-04826 CR-2024-04827 CR-2024-04829		
	Miscellaneous		Shutdown Safety Risk Management Plan Unit 1 23rd Refueling and Inspection Outage	Revision 0
	Procedures	IC-180-005	Installation and Removal of Temporary Unit 1 RPV Shutdown Level Instrument	Revision 10
71111.24	Corrective Action Documents Resulting from Inspection	CR-2024-04694 CR-2024-04695		

71111.24	Procedures	MT-024-024	Diesel Engine Analysis and Load Balancing	Revision 23
		SE-159-023	LLRT of Main Steam Line Isolation Valves Penetration Number X-7C	Revision 24
		SI-180-305	Quarterly Calibration of Reactor Vessel Water Level Channels LIS-B21-1N024 A, B, C, D	Revision 37
		SO-024-001C	Monthly Diesel Generator 'C' Operability Test	Revision 29
		SO-124-117	Division I Diesel Generator LOCA LOOP Test (Infrequently Performed Test or Evolution)	Revision 11
		SO-150-016	RCIC Functional Test at Remote Shutdown Panel (1C201A)	Revision 2
		SO-250-002	Quarterly RCIC Flow Verification	Revision 61
	Work Orders	2511404 2575640-0 2669143 RTSV 2682036		
71114.06	Procedures	EP-104-1003	Drill and Exercise Evaluation	Revision 2
71151	Corrective Action Documents	DI-2023-00514 DI-2023-02217 DI-2023-03680 DI-2023-04608 DI-2023-06217 DI-2023-08562 DI-2023-10392 DI-2023-11422 DI-2023-11503 DI-2023-12847 DI-2023-16148 DI-2023-17495 DI-2023-18867 DPA-01-DI-2023-00427 DPA-02-DI-2023-00427 DPA-03-DI-2023-00427 DPA-04-DI-2023-00427 DPA-05-DI-2023-00427 DPA-06-DI-2023-00427		

		DPA-07-DI-2023-00427 DPA-08-DI-2023-00427 DPA-09-DI-2023-00427 DPA-10-DI-2023-00427 DPA-11-DI-2023-00427 DPA-12-DI-2023-00427		
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