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

November 5, 2020

Mr. 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 05000387/2020003 AND 05000388/2020003

Dear Mr. Berryman:

On September 30, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Susquehanna Steam Electric Station, Units 1 and 2. On October 15, 2020, 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.

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* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

X /RA/

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

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 05000387/2020003 AND 05000388/2020003 DATED NOVEMBER 5, 2020

DISTRIBUTION:

DLew, RA (R1ORAMAIL Resource)
RLorson, DRA (R1ORAMAIL Resource)
DCollins, DRP (R1DRPMAIL Resource)
BPham, DRP (R1DRPMAIL Resource)
JYerokun, DRS (R1DRSMAIL Resource)
PKrohn, DRS (R1DRSMAIL Resource)
JGreives, DRP
LCasey, DRP
ZCoffman, DRP
CHighley, DRP, SRI
MRossi, DRP, RI
DHochmuth, DRP, AA
RSkokowski, RI OEDO
RidsNrrPMSusquehanna Resource
RidsNrrDorlLpl1 Resource
ROPreports Resource

DOCUMENT NAME: https://usnrc.sharepoint.com/teams/Region-I-Branch-4/Shared Documents/Inspection Reports/Susquehanna/2020/3Q/SUS2020_003 FINAL.docx

ADAMS ACCESSION NUMBER: ML20309B019

☑ SUNSI Review		☑ Non-Sensitive ☐ Sensitive		☑ Publicly Available ☐ Non-Publicly Available	
OFFICE	RI/DRP	RI/DRP	RI/DRP		
NAME	MHardgrove	LCasey	JGreives		
DATE	11/04/2020	11/04/2020	11/05/2020		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000387 and 05000388
License Numbers:	NPF-14 and NPF-22
Report Numbers:	05000387/2020003 and 05000388/2020003
Enterprise Identifier:	I-2020-003-0038
Licensee:	Susquehanna Nuclear, LLC
Facility:	Susquehanna Steam Electric Station, Units 1 and 2
Location:	Berwick, PA
Inspection Dates:	July 1, 2020, to September 30, 2020
Inspectors:	M. Hardgrove, Senior Resident Inspector C. Highley, Senior Resident Inspector M. Rossi, Resident Inspector H. Anagnostopoulos, Senior Health Physicist
Approved By:	Jonathan E. Greives, Chief Reactor Projects Branch 4 Division of Reactor Projects

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 100 percent power. On July 31, 2020, operators reduced power to approximately 60 percent for a rod sequence exchange. The unit was returned to full power on August 4, 2020. The unit remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. On September 11, 2020, operators reduced power to approximately 60 percent for a rod sequence exchange. The unit was returned to 100 percent power on September 15, 2020, 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 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. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time the resident inspectors performed periodic site visits each week, increasing the amount of time on site as local COVID-19 conditions permitted. As part of their onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; observed risk significant activities; and completed on site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

REACTOR SAFETY

71111.01 - Adverse Weather Protection

External Flooding Sample (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated readiness to cope with external flooding on August 17, 2020.

71111.04 - Equipment Alignment

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

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

(1) Unit 2, 'B' loop residual heat removal during 'A' loop maintenance on August 3, 2020
(2) Unit Common, 'E' emergency diesel generator (EDG) during 'D' EDG system outage window on August 3, 2020
(3) Unit 1, 'B' loop residual heat removal service water during 'A' loop heat exchanger maintenance on September 22, 2020

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated system configurations during a complete walkdown of Units 1 and 2 residual heat removal service water system on July 7, 2020.

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (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 2, 683' elevation equipment space (fire zone 2-3C) on July 14, 2020
(2) Unit Common, diesel generator bay 'B' during planned maintenance window (fire zone 0-41B) on July 29, 2020
(3) Unit 2, 719' elevation containment instrument gas compressor area (fire zone 2-4A-N/W/S) on August 26, 2020
(4) Unit Common, 'D' diesel generator bay following 'D' EDG system outage window (fire zone 0-41D) on August 31, 2020
(5) Unit 2, 754' elevation upper relay room (fire zone 0-27A) on September 22, 2020

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

(1) Unit 2 683' and 670' elevations of the reactor building general areas on September 1 to 2, 2020

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 Unit 1 rod sequence exchange and pattern adjustment on July 31, 2020.

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

(1) The inspectors observed and evaluated simulator training on August 4, 2020.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 Samples)

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

(1) Unit Common, refueling bridge and hoist on August 18, 2020
(2) Unit 1, main steam isolation valve leakage trending and maintenance planning on September 17, 2020

Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

(1) Unit 2, 2A emergency service water core spray room cooler throttle valve leaking through wall on July 31, 2020

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (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) Units 1 and 2, yellow risk during automatic depressurization system (ADS) drywell pressure bypass timer and ADS timer permissive testing on July 8, 2020
(2) Units 1 and 2, yellow risk during reactor pressure vessel level functional tests with 2A core spray room cooler isolated and 2A core spray declared inoperable for maintenance on July 21, 2020
(3) Unit Common, 'D' EDG system outage window - 5-year overhaul on August 10, 2020
(4) Unit 2, temporary design change to provide main steam pressure to main steam line A instrument indication on September 8, 2020

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (5 Samples)

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

(1) Unit 1, reactor core isolation cooling system one of two anti-rotational bolts found loose on July 20, 2020
(2) Units 1 and 2, fuel pool cooling pump bearing degradation on August 11, 2020

(3) Unit 1, 'B' residual heat removal service water pump failed to start on demand on August 19, 2020
(4) Unit 1, 'D' main steam isolation valve pressure switch stuck on September 2, 2020
(5) Unit 2, 'D' low pressure coolant injection permissive switch found out of tolerance on September 16, 2020

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (2 Samples)

The inspectors evaluated the following temporary or permanent modifications:

(1) Unit 2, EC 2365089, temporary design change to provide main steam pressure to main steam line A instrument indication on September 3, 2020
(2) Unit 1, EC 2276120, permanent modification for 'A' loop residual heat removal valve actuator replacement on September 14, 2020

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

(1) Unit 2, ventilation exhaust rad monitoring system (VERMS) 'A' bypass pump failed on July 14, 2020
(2) Unit 2, 'A' core spray room cooler emergency service water piping valve replacements on July 22, 2020
(3) Unit 2, residual heat removal 'A' loop motor cooler maintenance window on August 3, 2020
(4) 'C' EDG repair due to fuel oil seepage on August 6, 2020
(5) Unit Common, 'D' EDG scheduled outage window on August 10, 2020
(6) Unit 2, 'A' main steam line low pressure instrumentation temporary modification installation on September 10, 2020

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Inservice Testing (IP Section 03.01) (1 Sample)

(1) Unit 2, high-pressure coolant injection quarterly start and flow surveillance on September 10, 2020

RCS Leakage Detection Testing (IP Section 03.01) (1 Sample)

(1) Unit 2, drywell floor drain sump level channels monthly test on August 3, 2020

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

(1) Integrated on-site and off-site fire response drill on September 17, 2020

RADIATION SAFETY

71124.01 - Radiological Hazard Assessment and Exposure Controls

Contamination and Radioactive Material Control (IP Section 03.03) (2 Samples)

The inspectors evaluated licensee processes for monitoring and controlling contamination and radioactive material.

(1) Observed the egress of personnel and material from the Unit 2 radiation protection control point.
(2) Observed the unconditional release of gas bottles from the Unit 2 turbine building truckbay.

Radiological Hazards Control and Work Coverage (IP Section 03.04) (2 Samples)

The inspectors evaluated in-plant radiological conditions during facility walkdowns and observation of radiological work activities.

(1) Pre-job briefing, initial entry radiation survey, and worker entry into the Unit 2 spent fuel pool cooling pump room to collect pump vibration data.
(2) Briefing and unconditional release of gas bottles from the Unit 2 turbine building truckbay.

High Radiation Area and Very High Radiation Area Controls (IP Section 03.05) (2 Samples)

The inspectors evaluated licensee controls of the following high radiation areas and very high radiation areas:

(1) Units 1 and 2 spent fuel pool
(2) Unit 2 spent fuel pool cooling pump room

Radiation Worker Performance and Radiation Protection Technician Proficiency (IP Section 03.06) (1 Sample)

(1) The inspectors evaluated radiation worker and radiation protection technician performance as it pertains to radiation protection requirements for initial entry into the Unit 2 spent fuel pool cooling pump room.

71124.05 - Radiation Monitoring Instrumentation

Walkdowns and Observations (IP Section 03.01) (5 Samples)

The inspectors evaluated the following radiation detection instrumentation during plant walkdowns:

(1) Personnel contamination monitors at the main access point
(2) Portal monitors at the main access point
(3) Tool monitors at the main access point
(4) Whole body counter in the dosimetry office
(5) Telepole in the ready-for-issue rack in the calibration laboratory

Calibration and Testing Program (IP Section 03.02) (10 Samples)

The inspectors evaluated the calibration and testing of the following radiation detection instruments:

(1) AMP100 AMP1-0064
(2) Fluke FMFM-0093
(3) Ludluum 43-93 L236-006
(4) Ludluum 43-2 L200-0013
(5) AMS4 AMS4-0039
(6) FUJI NSN3 FUJI-0007
(7) FUJI NSN3 FUJI-0008
(8) Ludluum Model 3 LUD3-0051
(9) Telepole POLE-0019
(10) Canberra Fastscan Dosimetry Office

Effluent Monitoring Calibration and Testing Program Sample (IP Sample 03.03) (2 Samples)

The inspectors evaluated the calibration and maintenance of the following radioactive effluent monitoring and measurement instrumentation:

(1) Standby gas treatment vent low range radiation monitor (VERMS)
(2) Unit 2 reactor building vent low range radiation monitor nobel gas channel (VERMS)

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 02.04) (2 Samples)

(1) Unit 1 for the period of July 1, 2019, through June 30, 2020
(2) Unit 2 for the period of July 1, 2019, through June 30, 2020

MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

(1) Unit 1 for the period of July 1, 2019, through June 30, 2020
(2) Unit 2 for the period of July 1, 2019, through June 30, 2020

MS07: High Pressure Injection Systems (IP Section 02.06) (2 Samples)

(1) Unit 1 for the period of July 1, 2019, through June 30, 2020
(2) Unit 2 for the period of July 1, 2019, through June 30, 2020

MS08: Heat Removal Systems (IP Section 02.07) (2 Samples)

(1) Unit 1 for the period of July 1, 2019, through June 30, 2020
(2) Unit 2 for the period of July 1, 2019, through June 30, 2020

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (1 Sample)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Human performance error trend and operator crew clock resets

INSPECTION RESULTS

Observation: Human Performance Error Trend and Operator Crew Clock Resets	71152
The inspectors reviewed Susquehanna's evaluations and corrective actions to address human performance errors as documented in various condition reports (CRs) from January 1, 2020. This time period covered the spring outage for Unit 1 and the COVID-19 pandemic. Additionally, the inspectors reviewed Level 1 through Level 3 evaluations with an associated human performance error dating back to August 2019. The inspectors determined during their review of the Level 1 through Level 3 evaluations impacted by human performance errors that Susquehanna conducted an appropriate review of each issue and implemented appropriate and timely corrective actions to address the human performance errors. The inspectors determined during their review of the selected CRs that Susquehanna was appropriately screening and implementing adequate corrective actions to address the human performance errors. Susquehanna identified a rise in human performance errors during the spring outage for Unit 1 and saw the human performance error trend decline following the outage. Overall, the inspectors determined that Susquehanna is adequately trending and addressing human performance errors through the corrective action program. The inspectors documented a negative human performance trend in Susquehanna Steam Electric Station, Units 1 and 2 – Integrated Inspection Report 05000387/2020002 and 05000388/2020002, with the licensee documenting the trend in CR-2020-03025. The corrective actions taken to address the human performance errors included procedure revisions, revisions to various maintenance work instruction revisions, training, operating experience communications to departments, and a larger management presence in the field providing observations. The inspectors focused on human performance errors within the operations department related to crew clock resets. During the time period of review, 20 CRs captured a human performance error within the operations department without a crew clock reset, with 12 CRs	

being questioned by the inspectors whether there should have been a crew clock reset. The inspectors discussed with the operations department on how crew clock resets are applied and the thresholds for operating crews, as it was not clear to the inspectors when reviewing the CRs. From this discussion with the inspectors, the operations department determined 3 of the 12 CRs should have been classified as operator crew clock resets related to discretionary and non-discretionary thresholds, which has subsequently been changed. These CRs were related to missing a swap of a breaker during Unit 1 4kV A bus restoration (CR-2020-05018); performance of a high-pressure coolant injection valve stroke testing while local leak rate testing was in progress (CR-2020-05851); and missed fire drills during the first and second quarters of 2019 (CR-2020-00579). The changes made to these three CRs constitute a minor performance deficiency in accordance with IMC 01612, Appendix B, “Additional Issue Screening Guidance,” because all more-than-minor questions were answered no. Crew clock resets are determined under licensee procedures NDAP-00-0032, "Human Performance (HuP) - Standards for Error and Event Prevention," Attachment C and OP-AD-300, "Administration of Operations," Attachment I. The reclassification of the crew clock resets was captured in Susquehanna’s corrective action program and addressed.

The inspector’s assessment of Susquehanna appropriately applying procedures, standards, and thresholds for operations crew clock is overall adequate, however, as discussed above there were some areas where the licensee had to reassess after further engagement from the inspectors.

EXIT MEETINGS AND DEBRIEFS

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

- On October 15, 2020, the inspectors presented the integrated inspection results to Mr. Kevin Cimorelli, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.05	Corrective Action Documents	CR-2020-09929		
	Fire Plan	FP-213-248	Containment Access Area	Revision 5
71111.13	Corrective Action Documents	CR-2020-10317		
		CR-2020-10379		
		CR-2020-10384		
71111.15	Corrective Action Documents	CR-2020-09452		
71111.19	Corrective Action Documents	CR-2019-09542		
		CR-2020-09407		
		CR-2020-09836		
	Work Orders	235424-0		
		PCWO 2360082-0		
		RLWO 2356922		