



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 17, 2020

Mr. Kevin Cimorelli
Site Vice President
Susquehanna Nuclear, LLC
769 Salem Boulevard
NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE
OF AMENDMENT NOS. 275 AND 257 RE: TEMPORARY CHANGES TO
ALLOW REPLACEMENT OF THE EMERGENCY SERVICE WATER SYSTEM
PIPING (EPID L-2019-LLA-0004)

Dear Mr. Cimorelli:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 275 to Renewed Facility Operating License No. NPF-14 and Amendment No. 257 to Renewed Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station (Susquehanna), Units 1 and 2, respectively. These amendments consist of changes to the technical specifications (TSs) in response to your application dated January 9, 2019, as supplemented by letters dated June 3, 2019, and December 9, 2019.

These amendments revise requirements in TS 3.7.1, "Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)," and TS 3.7.2, "Emergency Service Water (ESW) System," to temporarily allow one division of the ESW and RHRSW systems to be inoperable for a total of 14 days to address piping degradation. The changes are temporary as annotated by a note in each TS that specifies that the allowance expires on June 25, 2027, for Unit 1, and June 25, 2026, for Unit 2. The amendments also remove the tables of contents from the TSs and place them under licensee control.

A copy of the related safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's Biweekly *Federal Register* Notice.

Sincerely,

/RA – James G. Danna for/

Sujata Goetz, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures:

1. Amendment No. 275 to License
No. NPF-14
2. Amendment No. 257 to License
No. NPF-22
3. Safety Evaluation

cc: Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-387

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 275
Renewed License No. NPF-14

1. The U.S. Nuclear Regulatory Commission (NRC or the Commission) has found that:
 - A. The application for the amendment filed by Susquehanna Nuclear, LLC, dated January 9, 2019, as supplemented by letters dated June 3, 2019, and December 9, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-14 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 275, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility Operating
License and Technical Specifications

Date of Issuance: January 17, 2020

ATTACHMENT TO LICENSE AMENDMENT NO. 275

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

RENEWED FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

REMOVE
Page 3

INSERT
Page 3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE
TOC - 1
TOC - 2
TOC - 3
TOC - 4
3.7-2
3.7-4
3.7-5

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3.7-5

- (3) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed neutron sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Susquehanna Nuclear, LLC is authorized to operate the facility at reactor core power levels not in excess of 3952 megawatts thermal in accordance with the conditions specified herein. The preoperational tests, startup tests and other items identified in License Conditions 2.C.(36), 2.C.(37), 2.C.(38), and 2.C.(39) to this license shall be completed as specified.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 275, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

For Surveillance Requirements (SRs) that are new in Amendment 178 to Facility Operating License No. NPF-14, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 178. For SRs that existed prior to Amendment 178, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 178.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One Unit 1 RHRSW subsystem inoperable.	B.1 Restore the Unit 1 RHRSW subsystem to OPERABLE status.	14 days during the replacement of the Unit 2 ESW piping ⁽¹⁾ <u>OR</u> 72 hours from discovery of the associated Unit 2 RHRSW subsystem inoperable <u>AND</u> 7 days
C. Both Unit 1 RHRSW subsystems inoperable.	C.1 Restore one Unit 1 RHRSW subsystem to OPERABLE status.	8 hours from discovery of one Unit 2 RHRSW subsystem not capable of supporting associated Unit 1 RHRSW subsystem <u>AND</u> 72 hours
D. Required Action and associated Completion Time not met. <u>OR</u> UHS inoperable.	D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 4.	12 hours 36 hours

⁽¹⁾This Completion Time is only applicable during the Unit 2 'A' and 'B' ESW piping replacement while the compensatory measures identified in Enclosure 2 to letter PLA-7830 are in place. Upon completion of pipe replacement activities, this temporary extension is no longer applicable and will expire on June 25, 2027.

3.7 PLANT SYSTEMS

3.7.2 Emergency Service Water (ESW) System

LCO 3.7.2 Two ESW subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----
Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources," for DGs made inoperable by ESW.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESW pump in each subsystem inoperable.	A.1 Restore both ESW pumps to OPERABLE status.	7 days
B. One or two ESW subsystems not capable of supplying ESW flow to at least three required DGs.	B.1 Restore ESW flow to the required DGs to ensure that each ESW subsystem is supplying at least three DGs.	14 days during the replacement of the Unit 2 ESW piping ⁽¹⁾ <u>OR</u> 7 days
C. One ESW subsystem inoperable for reasons other than Condition B.	C.1 Restore the ESW subsystem to OPERABLE status.	14 days during the replacement of the Unit 2 ESW piping ⁽¹⁾ <u>OR</u> 7 days

⁽¹⁾This Completion Time is only applicable during the Unit 2 'A' and 'B' ESW piping replacement while the compensatory measures identified in Enclosure 2 to letter PLA-7830 are in place. Upon completion of pipe replacement activities, this temporary extension is no longer applicable and will expire on June 25, 2027.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A, B or C not met.	D.1 Be in MODE 3.	12 hours
	<u>AND</u>	
	D.2 Be in MODE 4.	36 hours
<u>OR</u>		
Both ESW subsystems inoperable for reasons other than Conditions A and B.		

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.7.2.1 -----NOTE----- Isolation of flow to individual components does not render ESW System inoperable. -----</p> <p>Verify each ESW subsystem manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.</p>	In accordance with the Surveillance Frequency Control Program
<p>SR 3.7.2.2 Verify each ESW subsystem actuates on an actual or simulated initiation signal.</p>	In accordance with the Surveillance Frequency Control Program



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SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 257
Renewed License No. NPF-22

1. The U.S. Nuclear Regulatory Commission (NRC or the Commission) has found that:
 - A. The application for the amendment filed by Susquehanna Nuclear, LLC, dated January 9, 2019, as supplemented by letters dated June 3, 2019, and December 9, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-22 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 257, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility Operating
License and Technical Specifications

Date of Issuance: January 17, 2020

ATTACHMENT TO LICENSE AMENDMENT NO. 257

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

RENEWED FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

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Page 3

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Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

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3.7-1

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3.7-4

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3.7-1

3.7-2

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3.7-3a

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3.7-3e

3.7-4

- (3) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed neutron sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (4) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (5) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Susquehanna Nuclear, LLC is authorized to operate the facility at reactor core power levels not in excess of 3952 megawatts thermal in accordance with the conditions specified herein. The preoperational tests, startup tests and other items identified in License Conditions 2.C.(20), 2.C.(21), 2.C.(22), and 2.C.(23) to this license shall be completed as specified.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 257, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

For Surveillance Requirements (SRs) that are new in Amendment 151 to Facility Operating License No. NPF-22, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 151. For SRs that existed prior to Amendment 151, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 151.

3.7 PLANT SYSTEMS

3.7.1 Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)

LCO 3.7.1 Two RHRSW subsystems and the UHS shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----
Enter applicable Conditions and Required Actions of LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System-Hot Shutdown," for RHR shutdown cooling made inoperable by RHRSW System.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. -----NOTE----- Separate Condition entry is allowed for each valve. -----</p> <p>One valve in Table 3.7.1-1 inoperable.</p> <p><u>OR</u></p> <p>One valve in Table 3.7.1-2 inoperable.</p> <p><u>OR</u></p> <p>One valve in Table 3.7.1-3 inoperable.</p>	A.1 Declare the associated RHRSW subsystems inoperable.	Immediately
	<u>AND</u>	
	A.2 Establish an open flow path to the UHS.	8 hours
	<u>AND</u>	
	A.3 Restore the inoperable valve(s) to OPERABLE status.	8 hours from the discovery of an inoperable RHRSW subsystem in the opposite loop from the inoperable valve(s)
		<u>AND</u>
		72 hours
		(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p><u>OR</u></p> <p>Any combination of valves in Table 3.7.1-1, Table 3.7.1-2, or Table 3.7.1-3 in the same return loop inoperable.</p>		<p><u>OR</u></p> <p>7 days during the replacement of 480 V ESS Load Center Transformers 1X210 and 1X220 in Unit 1⁽¹⁾</p>
<p>B. One Unit 2 RHRSW subsystem inoperable.</p>	<p>B.1 Restore the Unit 2 RHRSW subsystem to OPERABLE status.</p>	<p>7 days during the replacement of 480 V ESS Load Center Transformers 1X210 and 1X220 in Unit 1⁽¹⁾</p> <p><u>OR</u></p> <p>14 days during the replacement of the Unit 1 ESW piping⁽²⁾</p> <p><u>OR</u></p> <p>72 hours from discovery of the associated Unit 1 RHRSW subsystem inoperable</p> <p><u>AND</u></p> <p>7 days</p>

⁽¹⁾Upon completion of the replacement of the 480 V ESS Load Center Transformers 1X210 and 1X220 in Unit 1, this temporary extension is no longer applicable and will expire on June 15, 2020.

⁽²⁾This Completion Time is only applicable during the Unit 1 'A' and 'B' ESW piping replacement while the compensatory measures identified in Enclosure 2 to letter PLA-7830 are in place. Upon completion of pipe replacement activities, this temporary extension is no longer applicable and will expire on June 25, 2026.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Both Unit 2 RHRWS subsystems inoperable.	C.1 Restore one Unit 2 RHRWS subsystem to OPERABLE status.	8 hours from discovery of one Unit 1 RHRWS subsystem not capable of supporting associated Unit 2 RHRWS subsystem <u>AND</u> 72 hours
D. Required Action and associated Completion Time not met. <u>OR</u> UHS inoperable.	D.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.1.1 Verify the water level is greater than or equal to 678 feet 1 inch above Mean Sea Level.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.7.1.2 Verify the average water temperature of the UHS is:</p> <p>a. -----NOTE----- Only applicable with both units in MODE 1 or 2, or with either unit in MODE 3 for less than twelve (12) hours.</p> <p>-----</p> <p>≤ 85°F; or</p> <p>b. -----NOTE----- Only applicable when either unit has been in MODE 3 for at least twelve (12) hours but not more than twenty-four (24) hours.</p> <p>-----</p> <p>≤ 87°F; or</p> <p>c. -----NOTE----- Only applicable when either unit has been in MODE 3 for at least twenty-four (24) hours.</p> <p>-----</p> <p>≤ 88°F.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.7.1.3 Verify each RHRWS manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position or can be aligned to the correct position.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.7.1.4 Verify that valves HV-01222A and B (the spray array bypass valves) close upon receipt of a closing signal and open upon receipt of an opening signal.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.7.1.5 Verify that valves HV-01224A1 and B1 (the large spray array valves) close upon receipt of a closing signal and open upon receipt of an opening signal.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.7.1.6 Verify that valves HV-01224A2 and B2 (the small spray array valves) close upon receipt of a closing signal and open upon receipt of an opening signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.1.7 Verify that valves 012287A and 012287B (the spray array bypass manual valves) are capable of being opened and closed.	In accordance with the Surveillance Frequency Control Program

TABLE 3.7.1-1

Ultimate Heat Sink Spray Array Valves

VALVE NUMBER	VALVE DESCRIPTION
HV-01224A1	Loop A large spray array valve
HV-01224B1	Loop B large spray array valve
HV-01224A2	Loop A small spray array valve
HV-01224B2	Loop B small spray array valve

TABLE 3.7.1-2

Ultimate Heat Sink Spray Array Bypass Valves

VALVE NUMBER	VALVE DESCRIPTION
HV-01222A	Loop A spray array bypass valve
HV-01222B	Loop B spray array bypass valve

TABLE 3.7.1-3

Ultimate Heat Sink Spray Array Bypass Manual Valves

VALVE NUMBER	VALVE DESCRIPTION
012287A	Loop A spray array bypass manual valve
012287B	Loop B spray array bypass manual valve

3.7 PLANT SYSTEMS

3.7.2 Emergency Service Water (ESW) System

LCO 3.7.2 Two ESW subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----
Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources," for DGs made inoperable by ESW.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ESW pump in each subsystem inoperable.	A.1 Restore both ESW pumps to OPERABLE status.	7 days
B. One or two ESW subsystems not capable of supplying ESW flow to at least three required DGs.	B.1 Restore ESW flow to the required DGs to ensure that each ESW subsystem is supplying at least three DGs.	14 days during the replacement of the Unit 1 ESW piping ⁽¹⁾ <u>OR</u> 7 days
C. One ESW subsystem inoperable for reasons other than Condition B.	C.1 Restore the ESW subsystem to OPERABLE status.	14 days during the replacement of the Unit 1 ESW piping ⁽¹⁾ <u>OR</u> 7 days

⁽¹⁾This Completion Time is only applicable during the Unit 1 'A' and 'B' ESW piping replacement while the compensatory measures identified in Enclosure 2 to letter PLA-7830 are in place. Upon completion of pipe replacement activities, this temporary extension is no longer applicable and will expire on June 25, 2026.



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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 275 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-14

AND AMENDMENT NO. 257 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-22

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 50-388

1.0 INTRODUCTION

By application dated January 9, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19009A431), as supplemented by letters dated June 3, 2019, and December 9, 2019 (ADAMS Accession Nos. ML19154A125 and ML19343E412, respectively), Susquehanna Nuclear, LLC (the licensee) requested changes to the technical specifications (TSs) for Susquehanna Steam Electric Station (Susquehanna), Units 1 and 2. The supplements dated June 3, 2019, and December 9, 2019, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 26, 2019 (84 FR 6180).

The proposed amendments would provide a temporary extension of completion times (CTs) for TS 3.7.1, "Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)," and TS 3.7.2, "Emergency Service Water (ESW) System," for Susquehanna, Units 1 and 2.

The TS changes would permit one division of the ESW and RHRSW systems to be inoperable for a total of 14 days to address piping degradation. For the Unit 1 refueling outage in spring 2020, the licensee proposes to replace portions of the Division 1 ESW piping at the Unit 1 reactor building wall penetration. During the replacement activities, the licensee will perform further inspections of the normally inaccessible piping. Based on the results of those inspections, the licensee will determine whether further piping replacements are needed during subsequent unit outages in the ESW system for either divisions or units. The licensee expects

that any necessary piping replacements would be completed within four refueling outages for each unit. Thus, the licensee proposes that the temporary extension expire in 2027 for Unit 1 and in 2026 for Unit 2.

The proposed amendments would also remove the tables of contents from the TSs and place them under licensee control.

One anonymous comment was submitted in response to the publication of the notice of the license amendment request in the *Federal Register* (ADAMS Accession No. ML19088A143). This comment appears to state that the maintenance action to replace the ESW piping should be based on a permanent rather than on a temporary extension of CTs. It also appears to state that the NRC staff should perform a detailed review of the actual work instructions and procedures to be used in performing the maintenance action. As summarized below, the NRC staff has evaluated the licensee's proposed temporary TS changes by considering the relevant issues of the risks associated with the extended ESW and RHRSW out-of-service times and the licensee's proposed mitigating measures to limit these risks to an acceptable level.

2.0 REGULATORY EVALUATION

2.1 Background

ESW System Description

As discussed in Section 9.2.5 of the Susquehanna Updated Final Safety Analysis Report (UFSAR), Revision 69, the ESW system is designed to supply cooling water to the diesel generators, residual heat removal (RHR) pumps, and to those room coolers that are required during normal and emergency conditions to safely shut down both units. The ESW system is designed to take water from the spray pond (the UHS), pump it through the various heat exchangers, and return it to the spray pond via spray arrays or a spray array bypass line. The ESW system consists of two loops shared between the two units, with each loop providing 100 percent capacity for both units. Each loop has two 50 percent capacity pumps. The four ESW pumps are in the engineered safeguard service water (ESSW) pumphouse at the edge of the spray pond. During normal power generation, the ESW system does not operate, but is available for normal shutdown, emergencies, or to support testing and surveillances. All piping outside of the ESSW pumphouse, reactor building, and spray pond is buried, and it is coated and wrapped for corrosion protection.

RHRSW System Description

As discussed in Section 9.2.6 of the Susquehanna UFSAR, the RHRSW system is designed to supply cooling water to the RHR heat exchangers of both units. The RHRSW system is designed to take water from the spray pond (the UHS), pump it through the RHR heat exchangers, and return it to the spray pond via spray arrays or a spray array bypass line. The RHRSW system consists of two loops per unit. Each loop has a 100 percent capacity pump. The Unit 1 A and Unit 2 A RHRSW pumps are cross-connected so that they can supply cooling water to either the Unit 1 A or Unit 2 A RHR heat exchanger. The same arrangement and capability are provided for the Unit 1 B and Unit 2 B RHRSW pumps. The four RHRSW pumps are in the ESSW pumphouse at the edge of the spray pond. The RHRSW system is designed to provide a reliable source of cooling water for all operating modes of the RHR system, including suppression pool cooling. All piping outside of the ESSW pumphouse, reactor building, and spray pond is buried, and it is coated and wrapped for corrosion protection.

RHRSW Interface with ESW

The return flow to the spray pond via spray arrays or a spray array bypass line of the same division of the Unit 1 and Unit 2 RHRSW and ESW systems is through a common line. Thus, when the ESW piping is physically breached, the same division Unit 1 and Unit 2 RHRSW systems are inoperable. When the ESW piping is breached, RHRSW return flow would simply exit through the ESW pipe breach and not be returned to the UHS via spray arrays or a spray array bypass line. Since each division has its own separate return piping, the other division is not affected by the breach.

2.2 Proposed TS Changes

The proposed amendments would temporarily revise the Susquehanna, Unit 1 and Unit 2, TS 3.7.1 and TS 3.7.2 to allow for piping replacement during refueling outages. Specifically, the proposed changes to TS 3.7.1 would extend on a temporary basis the CT for Required Action B.1 for one RHRSW subsystem inoperable from 72 hours to 14 days during the replacement of the other unit's ESW piping. The proposed changes to TS 3.7.2 would extend on a temporary basis the CT for Required Action B.1 for an ESW subsystem not capable of supplying ESW flow to at least three required diesel generators and the CT for Required Action C.1 for one ESW subsystem inoperable from 7 days to 14 days during the replacement of the other unit's ESW piping. The TSs would be revised to state that these temporary changes expire on June 25, 2027, for Unit 1, and on June 25, 2026, for Unit 2. The TSs would also be revised to indicate that the compensatory measures identified in Enclosure 2 of the licensee's December 9, 2019 letter must be in place during the extended CTs. Finally, the proposed amendments would remove the tables of contents from the TSs and place them under licensee control.

2.3 Regulatory Requirements and Guidance

The NRC staff considered the following regulatory requirements and licensing and design-basis information during its review of the proposed amendments.

Section 182a of the Atomic Energy Act of 1954, as amended, requires applicants for licenses to operate nuclear power plants to include TSs as part of the license application. These TSs become part of any license issued.

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36, "Technical specifications," states, in part, that the TSs include items in the categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements; (4) design features; and (5) administrative controls.

Section 50.36(b) of 10 CFR requires TSs to be derived from the analyses and evaluation included in the safety analysis report and amendments thereto. The regulations in 10 CFR 50.36(c)(2)(ii) list four criteria used to determine whether LCOs must be established in the TSs for items related to plant operation. If the item meets one or more of the four criteria

listed below, an LCO must be established in the TSs to ensure the lowest functional capability or performance level of equipment required for safe operation of the facility will be met. The four criteria are:

- (A) Criterion 1. Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.
- (B) Criterion 2. A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
- (C) Criterion 3. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.
- (D) Criterion 4. A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Section 50.36(c)(2) of 10 CFR further requires that, when an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the condition can be met. It does not, however, specify what actions are required or how quickly they must be completed.

Section 50.65(a)(4) of 10 CFR requires, in part, that before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities.

The NRC's guidance for the format and content of TSs can be found, in part, in NUREG-1433, Revision 4, "Standard Technical Specifications – General Electric BWR [Boiling Water Reactor]/4 Plants," Volume 1, "Specifications," and Volume 2, "Bases" (ADAMS Accession Nos. ML12104A192 and ML12104A193, respectively).

3.0 TECHNICAL EVALUATION

As described in the Susquehanna UFSAR, the ESW system consists of two loops, each of which is designed to supply 100 percent of the ESW cooling requirements to both units and the common emergency diesel generators simultaneously. The RHRSW system is designed to supply cooling water to the RHR heat exchangers of both units. Each redundant loop of RHRSW provides cooling to one RHR heat exchanger in each unit. The design and function of these systems would not be permanently changed because of the proposed piping replacement.

The purpose of TS CTs is to allow a temporary relaxation of the single failure criterion to perform surveillances or necessary minor maintenance before a reactor shutdown would be required. This accommodation of a short but reasonable period is made, understanding that there is an elevated risk level associated with plant transients relative to some duration of

continued steady state operation. Long-term risk management recognizes the importance of preventive maintenance to ensure that the structures, systems, and components can continue to perform their safety functions without unduly limiting power operation.

3.1 Safety Insights

With one ESW and RHRSW subsystem inoperable, the system functions are maintained by the operable subsystems. The ESW system is essential for onsite emergency power generation during events involving loss-of-offsite power (LOOP) and provides room and component cooling for pumps providing for decay heat removal and reactor coolant inventory control. The RHRSW system provides cooling water for decay heat removal when the normal heat sink via the main condenser and circulating water is not available. One ESW and RHRSW system is adequate to mitigate the consequences of any design-basis accident in one unit, while maintaining the other unit in cold shutdown or refueling modes. A loss-of-coolant accident on the operating unit during the proposed CT extension durations is very unlikely. However, a LOOP or other event that results in a loss of normal heat sink during these CT extensions is high enough that the reliability of the single operable ESW and RHRSW subsystems during this time must be assessed.

The NRC staff performed a qualitative assessment of the ESW and RHRSW subsystem reliability in mitigating the LOOP event, which is the most limiting of the initiating events involving a loss of the normal heat sink. The staff determined that a single ESW pump and a single RHRSW pump provided adequate heat removal to support essential equipment on a best-estimate basis for a single Susquehanna unit in the NRC internal probabilistic safety assessment. However, neither the license amendment request (LAR) nor the Susquehanna UFSAR addressed the reliability of these functions and how a LOOP event could be mitigated for the operating unit simultaneously with maintaining the shutdown unit stable.

In a request for additional information (RAI) dated November 14, 2019 (ADAMS Accession No. ML19319A009), the NRC staff requested that the licensee provide a qualitative assessment of the reliability of both the ESW and RHRSW subsystems either by addressing the effects of credible single failures or by addressing the adequacy of cooling capability provided by a single operating pump in these subsystems to mitigate a LOOP event in both the operating unit and the shutdown unit. The staff also stated that the LAR's description of required compensatory actions was not clear for all the proposed ESW piping replacement work, including those compensatory actions that were previously established in Susquehanna, Unit 2, License Amendment No. 248, dated January 26, 2017 (ADAMS Accession No. ML17004A250), supporting the replacement of transformer 1X210 during the spring 2020 refueling outage.

The licensee stated in its December 9, 2019 supplemental letter that:

It was determined that the first two mitigating actions – i.e., 1) Unit 1 in MODE 5 for at least 24 hours with the core and fuel pools connected through the reactor cavity; and 2) Spray pond temperature is maintained less than 82°F – should also be applied to all ESW piping replacement evolutions.

This change in the originally proposed compensatory measures is reflected in Section 3.2 of this safety evaluation. Specifically, this change resulted in an enhancement to compensatory measure 4 and in a new compensatory measure 11. These compensatory measures will

mitigate the risk associated with a dual unit LOOP by providing the large mass of water over the outage unit reactor core that can absorb the decay heat present for an extended period and allow the remaining ESW and RHRSW loops to provide all the needed cooling for the unit that was operating just prior to the LOOP.

The RAI also requested more detail regarding the flooding hazard presented by a large hole in the reactor building wall associated with the ESW piping replacement. The LAR described the ESW line as entering the building some 18 feet below grade, and the necessary excavation outside would present a sizeable collection basin for precipitation runoff. In response, the licensee stated in its December 9, 2019 supplemental letter that:

As a first line of defense, an external sump pump will be available to remove any water accumulation from the excavated area due to rainfall or snow melt. Second, entrance to all rooms on the basement elevation are through water tight doors which would prevent water propagation to adjacent rooms in the event of a flood. All rooms on the basement contain a seismically qualified room flooding alarm which alarms in the control room. This will allow Operations personnel to respond to high water level in any room and initiate prudent mitigative measures in a timely manner. The reactor building basement also contains a sump pump that can be aligned to any basement room to remove flood water. Finally, the Unit 1 and 2 reactor buildings are separated by a concrete wall which prevents water propagation from the outage unit to the operating unit.

This combination of existing plant features and the external pump for removing water from the excavation area (identified in compensatory measure 8) provides reasonable assurance that any flood hazard presented by the breach of the reactor building can be successfully mitigated.

3.2 Compensatory Measures

LAR Enclosure 1, Section 3.1, describes the pipe replacement activities and indicates that throughout the activities, a restoration of the affected loop functionality (but not operability) could be accomplished in much less than the existing CT of 72 hours, should an event occur where the function might be needed.

Enclosure 2 of the licensee's December 9, 2019 supplemental letter provides the following compensatory measures for managing risk during the ESW piping replacement activities:

1. The opposite division ESW and Residual Heat Removal Service Water (RHRSW) systems will be OPERABLE and available prior to breaching the pipe on the affected division.
2. Procedures will be established to provide direction for restoring the affected ESW and RHRSW divisions to a functional status. The procedures will require designating individuals to perform the restoration tasks and that the required materials be pre-staged at the work site.
3. FLEX [Diverse and Flexible Mitigation Capability] strategies will be available for implementation as additional defense in depth contingency on both units.

4. The outage unit will be in MODE 5 for at least 24 hours with the core and fuel pools connected through the reactor cavity. The Unit 1 and 2 spent fuel pools will remain cross-tied through the cask storage pit.
5. Training will be provided to Operations personnel on this Technical Specification (TS) change and the associated evolution to replace the ESW piping.
6. The Outage Control Center will be manned while performing the activities authorized by this amendment.
7. A temporary missile barrier will be available for use while the buried ESW piping is exposed.
8. A sump pump will be staged at the work area to prevent flooding into the reactor building in the event of torrential rain during the pipe replacement activities.
9. Susquehanna will not enter the window of common shutdown cooling until the ESW piping is at least watertight.
10. Equipment will be protected and discretionary maintenance controlled in accordance with procedure NDAP-QA-0340, "Protected Equipment Program." Susquehanna will evaluate the ESW piping replacement and protect equipment in accordance with the program at the time of the evolution. Currently, the list of protected equipment would include:
 - a. The four required Diesel Generators (DGs)
 - b. Opposite division ESW pumps and spray pond valves and associated power supplies
 - c. Opposite division RHRSW pumps and valves and associated power supplies
 - d. Opposite division 4.16 kV [kilovolt] buses
 - e. Opposite division 250 V [volt] and 125 V batteries
 - f. Opposite division Direct Expansion (DX) unit
 - g. Opposite division Control Structure Chiller
11. Spray Pond temperature will be maintained less than 82 °F [degrees Fahrenheit].

The NRC staff reviewed these compensatory measures. Compensatory measures 1, 5, 6, and 10 ensure that reasonable administrative measures will be in place to reduce the risk of inadvertent compromise of the unaffected cooling water subsystems, while the ESW piping replacement activities render the affected subsystems as non-functional. Compensatory measures 4, 7, 8, 9, and 11 ensure that conditions will be established and maintained to directly manage risk associated with the ESW piping replacement activities. Compensatory measures 2 and 3 address defense in depth regarding the capability to restore ESW and RHRSW subsystems to functionality as quickly as possible.

Diverse and flexible mitigation capability, or FLEX, safety strategies maintain long-term core cooling with installed plant equipment that is protected from natural hazards. Compensatory

measures 2 and 3 can also employ the FLEX equipment for functional redundancy, should an event occur, and the operable subsystems need to be placed in service.

The licensee noted that during the planned initial ESW piping replacement activities in 2020, the safeguards 480 V load center transformers 1X210 and 1X220 will also be replaced, utilizing the extension to LCO 3.7.1 approved for Susquehanna, Unit 2, in License Amendment No. 248, dated January 26, 2017. That amendment approved a temporary change to the Unit 2 TS 3.7.1 to increase the CT from 72 hours to 7 days to accommodate the 480 V engineered safeguard system load center transformer replacements in Unit 1.

The transformer replacements will occur on the same division as the proposed initial ESW piping replacement. In the January 26, 2017 safety evaluation for License Amendment No. 248, the NRC staff found the following four actions acceptable to mitigate the consequences of a dual unit LOOP and component failure in the only operable RHRSW loop during the transformer replacements by retaining the capability to maintain both units in safety shutdown with the spent fuel pools adequately cooled:

1. Unit 1 in MODE 5 for at least 24 hours, with the core and fuel pools connected through the reactor cavity.
2. Spray pond temperature is maintained less than 82 °F.
3. ESSW pumphouse doors or dampers aligned to provide adequate cooling prior to replacing 1X210 and 1X220.
4. Designated personnel to open the spray array valves and close the bypass valve.

To ensure that the licensee addressed the compensatory measure in the footnotes of the TSs regarding the CT of 14 days for TS 3.7.1 Condition B and TS 3.7.2 Conditions B and C during the replacement of the ESW piping for the opposite unit, the NRC staff requested additional information by e-mail dated May 7, 2019 (ADAMS Accession No. ML19128A023). In its supplemental letter dated June 3, 2019, the licensee determined that it was necessary to revise the wording of the footnotes modifying TS 3.7.1 Condition B and TS 3.7.2 Conditions B and C for both units. Specifically, the licensee proposed revising the wording for all such footnotes to state:

This Completion Time is only applicable during the Unit [1 or 2, as appropriate] 'A' and 'B' ESW piping replacement while the compensatory measures identified in Section 3.3 of Enclosure 1 to letter PLA-7751 are in place. Upon completion of pipe replacement activities, this temporary extension is no longer applicable and will expire on June 25, [2026 or 2027, as appropriate].

The NRC staff found that this proposed response did not adequately define the operating condition of the shutdown unit while in the extended CT and requested additional information in its letter dated November 14, 2019.

The respective required actions of TS 3.7.1 Condition B and TS 3.7.2 Conditions B and C, combined with the compensatory measures, are acceptable remedial measures when the respective LCO is not met during the ESW piping replacements to justify continued operation for up to 14 days during the ESW piping replacements. The staff reviewed the compensatory measures and administrative controls to ensure that they are implemented during the maintenance activity. These compensatory actions provide reasonable assurance that the risk associated with the requested extension of the CTs for the ESW and RHRSW subsystems will

be appropriately managed, consistent with the requirements of 10 CFR 50.36 and 10 CFR 50.65(a)(4). The requirements to maintain the outage unit in refueling mode with the reactor well flooded and spray pond temperature less than 82 °F, combined with the remaining capability of the ESW and RHRSW systems, provides reasonable assurance that these systems' safety functions would be accomplished. In addition, appropriate compensatory measures were identified to ensure the availability of the unaffected ESW and RHRSW subsystems and to provide defense-in-depth capabilities to respond to events that could challenge those system functions. Thus, plant safety would be maintained by minimizing risks of the unaffected subsystems becoming inoperable and limiting the time that the affected subsystems functions would be unavailable.

The licensee's December 9, 2019 supplemental letter contained a revised list of the compensatory measures, which included maintaining the non-operating unit in Mode 5 for at least 24 hours, with the core and fuel pools connected through the reactor cavity, and the spray pond temperature maintained less than 82 °F.

The licensee's December 9, 2019 supplemental letter also contained a qualitative discussion of the reliability of the ESW and RHRSW components during a LOOP event in the operating unit and an expanded discussion regarding flood mitigation strategy.

The NRC staff reviewed the revised compensatory measures and determined that they were acceptable with the justifications identified in Section 3.1 of this safety evaluation.

The licensee's December 9, 2019 supplemental letter proposed a CT of 14 days for TS 3.7.1 Condition B and TS 3.7.2 Conditions B and C during the replacement of ESW piping for the opposite unit, as well as footnotes for each proposed CT, which would state:

This Completion Time is only applicable during the Unit [1 or 2, as appropriate] 'A' and 'B' ESW piping replacement while the compensatory measures identified in Enclosure 2 to letter PLA-7830 are in place. Upon completion of pipe replacement activities, this temporary extension is no longer applicable and will expire on June 25, [2026 or 2027, as appropriate].

The NRC staff determined that the respective proposed temporary required actions of TS 3.7.1 Condition B and TS 3.7.2 Conditions B and C, combined with the compensatory measures, are acceptable remedial measures when the respective LCO is not met during ESW piping replacement and justify continued operation for up to 14 days during the ESW piping replacement.

The NRC staff reviewed the licensee's evaluation and justification of the proposed changes. The NRC staff determined that the TSs will be based on the analyses and evaluation included in the safety analysis report, and amendments thereto, as required by 10 CFR 50.36(b). The staff also determined that when the LCOs for TS 3.7.1 and TS 3.7.2 are not met, the TSs will require the licensee to shut down the reactor or follow remedial action permitted by the TSs until the LCO can be met, as required by 10 CFR 50.36(c)(2). Therefore, the staff concludes that the proposed changes are acceptable.

The NRC staff also reviewed the licensee's proposal to remove the tables of contents from the TSs and place them in a licensee-controlled document. The staff determined that while the guidance for format and content of licensee TSs found in NUREG-1433 contains a table of contents, a table of contents is not required per 10 CFR 50.36 to be part of a licensee's TSs.

Therefore, the staff concludes that placing the tables of contents under licensee control is an administrative change and, thus, is acceptable.

3.3 Technical Conclusion

The licensee's requested TS CT duration extensions are temporary. The operable ESW and RHRSW subsystems maintain the system functions, and the compensatory actions listed in the LAR that would adequately manage risk are invoked by a note in the proposed TS CT wording changes. Based on the preceding regulatory and technical evaluations, the NRC staff concludes that the proposed changes to TS 3.7.1 that would extend on a temporary basis the CT for Required Action B.1 for one RHRSW subsystem inoperable and the proposed changes to TS 3.7.2 that would extend on a temporary basis the CT for Required Action B.1 for an ESW subsystem not capable of supplying ESW flow to at least three required diesel generators and the CT for Required Action C.1 for one ESW subsystem inoperable to 14 days during the replacement of the other unit's ESW piping provide reasonable assurance of reactor safety and are, therefore, acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendments on January 7, 2020. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration and there has been no public comment on such finding published in the *Federal Register* on February 26, 2019 (84 FR 6180). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: J. Bettie
M. Hamm

Date: January 17, 2020

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 275 AND 257 RE: TEMPORARY CHANGES TO ALLOW REPLACEMENT OF THE EMERGENCY SERVICE WATER SYSTEM PIPING (EPID L-2019-LLA-0004) DATED JANUARY 17, 2020

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