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

March 10, 2021

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. 280 AND 262 RE: REVISE TECHNICAL SPECIFICATION 3.8.1, "AC SOURCES – OPERATING," TO CREATE A NEW CONDITION FOR AN INOPERABLE MANUAL SYNCHRONIZATION CIRCUIT (EPID L-2019-LLA-0118)

Dear Mr. Cimorelli:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 280 to Renewed Facility Operating License No. NPF-14 and Amendment No. 262 to Renewed Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Units 1 and 2, respectively. These amendments consist of changes to the technical specifications in response to your application dated May 26, 2020.

The amendments revise Technical Specification 3.8.1, "AC [Alternating Current] Sources – Operating." Specifically, the amendments create a new technical specification action for an inoperable manual synchronization circuit requiring restoration within 14 days.

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

Sincerely,

/RA/

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. 280 to License No. NPF-14
2. Amendment No. 262 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. 280
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 May 26, 2020, 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. 280, 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 license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna

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Date: 2021.03.10 09:55:00 -05'00'

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: March 10, 2021

ATTACHMENT TO LICENSE AMENDMENT NO. 280

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	INSERT
Page 3	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 a marginal line indicating the area of change.

REMOVE	INSERT
3.8-4	3.8-4
3.8-5	3.8-5
3.8-6	3.8-6
3.8-7	3.8-7
3.8-8	3.8-8
3.8-9	3.8-9
3.8-10	3.8-10
3.8-11	3.8-11

(3) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, posses, 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, posses, 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 nor 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. 280, 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
E. Two or more required DGs inoperable.	E.1	Restore at least three required DGs to OPERABLE status.	2 hours
F. Required Action and Associated Completion Time of Condition A, B, C, D, or E not met.	F.1 AND F.2	Be in MODE 3. Be in MODE 4.	12 hours 36 hours
G. One or more offsite circuits and two or more required DGs inoperable. OR One required DG and two offsite circuits inoperable.	G.1	Enter LCO 3.0.3.	Immediately
H. Manual synchronization circuit inoperable.	H.1	Restore manual synchronization circuit to OPERABLE status.	14 days

SURVEILLANCE REQUIREMENTS

----------NOTE----------
Four DGs are required and a DG is only considered OPERABLE when the DG is aligned to the Class 1E distribution system. DG Surveillance Requirements have been modified to integrate the necessary testing to demonstrate the availability of DG E and ensure its OPERABILITY when substituted for any other DG. If the DG Surveillance Requirements, as modified by the associated Notes, are met and performed, DG E can be considered available and OPERABLE when substituted for any other DG after performance of SR 3.8.1.3 and SR 3.8.1.7.

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each offsite circuit.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.2	Not Used.	

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.3	----------NOTES---------- 1. DG loading may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by and immediately follow, without shutdown, a successful performance of SR 3.8.1.7. 5. DG E, when not aligned to the Class 1 E distribution system, may satisfy this SR using the test facility. 6. A single test will satisfy this Surveillance for both units if synchronization is to the 4.16 kV ESS bus for Unit 1 for one periodic test and synchronization is to the 4.16 kV ESS bus for Unit 2 for the next periodic test. However, if it is not possible to perform the test on Unit 2 or test performance is not required per SR 3.8.2.1, then the test shall be performed synchronized to the 4.16 kV ESS bus for Unit 1. ---------- Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 3600 kW and ≤ 4000 kW.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.4	Verify each engine mounted day tank fuel oil level is ≥ 420 gallons for DG A-D and ≥ 425 gallons for DG E.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.5	Check for and remove accumulated water from each engine mounted day tank.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.6	Verify the fuel oil transfer system operates to automatically transfer fuel oil from the storage tanks to each engine mounted tank.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.7	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. A single test at the specified Frequency will satisfy this Surveillance for both units. ---------- Verify each DG starts from standby condition and achieves, in ≤ 10 seconds, voltage ≥ 3793 V and frequency ≥ 58.8, and after steady state conditions are reached, maintains voltage ≥ 4000 V and ≤ 4400 V and frequency ≥ 59.3 Hz and ≤ 60.5 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.8	----------NOTE---------- The automatic transfer of the unit power supply shall not be performed in MODE 1 or 2. ---------- Verify automatic and manual transfer of unit power supply from the normal offsite circuit to the alternate offsite circuit.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- A single test at the specified Frequency will satisfy this Surveillance for both units. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 64.5 Hz; b. Within 4.5 seconds following load rejection, the voltage is ≥ 3760 V and ≤ 4560 V, and after steady state conditions are reached, maintains voltage ≥ 4000 V and ≤ 4400 V; and c. Within 6 seconds following load rejection, the frequency is ≥ 59.3 Hz and ≤ 60.5 Hz.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.10	----------NOTES---------- A single test at the specified Frequency will satisfy this Surveillance for both units. ---------- Verify each DG does not trip and voltage is maintained ≤ 4560 V during and following a load rejection of ≥ 4000 kW.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.11	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. This SR shall be performed for each DG on a rotational test basis and for each 4.16 kV ESS bus at the specified FREQUENCY. 3. This Surveillance shall not be performed in MODE 1, 2, or 3. ---------- Verify on an actual or simulated loss of offsite power signal: a. De-energization of 4.16 kV ESS buses; b. Load shedding from 4.16 kV ESS buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected shutdown loads through individual load timers, 3. maintains steady state voltage ≥ 4000 V and ≤ 4400 V, 4. maintains steady state frequency ≥ 59.3 Hz and ≤ 60.5 Hz, and 5. supplies permanently connected loads for ≥ 5 minutes.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	----------NOTES---------- 1. All DG starts may be preceded by an engine prelube period. 2. DG E, when not aligned to the Class 1E distribution system, may satisfy this SR for both units by performance of SR 3.8.1.12.a, b and c using the test facility to simulate a 4.16 kV ESS bus. SR 3.8.1.12.d and e may be satisfied with either the normally aligned DG or DG E aligned to the Class 1E distribution system. ---------- Verify on an actual or simulated Emergency Core Cooling System (ECCS) initiation signal, each DG auto-starts from standby condition and: a. In ≤ 10 seconds after auto-start achieves voltage ≥ 3793 V, and after steady state conditions are reached, maintains voltage ≥ 4000 V and ≤ 4400 V; b. In ≤ 10 seconds after auto-start achieves frequency ≥ 58.8 Hz, and after steady state conditions are reached, maintains frequency ≥ 59.3 Hz and ≤ 60.5 Hz; c. Operates for ≥ 5 minutes; d. Permanently connected loads remain energized from the offsite power system; and e. Emergency loads are energized or auto-connected through the individual load timers from the offsite power system.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.13	----------NOTES---------- 1. A single test at the specified Frequency will satisfy this Surveillance for both units. 2. DG E, when not aligned to the Class 1 E distribution system, may satisfy this SR for both units by using a simulated ECCS initiation signal. ---------- Verify each DG's automatic trips are bypassed on actual or simulated loss of voltage signal on the 4.16 kV ESS bus concurrent with an actual or simulated ECCS initiation signal except: a. Engine overspeed; and b. Generator differential current; and c. Low lube oil pressure.	In accordance with the Surveillance Frequency Control Program
SR 3.8.1.14	----------NOTES---------- 1. Momentary transients outside the load ranges do not invalidate this test. 2. A single test at the specified Frequency will satisfy this Surveillance for both units. 3. DG E, when not aligned to the Class 1E distribution system may satisfy this SR by using the test facility. ---------- Verify each DG operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 4400 kW and ≤ 4700 kW for DGs A through D and ≥ 5000 kW and ≤ 5500 kW for DG E; and b. For the remaining hours of the test loaded ≥ 3600 kW and ≤ 4000 kW for DGs A through D and ≥ 4500 kW and ≤ 5000 kW for DG E.	In accordance with the Surveillance Frequency Control Program

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WASHINGTON, D.C. 20555-0001

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. 262
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 May 26, 2020, 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. 262, 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 license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

James G. Danna

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Date: 2021.03.10 09:54:15 -05'00'

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: March 10, 2021

ATTACHMENT TO LICENSE AMENDMENT NO. 262

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.

REMOVE	INSERT
Page 3	Page 3

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

REMOVE	INSERT
3.8-5	3.8-5

(3) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, posses, 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, posses, 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 nor 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. 262, 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.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One or more offsite circuits and two or more required DGs inoperable. OR One required DG and two offsite circuits inoperable.	G.1 Enter LCO 3.0.3.	Immediately
H. Manual synchronization circuit inoperable.	H.1 Restore manual synchronization circuit to OPERABLE status.	14 days

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 280 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-14

AND AMENDMENT NO. 262 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 letter dated May 26, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20148L497), Susquehanna Nuclear, LLC (the licensee) requested changes to the technical specifications (TSs) for Susquehanna Steam Electric Station (Susquehanna), Units 1 and 2. The proposed amendments would revise TS 3.8.1, "AC [Alternating Current] Sources – Operating." Specifically, the proposed amendments would create a new TS action for an inoperable manual synchronization circuit requiring restoration within 14 days.

The licensee stated that the proposed amendments are necessary to reduce the potential for an unnecessary dual-unit shutdown. Based on the configuration of the AC power sources at Susquehanna, an inoperable manual synchronization circuit currently results in entry into Limiting Condition for Operation (LCO) 3.0.3 related to a condition when an LCO is not met and the associated actions are not met, or an associated action is not provided. For Susquehanna, Units 1 and 2, failure to comply with TS 3.8.1 requirements would result in dual-unit shutdown, which is not commensurate with the risk associated with having an inoperable manual synchronization circuit.

2.0 REGULATORY EVALUATION

The NRC staff applied the following U.S. Nuclear Regulatory Commission (NRC, the Commission) requirements to evaluate the license amendment request (LAR).

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36, "Technical specifications," requires, in part, that the operating license of a nuclear production facility include TSs.

Section 50.36(c)(2) of 10 CFR states that LCOs are the lowest functional capability or performance levels of equipment required for safe operation of the facility, and when LCOs are not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TSs until the LCO can be met.

Section 50.36(c)(3) of 10 CFR requires that the TSs include surveillance requirements (SRs), which are requirements "relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting condition for operation will be met."

Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 (GDC), Criterion 17, "Electric power systems," requires, in part, that an onsite electric power system and an offsite electric power system be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences, and (2) the core is cooled, and containment integrity and other vital functions are maintained in the event of postulated accidents. The onsite electric power supplies, including the batteries and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions, assuming a single failure. GDC 17 provides, in part, the basis for the TS LCOs for the plant offsite and onsite electrical power systems.

GDC 18, "Inspection and testing of electric power systems," requires, in part, that electric power systems important to safety be designed to permit appropriate periodic inspection and testing of important areas and features to assess the continuity of the systems and the condition of their components. GDC 18 also requires, in part that the systems shall be designed with a capability to test periodically (1) the operability and functional performance of the components of the systems, and (2) the operability of the systems as a whole and, under conditions as close to design as practical, the full operation sequence that brings the systems into operation.

3.0 TECHNICAL EVALUATION

3.1 System Design and Operation

According to the Susquehanna Updated Final Safety Analysis Report, Chapter 8, there are four 4.16 kilovolt (kV) safety-related buses for Units 1 and 2. The Susquehanna electrical design differs from the typical dual-unit site in that the five diesel generators (DGs) and the four safety-related buses are shared between the two units instead of two DGs and associated buses being assigned to each unit.

Electric power from the offsite power sources to the onsite distribution system is provided by two physically separated 230 kV transmission lines. Two startup transformers (T-10 and T-20) step down the voltage from 230 kV to 13.8 kV for onsite distribution for both units. The 13.8 kV distribution system provides a preferred and an alternate source of AC electric power via emergency safeguard system (ESS) transformers to all safety-related loads through the Class IE 4.16 kV distribution system.

The Class 1E power system has four 13.8/4.16 kV ESS transformers, T-101, T-111, T-201, and T-211, that can power the respective safety-related buses. Each bus has the capability to be

supplied from its preferred source (transformer) or the alternate source. According to the Updated Final Safety Analysis Report, the Class 1E AC system is divided into four load group channels per unit (load group channels A, B, C, and D) such that any combination of three-out-of-four load groups has the capability of supplying the minimum required safety loads of that unit.

Four independent DGs designated A, B, C, and D shared between the two units provide emergency power for each of the four ESS 1E AC load groups in each unit in the event of total loss of the preferred and alternate supplies. A spare Class 1E DG (E-diesel) is provided, which can be manually aligned as a replacement for any one of the other four DGs without violating the independence of the redundant safety-related load groups. In the event of a loss-of-offsite-power (LOOP), the engineered safety feature (ESF) loads are automatically connected to the DGs in sufficient time to support safe reactor shutdown and to mitigate the consequences of a design-basis accident (DBA) such as loss-of-coolant accident. DGs A, B, C, and D are each rated for continuous operation at 4,000 kilowatts (kW) 0.8 power factor and 4,700 kW for 2,000-hour operation. DG E is rated for continuous operation at 5,000 kW 0.8 power factor and 5,500 kW for 2,000-hour operation. The capacity of any DG aligned to the specific safety buses, assuming one of the aligned diesels fails, is sufficient to operate the ESF loads of one unit and those systems required for concurrent safe shutdown of the second unit.

At the 4 kV ESF power distribution subsystem, a three-way transfer system is provided to enable the ESF loads to connect to either of the two offsite power sources or to the standby DGs. This switch provides the means for a manual live bus transfer through a synchronizing device or allows a DG to be tied with any one of the two offsite sources for an indefinite time under test condition.

LAR Section 2.1.4 describes the design features for the manual synchronization circuit, in part, as follows:

> The manual synchronization circuit provides a means to switch the power supply to an energized electrical circuit from one source to another for the 13.8 kV buses and the 4.16 kV buses, as well as tie the DGs to the 4.16 kV buses. There is one manual synchronization circuit shared between the two units; it is comprised of a synchronization bus, a bus differential voltmeter, a synchroscope, two white lights, and 37 synchronizing selector switches (referred to as “sync selector switches” hereafter). Eight of the sync selector switches are for the DGs, 16 are for the primary and alternate offsite power supply to the 4.16 kV buses, and the remaining 13 are for the 13.8 kV buses. In order to manually synchronize one power supply to another, the desired hand switch is taken to the ON position. This provides power from the bus (i.e., the “Running Voltage”), which is compared to the source voltage (“Incoming Voltage”) with ground as a reference point. The synchroscope, two white lights, and the bus differential voltmeter provide indication to operators as to how well the two sources are matched in frequency, phase angle, and voltage. When the sources are synchronized, the operator manually closes the breaker for the new power source. Because the sync selector switches share the synchronization bus, only one sync selector switch can be turned on at a time.

The sync selector switches can be used to:

Transfer the 4.16 kV Emergency Safeguard System (ESS) bus power source from the preferred power supply to the alternate power supply, or from the alternate power supply to the preferred power supply.

Manually connect DGs A-D (or E, if substituted) to their corresponding 4.16 kV bus for DG testing purposes.

Restore offsite power source to an ESS bus (such as following a Loss of Offsite Power (LOOP)) if a DG was powering the bus. A de-energized ESS bus can be powered by offsite power without the use of the sync selector switches.

Transfer the 13.8 kV bus power source between startup transformers.

Transfer the 13.8 kV auxiliary buses between auxiliary transformers.

The sync selector switches are only utilized for manual transfers. The automatic transfer functions do not utilize any of the manual synchronization equipment. The ability to manually transfer the power source for a 4.16 kV or 13.8 kV bus is not assumed in any accident analysis. Restoration of the normal power source can be made without the manual synchronization circuit by de-energizing the bus. The ability to synchronize a DG to an energized bus is also not assumed in any accident analysis, but is needed to perform certain tests.

3.2 Current TS Requirements

LCO 3.8.1 requires, for each unit, that two offsite sources and four onsite DGs be operable in Modes 1, 2, and 3.

The following SRs are performed to demonstrate the operability requirements of the offsite power sources and the DGs. Although manual synchronization circuit is not described in the LCO, the manual synchronization circuit is functional to demonstrate completion of the SRs and operability of both onsite and offsite power systems.

SR 3.8.1.3 states, “Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 3600 kW and ≤ 4000 kW.”

SR 3.8.1.8 states, “Verify automatic and manual transfer of unit power supply from the normal offsite circuit to the alternate offsite circuit.”

SR 3.8.1.16 states:

Verify each DG:

a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;

b. Transfers loads to offsite power sources, and

c. Returns to ready-to-load operation.

The licensee stated in LAR Section 2.2 that based on the configuration of the Class 1E alternating current (AC) power sources at Susquehanna, a failure of a single sync selector switch (and, therefore, the entirety of the manual synchronization circuit) disables the capability to synchronize all four DGs and both offsite sources for both units. The inability to synchronize the DGs to an offsite source means that restoration of offsite power source to the ESS buses after recovery from a LOOP event cannot be achieved by parallel operation of the power sources. This results in non-compliance with the intent of Susquehanna TS SRs 3.8.1.8 and 3.8.1.16. Since Susquehanna TS 3.8.1 does not have a condition for an inoperable manual synchronization circuit, Required Action G.1 associated with Condition G, "One or more offsite circuits and two or more required DGs inoperable, OR one required DG and two offsite circuits inoperable," requires entry into LCO 3.0.3 immediately. As all sync selector switches share a common synchronization bus for both units, the required entry into LCO 3.0.3 is applicable to both units. The failure of a sync selector switch does not impact the automatic transfer capability between offsite and onsite power sources assumed in the accident analyses.

3.3 Proposed TS Changes

TS 3.8.1 is revised to add a new Action H. Condition H will state, "Manual synchronization circuit inoperable." The associated required action is to restore the manual synchronization circuit to an operable status with a completion time (CT) of 14 days.

3.4 NRC Staff Evaluation

In LAR Section 2.3, the licensee stated the reason for the proposed TS change. When the licensee performs verification of the transfer capabilities of the offsite power sources in SR 3.8.1.8 and the DGs in SR 3.8.1.16, the appropriate sync selector switch is placed in the 'on' position. This is performed by rotating a keyed switch in the control room. In LAR Section 2.2, the licensee stated that SR 3.8.1.3 also requires verification that "each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 3600 kW and ≤ 4000 kW." However, the DG is connected to the ESS bus to support performance of the test, and that connection cannot be performed without the manual synchronization circuit. If the manual synchronization circuit is not available, the SR cannot be performed, and the capability to restore offsite power following a LOOP event is not assured.

The licensee stated that Susquehanna has identified material degradation of the plastic within the key switch as a potential failure mechanism for the sync selector switch, which has resulted in two failures since 2013. The failures resulted in the circuit remaining energized with the inability to be deenergized. There are 37 sync selector switches that share a common synchronization bus. A failure of one switch renders the manual transfer capability of the remaining 36 sync selector switches unavailable. However, the safety function of automatic transfers between offsite and onsite power sources is not impacted.

Based on its review of the DG and the 4.16 kV and 13.8 kV manual synchronization circuitry and automatic transfer circuitry, the NRC staff determined that manual synchronization circuitry and automatic transfer circuitry are independent, and the automatic transfer circuitry does not utilize the sync selector switches. Therefore, the staff concluded that the existing automatic transfer circuitry is not affected by an inoperable sync selector switch or a manual synchronization component.

The AC sources are designed to permit inspection and testing of important areas and features, especially those that have a standby function, in accordance with 10 CFR Part 50, Appendix A,

GDC 18. Periodic component tests are supplemented by extensive functional tests during refueling outages under simulated accident conditions. The NRC staff noted that the manual synchronization circuit, including the sync selector switches, is needed to perform:

- TS SR 3.8.1.8 regarding transfer capabilities between normal and alternate offsite power sources,

- TS SR 3.8.1.3 to verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 3,600 kW and ≤ 4,000 kW transfer capabilities between the DGs and offsite power sources, and

- TS SR 3.8.1.16 to verify each DG synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power transfers loads to offsite power sources and returns each DG to ready-to-load operation.

The NRC staff reviewed the licensee's proposed request for the addition of a Condition H required action and the CT while the manual synchronization circuit is inoperable. The required action is to restore the manual synchronization circuit to an operable status within a CT of 14 days. The NRC staff noted that the proposed change provides additional time for the plant to operate with the manual synchronization circuit inoperable. The licensee has stated that during the time that the manual synchronization circuit is inoperable, the automatic transfer functions of all Class 1E AC sources remain unaffected, and the power sources will be available in a manner commensurate with assumptions in accident analyses. Therefore, the NRC staff finds that the Condition H required action is acceptable.

The NRC staff reviewed the licensee's analysis for the proposed CT duration of 14 days for the Condition H required action. The licensee stated in Section 3.1 of the LAR that TS SR 3.8.1.3 is typically performed once per week on successive DGs such that each of the required DGs is typically tested once every 28 days, although the current frequency of SR 3.8.1.3 is 31 days. In order to perform the monthly DG runs currently required by SR 3.8.1.3, operators manually synchronize the DG to the power grid by operating the sync selector switch. If the sync selector switch becomes inoperable during the test, the surveillances for the remaining DGs cannot be performed.

The licensee further states that based on Susquehanna scheduling surveillance practices with an allowable delay of 25 percent in accordance with SR 3.0.2, the subsequent performance of SR 3.8.1.3 would be required within 17.75 days after which the DG scheduled to be tested would be declared inoperable. Based on this analysis, Susquehanna is proposing a 14-day CT for an inoperable manual synchronization circuit. The NRC staff finds the 14-day CT duration acceptable because the current automatic transfer functions of both onsite and offsite power system design-basis safety functions are not adversely impacted by the inoperable manual synch switch. The 14-day period also provides the licensee with sufficient flexibility in scheduling and repairing a failed switch and maintaining conformance with surveillances associated with the SR 3.8.1.3 frequency for each DG. The relatively low risk associated with an inoperable manual synchronization circuit, compared to entry into LCO 3.0.3 for both units and the associated shutdown risk, is acceptable.

The NRC staff concludes that the LAR meets the regulatory requirements as discussed in Section 2.0 above. In the event of a loss of preferred power, the ESF electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to

mitigate the consequences of a DBA such as a loss-of-coolant accident. The 14-day CT considers the operability of the AC sources and reasonable time for repairs.

The NRC staff has determined that the licensee's request to add Condition H to the TS 3.8.1 required action and CT to restore the manual synchronization circuit to an operable status is consistent with the requirements specified in 10 CFR 50.36(c)(2) and (c)(3). Therefore, the staff concludes that the licensee's proposed change complies with existing regulations.

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 February 26, 2021. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or change SRs. 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 (85 FR 45449; July 28, 2020). There was one public comment on such finding, but it was not relevant to the LAR. 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 Contributor: R. Mathew

Date: March 10, 2021

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 – ISSUANCE OF AMENDMENT NOS. 280 AND 262 RE: REVISE TECHNICAL SPECIFICATION 3.8.1, "AC SOURCES – OPERATING," TO CREATE A NEW CONDITION FOR AN INOPERABLE MANUAL SYNCHRONIZATION CIRCUIT (EPID L-2019-LLA-0118) DATED MARCH 10, 2021

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