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

January 26, 2017

Mr. Robert J. Franssen
Acting Site Vice President
Susquehanna Nuclear, LLC
769 Salem Boulevard
NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2 – ISSUANCE OF AMENDMENT RE: TEMPORARY CHANGE OF TECHNICAL SPECIFICATIONS TO ALLOW REPLACEMENT OF ENGINEERED SAFEGUARD SYSTEM LOAD CENTER TRANSFORMERS (CAC NO. MF7298)

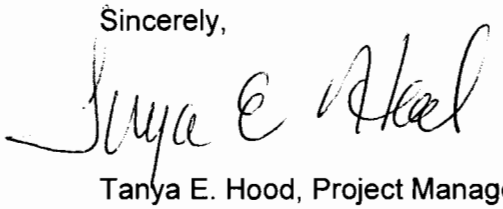
Dear Mr. Franssen:

The U.S. Nuclear Commission (Commission) has issued the enclosed Amendment No. 248 to Renewed Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station (SSES), Unit 2. This amendment consists of changes to the technical specifications (TSs) in response to your application dated January 28, 2016, as supplemented by letters dated April 6, 2016, and October 10, 2016 (Agencywide Documents Access and Management System Accession Nos. ML16029A031, ML16097A486 (package), and ML16284A013, respectively).

This amendment revises TS 3.7.1, "Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)," and TS 3.8.7, "Distribution Systems - Operating," to increase the completion time for Conditions A and B of TS 3.7.1, and Condition C of TS 3.8.7, from 72 hours to 7 days, in order to accommodate 480 volt engineered safeguard system load center transformer replacements on SSES, Unit 1. The proposed change is temporary and will be annotated by a note in each TS that specifies the allowance expires on June 15, 2020.

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

Sincerely,



Tanya E. Hood, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-388

Enclosures:
1. Amendment No. 248 to NPF-22
2. Safety Evaluation

cc w/enclosures: Distribution via Listserv

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

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 248
Renewed License No. NPF-22

1. The U.S. Nuclear Regulatory Commission (the Commission or the NRC) has found that:

   A. The application for the amendment filed by Susquehanna Nuclear, LLC, dated January 28, 2016, as supplemented by letters dated April 6, 2016, and October 10, 2016, 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 set forth in 10 CFR Chapter I;

   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. 248, 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 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Stephen S. Koenick, Acting 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 26, 2017

ATTACHMENT TO LICENSE AMENDMENT NO. 248

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 marginal lines indicating the areas 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 marginal lines indicating the areas of change.

REMOVE	INSERT
3.7-1	3.7-1
3.7-2	3.7-2
3.8-44	3.8-44

(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. 248, 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
A. ----------NOTE---------- Separate Condition entry is allowed for each valve. ----------	A.1 Declare the associated RHRSW subsystems inoperable.	Immediately
	AND	
One valve in Table 3.7.1-1 inoperable.	A.2 Establish an open flow path to the UHS.	8 hours
OR	AND	
One valve in Table 3.7.1-2 inoperable.	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)
OR		AND
One valve in Table 3.7.1-3 inoperable.		72 hours
OR		OR
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.		7 days during the replacement of 480 V ESS Load Center Transformers 1X210 and 1X220 in Unit 1[(1)]

(continued)

[(1)] Upon completion of the replacement of 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.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One Unit 2 RHRSW subsystem inoperable.	B.1 Restore the Unit 2 RHRSW subsystem to OPERABLE status.	72 hours from discovery of the associated Unit 1 RHRSW subsystem inoperable OR 7 days during the replacement of 480 V ESS Load Center Transformers 1X210 and 1X220 in Unit 1[(1)] AND 7 days
C. Both Unit 2 RHRSW subsystems inoperable.	C.1 Restore one Unit 2 RHRSW subsystem to OPERABLE status.	8 hours from discovery of one Unit 1 RHRSW subsystem not capable of supporting associated Unit 2 RHRSW subsystem AND 72 hours
D. Required Action and associated Completion Time not met. OR UHS inoperable.	D.1 Be in MODE 3. AND D.2 Be in MODE 4.	12 hours 36 hours

[(1)] Upon completion of the replacement of 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.

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Distribution Systems-Operating

LCO 3.8.7 The electrical power distribution subsystems in Table 3.8.7-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Not applicable to DG E DC Bus 0D597 ---------- One or more Unit 2 AC electrical power distribution subsystems inoperable.	----------Note---------- Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," for DC source(s) made inoperable by inoperable power distribution subsystem(s). ---------- A.1 Restore Unit 2 AC electrical power distribution subsystem(s) to OPERABLE status.	8 hours AND 16 hours from discovery of failure to meet LCO 3.8.7 except for Condition F or G
B. ----------NOTE---------- Not applicable to DG E DC Bus 0D597 ---------- One or more Unit 2 DC electrical power distribution subsystems inoperable.	B.1 Restore Unit 2 DC electrical power distribution subsystem(s) to OPERABLE status.	2 hours AND 16 hours from discovery of failure to meet LCO 3.8.7 except for Condition F or G
C. One Unit 1 AC electrical power distribution subsystem inoperable.	C.1 Restore Unit 1 AC electrical power distribution subsystem to OPERABLE status.	72 hours OR 7 days during the replacement of 480 V ESS Load Center Transformers in Unit 1 [1]

(continued)

[1] This temporary 7-day completion time is applicable during the replacement of all Unit 1 480 V ESS Load Center Transformers, while Unit 1 is in MODES 4 or 5, and will expire on June 15, 2020.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 248 TO

RENEWED FACILITY OPERATING LICENSE NO. NPF-22

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

DOCKET NO. 50-388

1.0 INTRODUCTION

By application dated January 28, 2016, as supplemented by letters dated April 6, 2016, and October 10, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML16029A031, ML16097A486 (package), and ML16284A013, respectively), Susquehanna Nuclear, LLC (the licensee), requested changes to the Technical Specifications (TSs) for Susquehanna Steam Electric Station (SSES), Unit 2.

The proposed changes would revise TS 3.7.1, "Residual Heat Removal Service Water (RHRSW) System and the Ultimate Heat Sink (UHS)," and TS 3.8.7, "Distribution Systems - Operating," to increase the completion time (CT) for Conditions A and B of TS 3.7.1, and Condition C of TS 3.8.7, from 72 hours to 7 days, in order to accommodate 480 volt (V) engineered safeguard system (ESS) load center transformer replacements on SSES, Unit 1. The proposed change is temporary and will be annotated by a note in each TS that specifies the allowance expires on June 15, 2020.

The supplement dated October 10, 2016, 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. Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on May 24, 2016 (81 FR 32810).

2.0 REGULATORY EVALUATION

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

2.1 Regulatory Requirements

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," Section 50.36, "Technical specifications," establishes the regulatory requirements related to the content of TSs.

Section 50.36(c)(2) to 10 CFR Part 50 states, in part, that the limiting conditions for operation (LCOs) are the lowest functional capability or performance level 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) to 10 CFR Part 50 requires, in part, that 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 LCOs will be met.

Section 50.65(a)(3) to 10 CFR Part 50 requires, in part, that adjustments shall be made where necessary to ensure that the objective of preventing failures of structures, systems, and components (SSCs) through maintenance is appropriately balanced against the objective of minimizing unavailability of SSCs due to monitoring or preventive maintenance.

The regulations in Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants" (hereinafter referred to as GDC), establishes the minimum requirements for the principal design criteria for water-cooled nuclear power plants. The principal design criteria establish the necessary design, fabrication, construction, testing, and performance requirements for SSCs important to safety.

GDC 5, "Sharing of structures, systems, and components," requires that SSCs important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.

GDC 17, "Electric power systems," requires, in part, that an onsite electrical power system and an offsite electric power system shall be provided to permit functioning of SSCs important to safety. The safety function for each system 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 18, "Inspection and testing of electric power systems," requires, in part, that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing of important areas and features.

GDC 44, "Cooling water," requires, in part, that a system to transfer heat from SSCs important to safety to an ultimate heat sink shall be provided. The system safety function shall be to transfer the combined heat load of these SSCs under normal operating and accident conditions. Suitable redundancy in components and features and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available), the system safety function can be accomplished, assuming a single failure.

2.2 Description of System/Component

2.2.1 Balance-of-Plant System

The Susquehanna Updated Final Safety Analysis Report (UFSAR), Revision 67, Sections 9.2.5.1, 9.2.6.1, and 9.2.7.2.1, provide the following information about the purpose of the emergency service water (ESW), RHRSW system, and the UHS:

2.2.1.1 Description of the ESW System, UFSAR Section 9.2.5.1

The ESW system has a safety-related function and is designed to provide cooling water for the removal of heat from equipment such as the diesel generators (DGs), residual heat removal (RHR) pump coolers, and room coolers for emergency core cooling system equipment required for a safe reactor shutdown following a design-basis accident (DBA) or transient.

The ESW system is designed to take water from the spray pond (the UHS), pump it to the various heat exchangers, and return it to the spray pond by way of a network of sprays that dissipate the heat to the atmosphere.

TS Bases 3.7.2 states, in part:

> Upon receipt of a loss of offsite power (LOOP) or Loss of Coolant Accident (LOCA) signal, ESW pumps are automatically started after a time delay. The ESW System consists of two independent and redundant subsystems. Each of the two ESW subsystems is made up of a header, two pumps, a suction source, and valves, piping and associated instrumentation. The two subsystems are separated from each other so an active single failure in one subsystem will not affect the OPERABILITY of the other subsystem.

2.2.1.2 Description of the RHRSW System and the UHS, UFSAR Sections 9.2.6.1 and 9.2.7.2.1

The RHRSW system has a safety-related function and 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 exchanger, and return it to the spray pond by way of a spray network that dissipates the heat to the atmosphere.

The RHRSW system is designed to provide a reliable source of cooling water for all operating modes of the RHR system, including heat removal under post-accident conditions, RHR fuel

pool cooling following a seismic event, and also to provide water to flood the reactor core or the primary containment after an accident, should it be necessary.

The UHS for both units consists of the Susquehanna River and one Seismic Category I spray pond. The UHS has safety-related functions and provides cooling water for use in the ESW and RHRSW systems. These water sources ensure that a reliable source of cooling water is available for shutdown and cool down of the reactor and mitigation of accident conditions.

The TS Bases 3.7.1 states, in part:

> The RHRSW System is operated whenever the RHR heat exchangers are required to operate in the shutdown cooling mode or in the suppression pool cooling or spray mode of the RHR System. The RHRSW System consists of two independent and redundant subsystems. Each subsystem is made up of a header, one pump, a suction source, valves, piping, heat exchanger, and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to maintain safe shutdown conditions. The two subsystems are separated so that failure of one subsystem will not affect the OPERABILITY of the other subsystem.
>
> One Unit 1 RHRSW subsystem and the associated (same division) Unit 2 RHRSW subsystem constitute a single RHRSW loop. The two RHRSW pumps in a loop can each, independently, be aligned to either Unit's heat exchanger. The RHRSW System is designed with sufficient redundancy so that no single active component failure can prevent it from achieving its design function.
>
> The UHS system is composed of approximately a 3,300,000 cubic foot spray pond and associated piping and spray risers. Each UHS return loop contains a bypass line, a large spray array and a small spray array. The function of the UHS is to provide water to the RHRSW and ESW systems at a temperature less than the 97°F design temperature of the RHRSW and ESW systems. UHS temperature is maintained less than the design temperature by introducing the hot return fluid from the RHRSW and ESW systems into the spray loops and relying on spray cooling to maintain temperature. The UHS is designed to supply the RHRSW and ESW systems with all the cooling capacity required during a combination (LOCA/LOOP) for thirty days without fluid addition.

2.2.2 Description of the Electrical Power System

According to the Susquehanna UFSAR, Revision 67, Sections 8.1, 8.2, and 8.3, the SSES alternating current (AC) distribution system transmits the output of the Unit 1 and Unit 2 main generators to offsite switchyards and distributes power from the unit auxiliary and offsite power supplies to onsite AC loads. The electric power distribution system includes Class 1E and non-Class 1E AC power systems. The non-Class 1E portion of the onsite power systems provides AC power for non-nuclear safety-related loads. A limited number of non-safety-related loads are important to the power generating equipment integrity and are fed from the Class 1E distribution system.

The Class 1E AC power system distributes power to safety-related loads. The Class 1E AC system is divided into four load group channels per unit (Channels A, B, C, and D). Any three out of four load groups has the capability of supplying the minimum required safety loads. Four DGs shared between the two units provide emergency power for one of the four Class 1E AC load groups in each unit when normal sources are lost. A spare DG (E Diesel) can be manually aligned as a replacement for any one of the other four DGs.

Each ESS Bus powers a 4.16 kV/480V ESS load center transformer used to supply an essential 480V single-ended load center. The associated 4.16 kV ESS bus is the only source of power to the respective load center through the load center transformer. The ESS load center supplies power to the individual 480V loads and to motor control centers (MCCs) that power instrument AC distribution panels, 125V and 250V direct current (DC) battery chargers, and essential plant lighting.

3.0 TECHNICAL EVALUATION

3.1 Description of the Proposed Change

The licensee indicated that it intends to replace the four ESS 480 V load center transformers of Unit 1, as these safety-related transformers are approaching their qualified service life of 40 years. The licensee desires to replace these transformers one at a time, based on the Doble testing, which indicates the deterioration of the transformers. Additionally, the SSES, Unit 2, AC power distribution loads are shared with Unit 1 ESS load center transformers. Such sharing of loads between units would affect the operability of the Unit 2 supported loads during the replacement of Unit 1 transformers.

This proposed change would increase the CT for Conditions A and B of TS 3.7.1, and Condition C of TS 3.8.7, from 72 hours to 7 days, in order to accommodate 480V ESS load center transformer replacements on Unit 1. The electrical distribution system at SSES is such that only changes to Unit 2 TSs are required for these replacements when Unit 1 is not in Modes 1 through 3. The licensee indicated that based on historical data and schedule projections, the replacement of a Unit 1 480V ESS load center transformer requires approximately 120 hours, which would exceed the currently specified CT of 72 hours. The proposed change is temporary and is annotated by a note in each TS that specifies the allowance expires on June 15, 2020.

3.2 Method of Review

The NRC staff reviewed the license amendment request (LAR) by comparing the proposed TS change against the requirements and guidelines of 10 CFR 50.36, 10 CFR 50.65, GDC-5, GDC-17, GDC-18, GDC 44, the current TSs, and the Susquehanna UFSAR, Chapter 8 and Chapter 9.

3.3 Technical Review

3.3.1 Systems and TSs Impacted by Unit 1 Transformer Replacement

The licensee plans to replace Unit 1 480V transformers, 1X210, 1X220, 1X230, and 1X240, one transformer at a time. These transformers power Safety Class 480V loads for Unit 1, some for Unit 2, and common loads for both units. Table 1 of the LAR identified Unit 2 and common loads affected by each transformer replacement. Since Unit 1 will be in Mode 5 during replacement of these transformers, associated Unit 1 TSs for Modes 1 through 3 will not be affected. The associated Unit 2 TSs for Unit 2 and shared components become applicable because the licensee intends for Unit 2 to be in Mode 1 during transformer replacement.

To ensure that the licensee identified in Table 1 of the LAR all of the Unit 2 safety class and Class 1E loads powered from the Unit 1 transformers, along with their corresponding LCOs and technical requirements for operation (TRO), the NRC staff requested additional information in a letter dated September 9, 2016 (ADAMS Accession No. ML16251A065). In Request for Additional Information (RAI) 2, the NRC staff asked that the licensee identify any other Unit 2 or common loads powered from the transformers that were not identified in the LAR and their associated LCOs and TROs.

In its RAI response dated October 10, 2016 (ADAMS Accession No. ML16284A013), the licensee identified additional Unit 2 loads powered by the associated Unit 1 480V transformers, but no additional LCOs or TROs were found to exist. As a result, no additional effect on TSs need be considered. The NRC staff finds this response acceptable, since all the affected LCOs and TROs have been identified in the LAR. The following table identifies the systems or components for Unit 2 that are affected by each transformer replacement. The table also identifies the associated Unit 2 TSs and action statement CT.

Common Unit Equipment Impacted			
Transformer	Equipment Impacted	Associated Unit 2 TS	Unit 2 TS LCO Duration
1X210	RHRSW A LOOP Return Valves	3.7.1	72 Hours
		3.7.2	7 days
1X220	RHRSW B LOOP Return Valves	3.7.1	72 Hours
		3.7.2	7 days
1X230	Standby Gas Treatment System (SGTS) Division 1	3.6.4 .3	7 Days
	Control Room Emergency Outside Air Supply System(CREOASS) Division 1	3.7.3	7 Days
	Control Room Floor Cooling Division 1	3.7.4	30 Days
1X240	SGTS Division 2	3.6.4.3	7 Days
	CREOASS Division 2	3.7.3	7 Days
	Control Room Floor Cooling Division 2	3.7.4	30 Days

The LAR stated the ESS load centers provide power to the individual 480 V loads and to MCCs that power instrument AC distribution panels, 125V and 250V DC battery chargers, and essential plant lighting. The NRC staff was concerned about the effect of Unit 1 transformer replacement on Unit 2 instrumentation. In its letter dated September 9, 2016, the NRC staff asked the licensee in RAI 5 to discuss the impact of the replacement of Unit 1 480V transformers on the Unit 2 instrument AC and DC power supply loads. In its RAI response dated October 10, 2016, the licensee provided a table showing that the impacted Unit 2 instrument AC and DC power loads supplied by Unit 1 have alternate supplies from Unit 2 and that loads will be aligned to alternate power sources as required. The NRC staff finds this response acceptable because the Unit 2 instrument AC and DC power system loads affected by transformer replacement will be powered by Unit 2, and thus, not be affected by the transformer replacement.

When either 1X210 or 1X220 are made INOPERABLE during transformer replacement, the associated RHRSW Loop (A or B) return valves (bypass valve and spray array valves) to the spray pond become INOPERABLE, making one RHRSW subsystem (TS 3.7.1) and one ESW subsystem (TS 3.7.2) INOPERABLE. The bypass valve and spray array valves become INOPERABLE because they will not be able to automatically reposition in the event of a DBA. The 7 days of inoperability requested for transformer replacement exceeds the 72 hour CT of TS 3.7.1, Conditions A and B. Therefore, the LAR proposes an extension of the CT for TS 3.7.1 to 7 days to allow sufficient time for transformer replacement and avert a shutdown of Unit 2. With an RHRSW loop INOPERABLE for 7 days, one supported subsystem of RHR suppression pool cooling (TS 3.6.2.3), one supported subsystem of RHR suppression pool spray (TS 3.6.2.4), and supported RHR pumps (TS 3.5.1) become INOPERABLE, but the associated TSs will not be entered in accordance with TS 3.0.6.

When replacing 1X210, four Train A engineered safeguard service water (ESSW) pump house fans lose power. When replacing 1X220, four Train B ESSW pump house fans lose power. After 36 hours, the associated two RHRSW and two ESW pumps become INOPERABLE in accordance with TRO 3.7.6. The CT for restoration of 2 ESW pumps is 7 days and would expire after the 7-day transformer maintenance period. The CT for restoration of the RHRSW pumps is 72 hours and requires an extension in accordance with the LAR. In its letter dated September 9, 2016, the NRC staff asked the licensee in RAI 3 to demonstrate that RHRSW can be restored such that safe shutdown and cooldown to Mode 4 can be achieved for both units, including cooling of the spent fuel pool. In its RAI response dated October 10, 2016, the licensee stated that analyses demonstrate that pump house doors or dampers can be aligned to allow natural circulation of air to maintain function of the applicable RHRSW and ESW pumps while they are INOPERABLE.

The effect on systems and components caused by the replacement of transformers 1X210 and 1X220 are similar. The difference is the train and components affected. Thus, the same TSs and TROs are affected, except for the opposite train. The conclusion would be the same (i.e., an approved extension of the CT for TS 3.7.1 Conditions A and B from 72 hours to 7 days would avert a required shutdown of Unit 2).

When 1X230 and 1X240 are individually made INOPERABLE during the 480 V transformer replacement, the associated division of standby gas treatment system, control room emergency

outside air supply system, and control room floor cooling become INOPERABLE for both units. The associated Unit 2 TSs 3.6.4.3, and 3.7.3, and 3.7.4, with allowed CTs of 7 days, 7 days, and 30 days, respectively, are entered, but the transformer replacement time of 7 days is within the allowed CTs. Therefore, the CT of the associated TSs need not be extended.

In addition, during the transformer replacements TS 3.8.7 will be entered. Assuming that Unit 2 is in an applicable mode of operation (1, 2, or 3), the removal of any Unit 1 480 V ESS LC transformer from service requires entry into Unit 2's TS 3.8.7 Condition C, which allows 72 hours to restore one Unit 1 AC electrical power distribution subsystem that is inoperable. Since replacing a single transformer takes approximately 120 hours, it is not possible to replace one of these transformers within the CT currently specified in TS 3.8.7. Therefore, the CT for TS 3.8.7 Condition C would need to extended from 72 hours to 7 days to avert a required shutdown of Unit 2.

3.3.2 Safety Analysis of the RHRSW and ESW Loop

The RHRSW and ESW loop associated with the replacement of either 1X210 or 1X220 becomes INOPERABLE because the bypass valve and spray array valves for that RHRSW loop to the UHS or spray pond fail as is and will not be able to reposition in the event of a DBA. The INOPERABLE RHRSW loop can become functional by manually repositioning the bypass valve and spray array valves. The other train of RHRSW and ESW (RHRSW loop) remains OPERABLE, which would allow mitigation of LOCA with a LOOP. A LOCA during the 7-day extended CT is sufficiently improbable that this accident with a corresponding failure of the remaining OPERABLE RHRSW loop need not be considered.

However, in considering sufficient defense-in-depth, the NRC staff determined that the possibility of a LOOP and an equipment failure in the remaining OPERABLE RHRSW loop during the extended CT should be evaluated for the replacement of 1X210 and 1X220. In its letter dated September 9, 2016, the NRC staff asked the licensee in RAI 1 to provide an analysis stating how the plant will mitigate a dual unit LOOP event and failure of the remaining OPERABLE RHRSW loop, including methods of decay heat removal for both units to achieve safe shutdown and cooldown and include cooling of the spent fuel pools. Unit 1 will initially be shut down, so the NRC staff asked the licensee to identify the minimum time Unit 1 must be shut down in order for the licensee's response to be valid. The NRC staff also asked the licensee to describe operator action and the associated timeline needed to restore an RHRSW header to service.

In its RAI response dated October 10, 2016, the licensee stated that to ensure an initial RHRSW flow path, the RHRSW spray pond bypass valve in the affected loop will be confirmed to be open before either 1X210 or 1X220 is made INOPERABLE. This establishes a flow path for both RHRSW and ESW to the spray pond. Plant personnel will be designated to manually position the affected spray pond bypass and spray array valves in case the remaining OPERABLE RHRSW loop has a failure during a LOOP. This evolution will take less than 2 hours (< 4 hours required), and is more than sufficient to keep peak spray pond temperature bounded by the current analysis if initial pond temperature is < 82 degrees Fahrenheit (°F). The RHR system of the shutdown Unit 1 will be used to cool both the Unit 1 core and fuel pools, with the core and fuel pools connected through the reactor cavity. Thus, the affected RHRSW loop

will have spray pond flow through the pond spray array valves in a maximum of 2 hours (< 4 hours required). The associated RHRSW and ESW pumps would be INOPERABLE after 36 hours (after loss of ESSW fan ventilation) + 72 hours, but will be functional because, as previously stated, the licensee's analyses demonstrated that pump house doors or dampers can be aligned to allow natural circulation of air to maintain function of the RHRSW and ESW pumps.

Accordingly, as stated by the licensee, the following actions will need to be taken when replacing 1X210 and 1X220:

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 below 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.

Based on the above discussion, one division of RHRSW and ESW will remain functional throughout a LOOP, and temperatures will remain within current analytical bounds, despite the assumed failure of the RHRSW loop that was OPERABLE before the LOOP event. The NRC staff finds this response acceptable because the station would have the capability to place both units in cold shutdown, and the fuel pools will have adequate cooling in the event of a dual unit LOOP and loss of the only OPERABLE RHRSW loop during transformer replacement.

3.3.3 Electrical Power System

The licensee provided the following information that would apply throughout the sequence for replacement of a 480 V ESS load center transformer. The following list provides the protective measures and actions pertinent to the electrical power system safety evolution:

1. Only one transformer will be tested at a time.
2. No core alterations, fuel movements, or operations with potential to drain the reactor vessel in Unit 1 will be conducted.
3. All Unit 2 buses will remain energized and operable.
4. Prior to commencing Doble test, the allocated replacement transformer will be on hand and fully qualified to act as an acceptable replacement.
5. The spray pond bypass valve for the RHRSW loop affected by the transformer replacement will be deenergized and verified open.
6. The following SRs are performed prior to replacement of 1X210 and 1X220:
   a. SR 3.7.1.3 - Verify position of RHRSW flow path valves every 31 days.
   b. \SR 3.7.1.4 - Verify RHRSW to UHS bypass valves (HV01222A/B) open and close upon receipt of corresponding signal every 92 days.
   c. SR 3.7.1.5 - Verify large spray array valves (HV01224AI/BI) open and close upon receipt of corresponding signal every 92 days.
   d. SR 3.7.1.6 - Verify small spray array valves (HV01224A2/B2) open and close upon receipt of corresponding signal every 92 days.
   e. SR 3.7.1.7 - Verify the manual small spray array bypass valves (012287A/B) are capable of being opened and closed every 92 days.

In its letter dated September 9, 2016, the NRC staff asked the licensee in RAI 4 to clarify the steps the licensee will take to limit the potential loss of power to Unit 2 equipment during the replacement of all Unit 1 480 V ESS load center transformers that feed both units. The NRC staff also requested a list of other SRs the licensee will perform prior to the transformer replacement sequence, as well as specific compensatory measures planned to limit the potential loss of power to Unit 2 during the replacement of all Unit 1 480 V ESS load center transformers.

In its RAI response dated October 10, 2016, the licensee stated in part, that, "The control and assurance of safety required to perform this work is built into normal station processes as required by regulation." Specifically, the licensee listed the following actions to be taken for assurance of system capabilities:

- Since this work impacts power sources on the Class 1E distribution system, surveillance testing is focused on testing associated with DG capability to power all other ESS busses. SRs 3.8.1.3/3.8.1.7 are performed under approved station procedures for each emergency diesel generator (EDG). SSES has four EDGs that are connected to the class 1E distribution system to meet LCO 3.8.1. Diesels are tested monthly to ensure the ability to start from standby condition and achieve rated parameters within their required start times. Additionally, SRs ensure the EDGs are capable of providing emergency power for the full duration of which they are required.

- Prior to transformer replacement, the 24-month LOCA/LOOP surveillance will be performed for the same division in the maintenance window. This assures that response of the other bus in that division and the diesel, including safety-related loads, and load timers are all operable and performing as designed.

- Prior to commencing transformer work, a review will be performed to determine if LCO 3.0.6 has been applied to either unit for any reason. If it has, a loss of safety function (LOSF) analysis is performed. This ensures the ability to perform a safety function assumed in the accident analysis can be performed with the equipment verified operable. An LOSF exists when, assuming no concurrent single failure, loss of offsite power, or loss of onsite DGs, a safety function assumed in the accident analysis cannot be performed. This LOSF review ensures all other SSCs are operable prior to commencing transformer work.

The licensee also provided a detailed list of seven actions to be taken during the evolution, including precautions for severe weather conditions, risk assessment based on grid operator notifications, risk assessment of emergent conditions, protected DGs, protected TS offsite power sources, protected equipment in the division opposite the transformer being replaced, and protection of decay heat removal equipment.

These planned compensatory measures to be implemented during the replacement sequence will work together to ensure that the overall plant risk to the operating unit is minimized. For instance, the SSES protection scheme for the electrical power systems and supported equipment on the opposite division will restrict access and activities near the equipment. This

will ensure the load center transformer replacement work will not negatively impact the ability of the redundant divisions to perform their safety functions.

The NRC staff finds the licensee's responses acceptable because the equipment tests and SRs would continue to be performed in accordance with the plant's TSs and technical requirements manual, and in compliance with GDC 18 for electrical power system testing. Additionally, the NRC staff finds that any increase in risk due to proposed plant maintenance would be assessed and mitigated in accordance with 10 CFR 50.65.

In its letter dated September 9, 2016, the NRC staff asked the licensee in RAI 6 to identify the alternate sources of power used for the Unit 2 Class 1E loads affected by the transformer replacements. In its RAI response dated October 10, 2016, the licensee stated that all of the loads in the table below have alternate power sources to which the SSCs important to safety will be aligned during the evolution. The only Unit 2 Class 1E loads affected are the battery chargers in the table with the normal (Unit 1) power source and alternate (Unit 2) power source alignments.

Load	Normal Power Source	Alternate Power Source
2D613 - U-2 125V DC BATTERY CHARGER 0B516071	0B516	Can be aligned to 2B210 via 0-ATS-516
2D623 - U-2 125V DC BATTERY CHARGER 0B526071	0B526	Can be aligned to 2B220 via 0-ATS-526
2D633 - U-2 125V DC BATTERY CHARGER 0B536071	0B536	Can be aligned to 2B230 via 0-ATS-536
2D643 - U-2 125V DC BATTERY CHARGER 0B536071	0B546	Can be aligned to 2B240 via 0-ATS-546

The NRC staff reviewed the licensee's responses and finds they are acceptable because the SSES, Unit 2, loads will continue to operate with sufficient power sources in compliance with GDC 17, which states that offsite and onsite electric power shall be provided to SSCs important to safety. The NRC staff also finds that this is also in compliance with GDC 5, which states that sharing SSCs important to safety between units will not significantly impair their ability to perform their safety functions because the Unit 2 loads in the table above, normally aligned and supplied by Unit 1, are capable of realignment to Unit 2.

The licensee presented a list of items that would apply throughout the evolution and a flow path for replacement. In its letter dated September 9, 2016, the NRC staff asked the licensee in RAI 7 for more detail to support the need for a 7-day CT. In response, the licensee stated that the 7-day CT includes time considerations, such as work that cannot be performed outside of the LCO, human factors, contingent replacements, and the risk of unanticipated outcomes. The licensee stated, "The anticipated duration of 108 hours is approximately 65% of the requested time (168 hours). This will accommodate unexpected responses or maintenance that may result during the transformer replacement."

The NRC staff reviewed the licensee's response and finds that temporarily extending the CT for SSES, Unit 2, TS 3.8.7, Condition C, from 72 hours to 7 days for the Unit 1 transformer replacements is acceptable because the time requested for the sequence allows for reasonable flexibility for unexpected occurrences and scheduling. The NRC staff also finds that with the specific compensatory measures discussed above, it is sufficient for continued operation of Unit 2.

3.4 NRC Staff Summary

The licensee has identified the impact on Unit 2 during the individual replacement of the 1X210 and 1X220 Unit 1 480V transformers. The NRC staff concludes that the licensee has shown that the effects of the transformer replacement, which will make an RHRSW loop INOPERABLE for 7 days, can be safely performed with Unit 2 in Mode 1, while Unit 1 is in Mode 5. The NRC staff bases this conclusion on sufficient defense-in-depth to mitigate a LOOP with the affected RHRSW loop by manually repositioning the spray array and bypass valves of the affected RHRSW loop, such that both units could be placed in cold shutdown, while providing adequate cooling to the spent fuel pools. Mitigating a LOCA and single failure of the redundant RHRSW train is not postulated during this evaluation because of the improbability of that event during the extended CT.

The NRC staff has evaluated the information provided by the licensee for the proposed changes to SSES, Unit 2, TS 3.8.7, to accommodate 480 V ESS load center transformer replacements on Unit 1. The NRC staff recognizes the importance of preventive maintenance to ensure SSCs are capable of performing their safety functions. The licensee is required to continue compliance with 10 CFR 50.65 for performance of maintenance activities and to balance maintenance, while minimizing unavailability of SSCs. The SSES, Unit 1, transformer replacement sequence plan demonstrates that protection of equipment and compensatory measures allow for temporarily extended operation of Unit 2 during the evolutions.

Based on its review, the NRC staff concludes that the licensee will remain in accordance with SSES TS requirements and regulations, as well as in compliance with GDC 5, 17, 18, and 44. The proposed amendment complies with GDC 5 because the Unit 2 Class 1E equipment normally powered by Unit 1 can be realigned to Unit 2 for continued operability. The proposed amendment complies with GDC 17 because the Unit 2 SSCs important to safety will continue to operate with sufficient power sources. The proposed amendment complies with GDC 18 and 10 CFR 50.36 because the licensee stated it will continue to perform the tests and SRs for electrical power systems in accordance with its license. The licensee has sufficient defense-in-depth during individual replacement of transformers 1X210 and 1X220. The intent of GDC 44 continues to be met by the licensee, in that during the evolution to replace the Unit 1 480V transformer, the RHRSW and ESW systems will remain functional. Therefore, the staff finds the proposed extension of the CT for TS 3.7.1, Conditions A and B, and TS 3.8.7 Condition C, from 72 hours to 7 days for Unit 1 load center transformer replacements acceptable.

Attachment 2 to the licensee's submittal dated January 28, 2016, provided revised TS Bases pages to be implemented with the associated TS changes. These pages were provided for

information only and will be revised in accordance with SSES TS 5.5.10, "Technical Specifications (TSs) Bases Control Program."

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration, and there has been no public comment on such finding (81 FR 32810). Accordingly, the amendment meets 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 amendment.

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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: G. Purciarello
K. West

Date: January 26, 2017

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2 – ISSUANCE OF AMENDMENT RE: TEMPORARY CHANGE OF TECHNICAL SPECIFICATIONS TO ALLOW REPLACEMENT OF ENGINEERED SAFEGUARD SYSTEM LOAD CENTER TRANSFORMERS (CAC NO. MF7298) DATED JANUARY 26, 2017

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