Mr. Robert G. Byram
Senior Vice President-Ge ation
and Chief Nuclear Officer
PP&L, Inc.
2 North Ninth Street
Allentown, PA 18101

July 6, 199

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT RE: TECHNICAL SPECIFICATION CHANGES ON ULTIMATE HEAT SINK AVERAGE WATER TEMPERATURE LIMIT (TAC NOS. MA0342 AND MA0343)

Dear Mr. Byram:

The Commission has issued the enclosed Amendment No. 182 to Facility Operating License No. NPF-14 and Amendment No. 156 to Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Units 1 and 2. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated November 26, 1997, which was superseded by letter dated June 1, 1998, as supplemented by letters dated October 30, 1998, March 29, 1999, April 20, 1999, and May 28, 1999.

These amendments would replace the current ultimate heat sink average water temperature limit of 88 ^{0}F for all combinations of plant operations with a set of more restrictive values of 85F, 87^{0}F or 88 ^{0}F depending on whether either unit has been in mode 3 less than 12 hours, at least 12 hours but less than 24 hours, or at least 24 hours, respectively, with the other unit in mode 1 or 2.

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

Sincerely,

ORIGINAL SIGNED BY:

Victor Nerses, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures: 1. Amendment No. 182 to License No. NPF-14
2. Amendment No. 156 to License No. NPF-22
3. Safety Evaluation

cc w/encls: See next page

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

July 6, 1999

Mr. Robert G. Byram
Senior Vice President-Generation
and Chief Nuclear Officer
PP&L, Inc.
2 North Ninth Street
Allentown, PA 18101

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT RE: TECHNICAL SPECIFICATION CHANGES ON ULTIMATE HEAT SINK AVERAGE WATER TEMPERATURE LIMIT (TAC NOS. MA0342 AND MA0343)

Dear Mr. Byram:

The Commission has issued the enclosed Amendment No. 182 to Facility Operating License No. NPF-14 and Amendment No. 156 to Facility Operating License No. NPF-22 for the Susquehanna Steam Electric Station, Units 1 and 2. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated November 26, 1997, which was superseded by letter dated June 1, 1998, as supplemented by letters dated October 30, 1998, March 29, 1999, April 20, 1999, and May 28, 1999.

These amendments would replace the current ultimate heat sink average water temperature limit of 88 °F for all combinations of plant operations with a set of more restrictive values of 85 °F, 87 °F or 88 °F depending on whether either unit has been in mode 3 less than 12 hours, at least 12 hours but less than 24 hours, or at least 24 hours, respectively, with the other unit in mode 1 or 2.

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

Sincerely,

Victor Nerses

Victor Nerses, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures: 1. Amendment No. 182 to License No. NPF-14
2. Amendment No. 156 to License No. NPF-22
3. Safety Evaluation

cc w/encls: See next page

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Units 1 &2

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

PP&L, INC.

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-387

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 182
License No. NPF-14

1. The Nuclear Regulatory Commission (the Commission or the NRC) having found that:

   A. The application for the amendment filed by PP&L, Inc., dated November 26, 1997, which was superseded by letter dated June 1, 1998, as supplemented by letters dated October 30, 1998, March 29, 1999, April 20, 1999, and May 28, 1999, 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 the 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. 182 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PP&L 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

S. Singh Bajwa, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: July 6, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 182

FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

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
3.7-2	3.7-2
3.7-3	3.7-3
B 3.7-2	B 3.7-2
B 3.7-3	B 3.7-3
B 3.7-4	B 3.7-4
B 3.7-5	B 3.7-5
B 3.7-6	B 3.7-6
B 3.7-7	B 3.7-7

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Both Unit 1 RHRSW subsystems inoperable.	B.1 Restore one Unit 1 RHRSW subsystem to OPERABLE status.	8 hours from discovery of one or both Unit 2 RHRSW subsystems not capable of supporting associated Unit 1 RHRSW subsystem AND 7 days
C. Required Action and associated Completion Time not met. OR UHS inoperable	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.1.1	Verify the water level is greater than or equal to 678 feet 1 inch above Mean Sea Level.	12 hours

(continued)

ACTIONS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.1.2	Verify the average water temperature of the UHS is: a. ---------- NOTE ---------- Only applicable with both units in MODE 1 or 2, or with either unit in MODE 3 for less than twelve (12) hours. ---------- ≤ 85°F; or b. ---------- NOTE ---------- Only applicable when either unit has been in MODE 3 for at least twelve (12) hours but not more than twenty-four (24) hours. ---------- ≤ 87°F; or c. ---------- NOTE ---------- Only applicable when either unit has been in MODE 3 for at least twenty-four (24) hours. ---------- ≤ 88°F.	24 hours
SR 3.7.1.3	Verify each RHRSW manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position or can be aligned to the correct position.	31 days

BASES

APPLICABLE SAFETY ANALYSES (continued)

following a LOCA. The ability of the RHRSW System to support long term cooling of the reactor or primary containment is discussed in the FSAR, Chapters 6 and 15 (Refs. 2 and 3, respectively). These analyses explicitly assume that the RHRSW System will provide adequate cooling support to the equipment required for safe shutdown. These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

The safety analyses for long term cooling were performed for various combinations of RHR System failures. The worst case single failure that would affect the performance of the RHRSW System is any failure that would disable one subsystem of the RHRSW System. As discussed in the FSAR, Section 6.2.2 (Ref. 2) for these analyses, manual initiation of the OPERABLE RHRSW subsystem and the associated RHR System is assumed to occur 30 minutes after a DBA. In this case, the maximum suppression chamber water temperature and pressure are analyzed to be below the design temperature of 220°F and maximum allowable pressure of 53 psig.

The RHRSW System, together with the UHS, satisfy Criterion 3 of the NRC Policy Statement. (Ref.4)

LCO

Two RHRSW subsystems are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads, assuming the worst case single active failure occurs coincident with the loss of offsite power.

An RHRSW subsystem is considered OPERABLE when:

a. One pump is OPERABLE; and
b. An OPERABLE flow path is capable of taking suction from the UHS and transferring the water to the RHR heat exchanger and returning it to the UHS at the assumed flow rate, and
c. An OPERABLE UHS.

The OPERABILITY of the UHS is based on having a minimum water level at the overflow weir of 678 feet 1 inch above mean sea level and a maximum water temperature of 85°F; unless either unit is in MODE 3. If a unit enters MODE 3,

(continued)

BASES (continued)

LCO (continued) the time of entrance into this condition determines the appropriate maximum ultimate heat sink fluid temperature. If the earliest unit to enter MODE 3 has been in that condition for less than twelve (12) hours, the peak temperature to maintain OPERABILITY of the ultimate heat sink remains at 85°F. If either unit has been in MODE 3 for more than twelve (12) hours but less than twenty-four (24) hours, the OPERABILITY temperature of the ultimate heat sink becomes 87°F. If either unit has been in MODE 3 for twenty-four (24) hours or more, the OPERABILITY temperature of the ultimate heat sink becomes 88°F.

This OPERABILITY definition is supported by analysis and evaluations performed in accordance with the guidance given in Regulatory Guide 1.27.

APPLICABILITY In MODES 1, 2, and 3, the RHRSW System and the UHS are required to be OPERABLE to support the OPERABILITY of the RHR System for primary containment cooling (LCO 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," and LCO 3.6.2.4, "Residual Heat Removal (RHR) Suppression Pool Spray") and decay heat removal (LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown"). The Applicability is therefore consistent with the requirements of these systems.

In MODES 4 and 5, the OPERABILITY requirements of the RHRSW System are determined by the RHR shutdown cooling subsystem(s) it supports (LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; LCO 3.9.7, "Residual Heat Removal (RHR) - High Water Level"; and LCO 3.9.8, "Residual Heat Removal (RHR) - Low Water Level").

In MODES 4 and 5, the OPERABILITY requirements of the UHS is determined by the systems it supports.

(continued)

BASES (continued)

ACTIONS

The ACTIONS are modified by a Note indicating that the applicable Conditions of LCO 3.4.8, be entered and Required Actions taken if the inoperable RHRSW subsystem results in inoperable RHR shutdown cooling (SDC) (i.e., both the Unit 1 and Unit 2 RHRSW pumps in a loop are inoperable resulting in the associated RHR SDC system being inoperable). This is an exception to LCO 3.0.6 because the Required Actions of LCO 3.7.1 do not adequately compensate for the loss of RHR SDC Function (LCO 3.4.8).

A.1

Required Action A.1 is intended to ensure that appropriate actions are taken if one Unit 1 RHRSW subsystem is inoperable. Although designated and operated as a unitized system, the associated Unit 2 subsystem is directly connected to a common header which can supply the associated RHR heat exchanger in either unit. The Unit 2 subsystems are considered capable of supporting Unit 1 RHRSW subsystem when the Unit 2 subsystem is OPERABLE and can provide the assumed flow to the Unit 1 heat exchanger. A Completion time of 7 days, when one or both Unit 2 RHRSW subsystems are not capable of supporting the Unit 1 RHRSW subsystems, is allowed to restore the Unit 1 RHRSW subsystem to OPERABLE status. In this configuration, the remaining OPERABLE Unit 1 RHRSW subsystem is adequate to perform the RHRSW heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE RHRSW subsystem could result in loss of RHRSW function. The Completion Time is based on the redundant RHRSW capabilities afforded by the OPERABLE subsystem and the low probability of an event occurring requiring RHRSW during this period.

With one RHRSW subsystem inoperable, and both of the Unit 2 RHRSW subsystems capable of supporting their respective Unit 1 RHRSW subsystems, the design basis cooling capacity for both units can still be maintained even considering a single active failure. However, the configuration does reduce the overall reliability of the RHRSW System. Therefore, provided both of the Unit 2 subsystems remain capable of supporting their respective Unit 1 RHRSW subsystems, the inoperable RHRSW subsystem must be restored to OPERABLE status within 30 days. The 30 day Completion Time is based on the remaining RHRSW System heat removal capability.

(continued)

BASES (continued)

ACTIONS

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if both Unit 1 RHRSW subsystems are inoperable. Although designated and operated as a unitized system, the associated Unit 2 subsystem is directly connected to a common header which can supply the associated RHR heat exchanger in either unit. With both Unit 1 RHRSW subsystems inoperable not caused by the inoperability of two Unit 1 RHRSW Pumps (e.g ., both subsystems with inoperable flow paths, or one subsystem with an inoperable pump and one subsystem with an inoperable flow path), the RHRSW System is not capable of performing its intended function. At least one subsystem must be restored to OPERABLE status within 8 hours. The 8 hour Completion Time for restoring one RHRSW subsystem to OPERABLE status, is based on the Completion Times provided for the RHR suppression pool spray function.

With both Unit 1 RHRSW subsystems inoperable, and both of the Unit 2 RHRSW subsystems capable of supporting their respective Unit 1 RHRSW subsystem, if no additional failures occur which impact the RHRSW System, the remaining OPERABLE Unit 2 subsystems and flow paths provide adequate heat removal capacity following a design basis LOCA. However, capability for this alignment is not assumed in long term containment response analysis and an additional single failure in the RHRSW System could reduce the system capacity below that assumed in the safety analysis. Therefore, continued operation is permitted only for a limited time. One inoperable subsystem is required to be restored to OPERABLE status within 7 days. The 7 day Completion Time for restoring one inoperable RHRSW subsystem to OPERABLE status is based on engineering judgment, considering the level of redundancy provided, and the low probability of a DBA with concurrent worst case single failure.

C.1 and C.2

If the RHRSW subsystems cannot be restored to OPERABLE status within the associated Completion Times, or the UHS is determined to be inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed

(continued)

BASES (continued)

ACTIONS

C.1 and C.2 (continued)

Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.1.1

This SR verifies the water level to be sufficient for the proper operation of the RHRSW pumps (net positive suction head and pump vortexing are considered in determining this limit). The 12 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

SR 3.7.1.2

Verification of the UHS temperature, which is the arithmetical average of the UHS temperature near the surface, middle and bottom levels, ensures that the heat removal capability of the ESW and RHRSW Systems are within the assumptions of the DBA analysis. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

SR 3.7.1.3

Verifying the correct alignment for each manual, power operated, and automatic valve in each RHRSW subsystem flow path provides assurance that the proper flow paths will exist for RHRSW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be realigned to its accident position. This is acceptable because the RHRSW System is a manually initiated system.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.1.3 (continued)

This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

REFERENCES

1. FSAR, Section 9.2.6.
2. FSAR, Chapter 6.
3. FSAR, Chapter 15.
4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).

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

PP&L, INC.

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 156
License No. NPF-22

1. The Nuclear Regulatory Commission (the Commission or the NRC) having found that:

   A. The application for the amendment filed by the PP&L, Inc., dated November 26, 1997, which was superseded by letter dated June 1, 1998, as supplemented by letters dated October 30, 1998, March 29, 1999, April 20, 1999, and May 28, 1999, 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 the 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. 156 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. PP&L 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

S. Singh Bajwa, Chief, Section I
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: July 6, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 156

FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

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
3.7-2	3.7-2
3.7-3	3.7-3
B 3.7-2	B 3.7-2
B 3.7-3	B 3.7-3
B 3.7-4	B 3.7-4
B 3.7-5	B 3.7-5
B 3.7-6	B 3.7-6
B 3.7-7	B 3.7-7

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Both Unit 2 RHRSW subsystems inoperable.	B.1 Restore one Unit 2 RHRSW subsystem to OPERABLE status.	8 hours from discovery of one or both Unit 1 RHRSW subsystems not capable of supporting associated Unit 2 RHRSW subsystem AND 7 days
C. Required Action and associated Completion Time not met. OR UHS inoperable	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.1.1	Verify the water level is greater than or equal to 678 feet 1 inch above Mean Sea Level.	12 hours

(continued)

ACTIONS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.7.1.2	Verify the average water temperature of the UHS is: a. ---------- NOTE ---------- Only applicable with both units in MODE 1 or 2, or with either unit in MODE 3 for less than twelve (12) hours. ---------- ≤ 85°F; or b. ---------- NOTE ---------- Only applicable when either unit has been in MODE 3 for at least twelve (12) hours but not more than twenty-four (24) hours. ---------- ≤ 87°F; or c. ---------- NOTE ---------- Only applicable when either unit has been in MODE 3 for at least twenty-four (24) hours. ---------- ≤ 88°F.	24 hours
SR 3.7.1.3	Verify each RHRSW manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position or can be aligned to the correct position.	31 days

BASES

APPLICABLE SAFETY ANALYSES (continued)

following a LOCA. The ability of the RHRSW System to support long term cooling of the reactor or primary containment is discussed in the FSAR, Chapters 6 and 15 (Refs. 2 and 3, respectively). These analyses explicitly assume that the RHRSW System will provide adequate cooling support to the equipment required for safe shutdown. These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

The safety analyses for long term cooling were performed for various combinations of RHR System failures. The worst case single failure that would affect the performance of the RHRSW System is any failure that would disable one subsystem of the RHRSW System. As discussed in the FSAR, Section 6.2.2 (Ref. 2) for these analyses, manual initiation of the OPERABLE RHRSW subsystem and the associated RHR System is assumed to occur 30 minutes after a DBA. In this case, the maximum suppression chamber water temperature and pressure are analyzed to be below the design temperature of 220°F and maximum allowable pressure of 53 psig.

The RHRSW System, together with the UHS, satisfy Criterion 3 of the NRC Policy Statement. (Ref.4)

LCO

Two RHRSW subsystems are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads, assuming the worst case single active failure occurs coincident with the loss of offsite power.

An RHRSW subsystem is considered OPERABLE when:

a. One pump is OPERABLE; and
b. An OPERABLE flow path is capable of taking suction from the UHS and transferring the water to the RHR heat exchanger and returning it to the UHS at the assumed flow rate, and
c. An OPERABLE UHS.

The OPERABILITY of the UHS is based on having a minimum water level at the overflow weir of 678 feet 1 inch above mean sea level and a maximum water temperature of 85°F;

(continued)

BASES (continued)

LCO (continued) unless either unit is in MODE 3. If a unit enters MODE 3, the time of entrance into this condition determines the appropriate maximum ultimate heat sink fluid temperature. If the earliest unit to enter MODE 3 has been in that condition for less than twelve (12) hours, the peak temperature to maintain OPERABILITY of the ultimate heat sink remains at 85°F. If either unit has been in MODE 3 for more than twelve (12) hours but less than twenty-four (24) hours, the OPERABILITY temperature of the ultimate heat sink becomes 87°F. If either unit has been in MODE 3 for twenty-four (24) hours or more, the OPERABILITY temperature of the ultimate heat sink becomes 88°F.

This OPERABILITY definition is supported by analysis and evaluations performed in accordance with the guidance given in Regulatory Guide 1.27.

APPLICABILITY In MODES 1, 2, and 3, the RHRSW System and the UHS are required to be OPERABLE to support the OPERABILITY of the RHR System for primary containment cooling (LCO 3.6.2.3, "Residual Heat Removal (RHR) Suppression Pool Cooling," and LCO 3.6.2.4, "Residual Heat Removal (RHR) Suppression Pool Spray") and decay heat removal (LCO 3.4.8, "Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown"). The Applicability is therefore consistent with the requirements of these systems.

In MODES 4 and 5, the OPERABILITY requirements of the RHRSW System are determined by the RHR shutdown cooling subsystem(s) it supports (LCO 3.4.9, "Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown"; LCO 3.9.7, "Residual Heat Removal (RHR) - High Water Level"; and LCO 3.9.8, "Residual Heat Removal (RHR) - Low Water Level").

In MODES 4 and 5, the OPERABILITY requirements of the UHS is determined by the systems it supports.

(continued)

BASES (continued)

ACTIONS

The ACTIONS are modified by a Note indicating that the applicable Conditions of LCO 3.4.8, be entered and Required Actions taken if the inoperable RHRSW subsystem results in inoperable RHR shutdown cooling (SDC) (i.e., both the Unit 1 and Unit 2 RHRSW pumps in a loop are inoperable resulting in the associated RHR SDC system being inoperable). This is an exception to LCO 3.0.6 because the Required Actions of LCO 3.7.1 do not adequately compensate for the loss of RHR SDC Function (LCO 3.4.8).

A.1

Required Action A.1 is intended to ensure that appropriate actions are taken if one Unit 2 RHRSW subsystem is inoperable. Although designated and operated as a unitized system, the associated Unit 1 subsystem is directly connected to a common header which can supply the associated RHR heat exchanger in either unit. The Unit 1 subsystems are considered capable of supporting Unit 2 RHRSW subsystem when the Unit 1 subsystem is OPERABLE and can provide the assumed flow to the Unit 2 heat exchanger. A Completion time of 7 days, when one or both Unit 1 RHRSW subsystems are not capable of supporting the Unit 2 RHRSW subsystems, is allowed to restore the Unit 2 RHRSW subsystem to OPERABLE status. In this configuration, the remaining OPERABLE Unit 2 RHRSW subsystem is adequate to perform the RHRSW heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE RHRSW subsystem could result in loss of RHRSW function. The Completion Time is based on the redundant RHRSW capabilities afforded by the OPERABLE subsystem and the low probability of an event occurring requiring RHRSW during this period.

With one RHRSW subsystem inoperable, and both of the Unit 1 RHRSW subsystems capable of supporting their respective Unit 2 RHRSW subsystems, the design basis cooling capacity for both units can still be maintained even considering a single active failure. However, the configuration does reduce the overall reliability of the RHRSW System. Therefore, provided both of the Unit 1 subsystems remain capable of supporting their respective Unit 2 RHRSW subsystems, the inoperable RHRSW subsystem must be restored to OPERABLE status within 30 days. The 30 day Completion Time is based on the remaining RHRSW System heat removal capability.

(continued)

BASES (continued)

ACTIONS

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if both Unit 2 RHRSW subsystems are inoperable. Although designated and operated as a unitized system, the associated Unit 1 subsystem is directly connected to a common header which can supply the associated RHR heat exchanger in either unit. With both Unit 2 RHRSW subsystems inoperable not caused by the inoperability of two Unit 2 RHRSW Pumps (e.g ., both subsystems with inoperable flow paths, or one subsystem with an inoperable pump and one subsystem with an inoperable flow path), the RHRSW System is not capable of performing its intended function. At least one subsystem must be restored to OPERABLE status within 8 hours. The 8 hour Completion Time for restoring one RHRSW subsystem to OPERABLE status, is based on the Completion Times provided for the RHR suppression pool spray function.

With both Unit 2 RHRSW subsystems inoperable, and both of the Unit 1 RHRSW subsystems capable of supporting their respective Unit 2 RHRSW subsystem, if no additional failures occur which impact the RHRSW System, the remaining OPERABLE Unit 1 subsystems and flow paths provide adequate heat removal capacity following a design basis LOCA. However, capability for this alignment is not assumed in long term containment response analysis and an additional single failure in the RHRSW System could reduce the system capacity below that assumed in the safety analysis. Therefore, continued operation is permitted only for a limited time. One inoperable subsystem is required to be restored to OPERABLE status within 7 days. The 7 day Completion Time for restoring one inoperable RHRSW subsystem to OPERABLE status is based on engineering judgment, considering the level of redundancy provided, and the low probability of a DBA with concurrent worst case single failure.

C.1 and C.2

If the RHRSW subsystems cannot be restored to OPERABLE status within the associated Completion Times, or the UHS is determined to be inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed

(continued)

BASES (continued)

ACTIONS

C.1 and C.2 (continued)

Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.1.1

This SR verifies the water level to be sufficient for the proper operation of the RHRSW pumps (net positive suction head and pump vortexing are considered in determining this limit). The 12 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

SR 3.7.1.2

Verification of the UHS temperature, which is the arithmetical average of the UHS temperature near the surface, middle and bottom levels, ensures that the heat removal capability of the ESW and RHRSW Systems are within the assumptions of the DBA analysis. The 24 hour Frequency is based on operating experience related to trending of the parameter variations during the applicable MODES.

SR 3.7.1.3

Verifying the correct alignment for each manual, power operated, and automatic valve in each RHRSW subsystem flow path provides assurance that the proper flow paths will exist for RHRSW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be realigned to its accident position. This is acceptable because the RHRSW System is a manually initiated system.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.1.3 (continued)

This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

REFERENCES

1. FSAR, Section 9.2.6.
2. FSAR, Chapter 6.
3. FSAR, Chapter 15.
4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 182 TO FACILITY OPERATING LICENSE NO. NPF-14

AMENDMENT NO. 156 TO FACILITY OPERATING LICENSE NO. NPF-22

PP&L, INC.

ALLEGHENY ELECTRIC COOPERATIVE, INC.

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 388

1.0 INTRODUCTION

By letter dated November 26, 1997, which was superseded by letter dated June 1, 1998, PP&L, Inc., (the licensee) submitted a request for changes to the Susquehanna Steam Electric Station (SSES), Units 1 and 2, Technical Specifications (TSs). Additionally, the June 1, 1998, letter was supplemented by letters dated October 30, 1998, March 29, 1999, April 20, 1999, and May 28, 1999.

The requested changes would replace the current ultimate heat sink average water temperature limit of 88 ^{0}F for all combinations of plant operations with a set of more restrictive values of 85 ^{0}F, 87 ^{0}F or 88 ^{0}F depending on whether either unit has been in mode 3 less than 12 hours, at least 12 hours but less than 24 hours, or at least 24 hours, respectively, with the other unit in mode 1 or 2.

The notice for the November 26, 1997, amendment request was published on May 20, 1998, (63 FR 27764). Although the June 1, 1998, letter superseded the November 26, 1997, letter, it was not necessary to re-notice this amendment request in the Federal Register since in both letters the licensee's safety assessment remained the same and the proposed no significant hazards consideration determination did not change. The October 30, 1998, March 29, 1999, April 20, 1999, and May 28, 1999, letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

2.0 BACKGROUND

The ultimate heat sink (UHS) at SSES is a Seismic Category I concrete lined spray pond which is shared between Unit 1 and Unit 2. It is designed to provide sufficient cooling water to the emergency service water (ESW) system and the residual heat removal service water (RHRSW) system at a maximum average UHS water temperature of 97 ^{0}F without make-up for 30 days following a design basis loss-of-coolant accident (LOCA) in one unit and simultaneous

shutdown of the other unit. In order to limit the average UHS water temperature at or below 97 °F following a LOCA, the current plant TS Section SR 3.7.1.2 requires the average UHS water temperature be maintained at less than or equal to 88 °F during plant operations in Modes 1, 2, or 3.

In June 1997, during an engineering review, the licensee identified an error in the decay heat values used to establish the UHS water temperature limit during plant operations in Modes 1, 2 or 3. Results of subsequent UHS water temperature analyses incorporating the corrected decay heat values show that there was a need to lower the maximum acceptable UHS water temperature from 88 °F to 85 °F during plant operations in Modes 1, 2,or 3 in order to limit the average UHS water temperature at or below 97 °F following a LOCA.

The licensee further revised the UHS water temperature analyses with the decay heat values which take credit for the lower reactor decay heat rate 12 hours or more after shutdown and 24 hours or more after shutdown, compared to the reactor decay heat rate during the first 12 hours following shutdown. Results of the revised analyses indicate that the maximum UHS water temperatures which are allowed during plant operations in Modes 1, 2, or 3 vary from 85 °F to 88 °F depending upon the length of time one unit has been in Mode 3 while the other unit is in Modes 1 or 2. Therefore, the licensee proposed changes to the TSs for both units to reflect the results of the revised UHS water temperature analyses by replacing the current UHS average water temperature limit of 88 °F with a set of more restrictive values of 85 °F, 87 °F or 88 °F.

The following evaluation covers the applicable areas of the licensee's submittals (including its responses dated October 30, 1998, and March 29, 1999, to the staff's Request for Additional Information dated September 8, 1998) for which the Plant Systems Branch has the primary review responsibility.

3.0 EVALUATION

3.1 Surveillance Requirements (SRs) Regarding Average UHS Temperature LIMITS During Plant Operation

Current TS Section SR 3.7.1.2 requires that:

Verify the average water temperature of the UHS is $\leq$ 88 °F once per 24 hours.

The licensee proposed to replace the above current TS Section SR 3.7.1.2 with the following three subsections:

a. SR 3.7.1.2.a

When both units are in MODE 1 or 2, or either unit has been in MODE 3 for less than twelve (12) hours, verify the average water temperature in the UHS is≤ 85 °F once per 24[1] hours.

b. SR 3.7.1.2.b

When either unit has been in MODE 3 for at least twelve (12) hours but not more than twenty-four (24) hours, verify the average water temperature in the UHS is≤ 87 °F once per 24[2] hours.

c. SR 3.7.1.2.c

When either unit has been in MODE 3 for at least twenty-four (24) hours, verify the average water temperature in the UHS is≤ 88 °F once per 24[3] hours.

The licensee stated that the revised decay heat values used in the UHS water temperature analyses were calculated in accordance with the guidance described in the Nuclear Regulatory Commission (NRC) Branch Technical Position ASB 9-2 and took credit for the lower decay heat generated in a reactor 12 hours or more after shutdown and 24 hours or more after shutdown, compared to the reactor decay heat generated in a reactor during the first 12 hours following shutdown. The UHS water temperature analyses were re-performed in accordance with the guidance described in Regulatory Guide 1.27 and with conservative inputs to establish the proposed TS UHS water temperature limits. The licensee identified the conservatisms considered in the analyses. The following are the more significant conservatisms:

a. A worst case initial spray pond level (the highest pond level) is assumed to reduce the distance that spray droplets travel through air from the nozzles back to the pond. Thus, heat removed from the spray droplets will be minimized.

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1 In the response (dated October 30, 1998) to the staff's request for additional information (RAI), the licensee stated that seven resistance temperature detectors (RTDs) are used to monitor spray pond temperature. Four of these RTDs are in the spray network areas and provide only surface temperatures. The remaining three RTDs are in a vertical array just outside the ESWS pump house and provide surface, middle and bottom temperature inputs to the average temperature calculation. Spray pond temperatures from the latter three RTDs are recorded four times a day in the shift surveillance log (This is more restricted than the TS requirement of once per 24 hours). An individual reading is recorded for each of the 3 levels, and an average value is calculated manually.

2 Same as Footnote 1.

3 Same as Footnote 1.

b. No heat loss from the spray pond to the environment through the concrete basin is assumed.

c. No credit is taken for heat loss from ESW/RHRSW system components and piping to the environment.

d. All pump energy is assumed to be deposited into the working fluid.

In addition, a measurement error allowance of 0.5 °F is included (by increasing the initial UHS water temperature from 85 °F to 85.5 °F) in the calculation.

In response to the staff's concerns, the licensee performed an additional analysis using less conservative (more realistic) assumptions to calculate the average UHS water temperatures to demonstrate that adequate margins exist in the above proposed TS temperature limits for the UHS. The licensee revised the above cited conservative assumptions in the following manner:

a. An average spray pond water level is assumed based on a calculated water level decrease of 6" during the first 44 hours following a LOCA. The effect of this revised assumption is an increase in the heat removal from the UHS compared to the previous calculation by increasing the effective distance that spray droplets travel through air from the nozzles back to the pond surface.

b. The heat transferred from the UHS water to the sediment, concrete basin and supporting soil as the UHS water temperature rises is included.

c. The heat transferred from the ESW and RHRSW fluid through the wall of the piping to the surrounding soil as the UHS water temperature rises is accounted for.

d. Estimated power input to the ESW and RHRSW pumps consistent with the manufacture's brake horsepower curves for the respective system pumps is used in the calculation.

Based on the calculations using the revised assumptions described above, the licensee stated that the analytical limit for the initial UHS water temperature for 2-unit operation is 87.5 °F in order to limit the average UHS water temperature at or below 97 °F following a LOCA. The corresponding proposed TS surveillance limit of 85 °F will provide an adequate margin to this analytical limit. Similarly, for 1-unit operation with one unit shut down at least 12 hours and for 1-unit operation with one unit shut down at least 24 hours, the analytical limits are 89.5 °F and 90.5 °F, respectively. The corresponding proposed TS surveillance limits of 87 °F and 88 °F, respectively, will provide adequate margins to these analytical limits.

In the October 30, 1998 submittal, the licensee stated that the spray pond temperature monitoring system will provide an alarm in the control room as well as an alarm in the ESW system pump house whenever the spray pond temperature of 83 °F is detected by any of the seven[4] RTDs. Plant operating procedures require operator actions to reduce the spray pond temperature whenever a spray pond high temperature alarm is received. The 2 °F margin

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[4] See Footnote 1.

between the spray pond alarm setpoint of 83 °F and the TS temperature limit of 85 °F provides sufficient time for operator response.

In the October 30, 1998 submittal, the licensee stated that a new calculation confirming spray pond temperature measurement uncertainty was performed. The calculation, which took into consideration accuracy of all loop components, repeatability, readability of indicators, calibration accuracy, and drift, as well as biased accuracy for non-independent (shared or common) components, showed an overall uncertainty of +1.97 °F. Also, based on its review of the calibration records for the loops used to calculate the average UHS water temperature for the 10-year period that included the most recent (1996) calibrations, the maximum as-found loop inaccuracy had not exceeded the design accuracy of ± 2 °F. Only twice during that period had the as-found inaccuracy for any of these loops been as much as ± 1.25 °F. The licensee concludes that the spray pond water temperature measurement uncertainty is bounded by the margin of ± 2 °F design accuracy.

Based on its review of the licensee's rationale and the conservatism described above, the staff finds the above proposed TS temperature limits for the spray pond during plant operation acceptable.

3.2 TS B 3.7.1.c Regarding An OPERABLE UHS

Current TS B 3.7.1.c defines an OPERABLE UHS as follows:

> The OPERABILITY of the UHS is based on having a minimum water level of 678 feet I inch above mean sea level and a maximum water temperature of 88 °F.

The licensee proposed to revise TS B 3.7.1.c to define an OPERABLE UHS in the following manner:

> The OPERABILITY of the UHS is based on having a minimum water level at the overflow weir of 678 feet 1 inch above mean sea level and a maximum water temperature of 85 °F; unless either unit is in MODE 3. If a unit enters MODE 3, the time of entrance into this condition determines the appropriate maximum ultimate heat sink fluid temperature. If the earliest unit to enter MODE 3 has been in that condition for less than twelve (12) hours, the peak temperature to maintain OPERABILITY of the ultimate heat sink remains at 85 °F. If eigher unit has been in MODE 3 for more than twelve (12) hours but less than twenty-four (24) hours, the OPERABILITY temperature of the ultimate heat sink becomes 87 °F. If either unit has been in MODE 3 for twenty-four (24) hours or more, the OPERABILITY temperature of the ultimate heat sink becomes 88 °F.

The staff finds that the above revised definition for UHS OPERABILITY appropriately reflects the UHS temperature limit as established in the proposed TS SR 3.7.1.2. Therefore, the staff finds it acceptable.

Based on its review of the licensee's rationale and the evaluation described above, the staff finds that the design and operation of the UHS at SSES are in accordance with the guidance

described in RG 1.27. Therefore, the staff concludes that the above cited proposed TS changes are acceptable.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (63 FR 27764). Accordingly, the amendments meet 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) 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.

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Date: July 6, 1999