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

August 27, 2014

Mr. Steven D. Capps
Vice President
McGuire Nuclear Station
Duke Energy Carolinas, LLC
12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING TECHNICAL SPECIFICATION 3.3.2 IN SUPPORT OF COMPLIANCE WITH NRC ORDER EA-12-049 (TAC NOS. MF2741 AND MF2742)

Dear Mr. Capps:

By letter dated September 12, 2013[1], as supplemented by letters dated May 20[2], and July 22, 2014[3], Duke Energy Carolinas, LLC (Duke, the licensee), submitted a license amendment request to modify Technical Specification 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation." Specifically, the change modifies setpoints associated with the auxiliary feedwater pump suction transfer on low suction pressure. The changes were requested to support Duke's compliance with NRC Order EA-12-049.

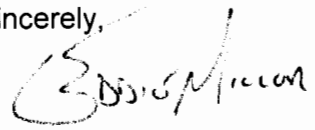
The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 273 to Renewed Facility Operating License NPF-9 and Amendment No. 253 to Renewed Facility Operating Licenses NPF-17 for the McGuire Nuclear Station, Units 1 and 2, respectively.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

[1] Agencywide Documents Access and Management System (ADAMS) Accession No. ML13262A500
[2] ADAMS Accession No. ML14161A231
[3] ADAMS Accession No. ML14205A440

If you have any questions, please call me at 301-415-2481.

Sincerely,



G. Edward Miller, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosures:
1. Amendment No. 273 to NPF-9
2. Amendment No. 253 to NPF-17
3. Safety Evaluation

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

DUKE ENERGY CAROLINAS, LLC

DOCKET NO. 50-369

MCGUIRE NUCLEAR STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 273
Renewed License No. NPF-9

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the McGuire Nuclear Station, Unit 1 (the facility), Renewed Facility Operating License No. NPF-9, filed by Duke Energy Carolinas, LLC (the licensee), dated September 12, 2013, as supplemented by letters dated May 20, 2014, and July 22, 2014, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and 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 hereby amended by page 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-9 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 273, are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert J. Pascarelli, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to License No. NPF-9
and the Technical Specifications

Date of Issuance: August 27, 2014

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

DUKE ENERGY CAROLINAS, LLC

DOCKET NO. 50-370

MCGUIRE NUCLEAR STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 253
Renewed License No. NPF-17

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment to the McGuire Nuclear Station, Unit 2 (the facility), Renewed Facility Operating License No. NPF-17, filed by Duke Energy Carolinas, LLC (the licensee), dated September 12, 2013, as supplemented by letters dated May 20, 2014, and July 22, 2014 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and 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 hereby amended by page 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-17 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 253, are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert J. Pascarelli, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to License No. NPF-17
and the Technical Specifications

Date of Issuance: August 27, 2014

ATTACHMENT TO LICENSE AMENDMENT NO. 273

RENEWED FACILITY OPERATING LICENSE NO. NPF-9

DOCKET NO. 50-369

AND

LICENSE AMENDMENT NO. 253

RENEWED FACILITY OPERATING LICENSE NO. NPF-17

DOCKET NO. 50-370

Replace the following pages of the Renewed Facility Operating Licenses and the Appendix A Technical Specifications (TSs) with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
Licenses	Licenses
NPF-9, page 3	NPF-9, page 3
NPF-17, page 3	NPF-17, page 3
TSs	TSs
3.3.2-14	3.3.2-14

(4) 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;

(5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproducts and special nuclear materials as may be produced by the operation of McGuire Nuclear Station, Units 1 and 2, and;

(6) Pursuant to the Act and 10 CFR Parts 30 and 40, to receive, possess and process for release or transfer such byproduct material as may be produced by the Duke Training and Technology Center.

C. This renewed operating 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

The licensee is authorized to operate the facility at a reactor core full steady state power level of 3469 megawatts thermal (100%).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 273 are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Updated Final Safety Analysis Report

The Updated Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on December 16, 2002, describes certain future activities to be completed before the period of extended operation. Duke shall complete these activities no later than June 12, 2021, and shall notify the NRC in writing when implementation of these activities is complete and can be verified by NRC inspection.

The Updated Final Safety Analysis Report supplement as revised on December 16, 2002, described above, shall be included in the next scheduled update to the Updated Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following issuance of this renewed operating license. Until that update is complete, Duke may make changes to the programs described in such supplement without prior Commission approval, provided that Duke evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59 and otherwise complies with the requirements in that section.

(4) 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;

(5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproducts and special nuclear materials as may be produced by the operation of McGuire Nuclear Station, Units 1 and 2; and,

(6) Pursuant to the Act and 10 CFR Parts 30 and 40, to receive, possess and process for release or transfer such byproduct material as may be produced by the Duke Training and Technology Center.

C. This renewed operating 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

The licensee is authorized to operate the facility at a reactor core full steady state power level of 3469 megawatts thermal (100%).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 253 are hereby incorporated into this renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Updated Final Safety Analysis Report

The Updated Final Safety Analysis Report supplement submitted pursuant to 10 CFR 54.21(d), as revised on December 16, 2002, describes certain future activities to be completed before the period of extended operation. Duke shall complete these activities no later than March 3, 2023, and shall notify the NRC in writing when implementation of these activities is complete and can be verified by NRC inspection.

The Updated Final Safety Analysis Report supplement as revised on December 16, 2002, described above, shall be included in the next scheduled update to the Updated Final Safety Analysis Report required by 10 CFR 50.71(e)(4), following issuance of this renewed operating license. Until that update is complete, Duke may make changes to the programs described in such supplement without prior Commission approval, provided that Duke evaluates each such change pursuant to the criteria set forth in 10 CFR 50.59, and otherwise complies with the requirements in that section.

Table 3.3.2-1 (page 5 of 6)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
6. Auxiliary Feedwater (continued)						
e. Trip of all Main Feedwater Pumps	1,2	1 per MFW pump	K	SR 3.3.2.7 SR 3.3.2.9	NA	NA
f. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low(c)	1,2,3	2 per MDP, 4 per TDP	N,O	SR 3.3.2.7(a)(b) SR 3.3.2.8(a)(b) SR 3.3.2.9	≥ 6.5 psig ≥ 7.5 psig (2A MDP only)	7.0 psig 8.0 psig (2A MDP only)
7. Automatic Switchover to Containment Sump						
a. Refueling Water Storage Tank (RWST) Level - Low	1,2,3	3	P,S	SR 3.3.2.1 SR 3.3.2.3(a)(b) SR 3.3.2.8(a)(b) SR 3.3.2.9	≥ 92.3 inches	95 inches
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					

(continued)

(a) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

(b) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and the as-left tolerances are specified in the UFSAR.

(c) Prior to completion of the AC independent AFW pump suction transfer scheme modification on the respective Unit, the Allowable Value for this Function is ≥3 psig (≥4 psig 2A MDP only) and the Nominal Trip Setpoint for this Function is 3.5 psig (4.5 psig 2A MDP only).

NOTE 1: The Trip Setpoint for the Containment Pressure Control System start permissive/termination (SP/T) shall be ≥ 0.3 psig and ≤ 0.4 psig. The allowable value for the SP/T shall be ≥ 0.25 psig and ≤ 0.45 psig.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 273 TO RENEWED FACILITY OPERATING LICENSE NPF-9

AND

AMENDMENT NO. 253 TO RENEWED FACILITY OPERATING LICENSE NPF-17

DUKE ENERGY CAROLINAS, LLC

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-369 AND 50-370

1.0 INTRODUCTION

By letter dated September 12, 2013, as supplemented by letters dated May 20 and July 22, 2014, Duke Energy Carolinas, LLC (Duke, the licensee), submitted a license amendment request (LAR) to modify Technical Specification (TS) 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation." Specifically, the change modifies setpoints associated with the auxiliary feedwater pump suction transfer on low suction pressure. The changes were requested to support Duke's compliance with NRC Order EA-12-049. The supplemental letters provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did no change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register*.

2.0 REGULATORY EVALUATION

2.1 Regulatory Requirements

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," establishes the fundamental regulatory requirements. Specifically, Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 establish the minimum necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety; that is, structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public.

In 10 CFR 50.36, "Technical Specifications," the Commission established its regulatory requirements related to the contents of the TS.
10 CFR 50.36 states:

> "...each applicant for a license authorizing operation of a production or utilization facility shall include in his application proposed technical specifications in accordance with the requirements of this section."

Specifically, 10 CFR 50.36(c)(1)(ii)(A) states:

> "Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. If, during operation, it is determined that the automatic safety system does not function as required, the licensee shall take appropriate action, which may include shutting down the reactor."

Additionally, 10 CFR 50.36(c)(3) states:

> "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

Additionally, 10 CFR 50.36(c)(5), states in part:

> "Administrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure the operation of the facility in a safe manner."

General Design Criterion (GDC) 13, "Instrumentation and Control," of Appendix A to 10 CFR Part 50 requires that instrumentation be provided to monitor variables and systems and that controls be provided to maintain these variables and systems within prescribed operating ranges.

GDC 20, "Protection System Functions," of Appendix A to 10 CFR Part 50 requires that the protection system be designed to initiate the operation of appropriate systems to ensure that specified acceptable fuel design limits are not exceeded.

2.2 Regulatory Guidance

Regulatory Guide (RG) 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation," dated December 1999 (ADAMS Accession No. ML993560062) describes a method that the NRC staff finds acceptable for use in complying with the NRC's regulations for ensuring that setpoints for safety-related instrumentation are initially within, and will remain within, the TS limits. RG 1.105 endorses Part I of Instrument Society of America (ISA)-S67.04-1994, "Setpoints for Nuclear Safety Instrumentation," subject to NRC staff clarifications.

In Regulatory Issue Summary (RIS) 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, "Technical Specifications," Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels," dated August 24, 2006 (ADAMS Accession No. ML051810077), the NRC addresses requirements on limiting safety system settings that are assessed during the periodic testing and calibration of instrumentation.

By letter dated September 7, 2005, from Patrick L. Hiland (NRC) to the Nuclear Energy Institute's Setpoint Methods Task Force, "Technical Specification for Addressing Issues Related to Setpoint Allowable Values", (ADAMS Accession No. ML052500004) the NRC specifies footnotes that should be added to surveillance requirements related to setpoint verification for instrument functions on which a safety limit has been placed. This letter also addresses the information that should be included within TSs to ensure operability of the instruments following surveillance tests related to instrument setpoints.

2.3 Supplemental Guidance

The PWR [Pressurized-Water Reactor] and BWR [Boiling-Water Reactor] Owner's Groups' TSTF-493, Revision 4, dated January 5, 2010 (ADAMS Accession No. ML100060064), and an errata sheet dated April 23, 2010, (ADAMS Accession No. ML101160026) addresses the NRC staff's concerns stated in RIS 2006-17.

On May 11, 2010, the NRC published a notice in the *Federal Register* "Notice of Availability of the Models for Plant-Specific Adoption of Technical Specifications Task Force Traveler TSTF–493, Revision 4, 'Clarify Application of Setpoint Methodology for LSSS Functions'" (75 FR 26294 ADAMS Accession No. ML11231A714), the NRC documenting its position on the adoption of TSTF-493, Revision 4. Under TSTF-493, Revision 4, Option A, two surveillance Notes would be added to surveillance requirements (SRs) in the Surveillance Requirement Column of TSs Instrumentation Function Tables. Specifically, surveillance Notes would be added to SRs that require verifying trip setpoint setting values, i.e., channel calibration and trip actuating device operational test. The affected instrument Function is discussed in Enclosure 1 and shown in Attachment 1 to the LAR. This instrument Function is in the limiting conditions for operation (LCOs) for the Engineered Safety Feature Actuation System Instrumentation, TS 3.3.2.

3.0 TECHNICAL EVALUATION

3.1 Background

By letter dated September 12, 2013, the licensee proposes to change the nominal trip setpoint and the allowable value for Auxiliary Feedwater (AFW) Pump Suction Transfer on Suction Pressure (Function "6f") in TS Table 3.3.2-1 in order to facilitate plant modifications to comply with NRC Order EA 12-049 (ADAMS Accession No. ML12054A735). The licensee states that the changes are necessary to have the auxiliary feedwater pumps' suction transfer to the safety-related nuclear service water at a higher pressure in order to accommodate installing a new suction water supply that is independent of the alternating current (AC) system. The new system will actuate a transfer to the non-AC dependent water supply at a lower suction pressure in order not to interfere with the safety-related transfer function.

The licensee proposes to increase the transfer nominal trip setpoint from 3.5 psig to 7.0 psig. For the Unit 2 motor-driven auxiliary feedwater pump '2A' only, the licensee proposes to increase the transfer nominal trip setpoint to 8.0 psig to account for a difference in elevation of the pump's suction piping. The licensee also proposes to increase the allowable value from 3 psig to 6.5 psig. For the Unit 2 motor-driven auxiliary feedwater pump '2A' only, the licensee proposes to increase the allowable value to 7.5 psig to account for a difference in elevation of the pump's suction piping. The difference in setpoints for the Unit 2 motor-driven auxiliary feedwater pump '2A' is to account for a 2-foot difference in elevation of where the pressure sensing instruments are located in the suction piping.

3.2 System Description

In the Updated Final Safety Analysis Report (UFSAR), Section 10.4.10, "Auxiliary Feedwater System," the licensee describes the auxiliary feedwater system as a safety-related system designed to automatically supply sufficient feedwater to the steam generators to remove thermal energy from the reactor coolant system in the event of a loss of the main feedwater supply. The auxiliary feedwater system can be used following a reactor shutdown in conjunction with the condenser dump valves or atmospheric relief valves, to cool the reactor coolant system. The auxiliary feedwater system is not required during normal power generation and is normally aligned in standby readiness.

The auxiliary feedwater system system includes two 100% capacity (450 gpm) motor-driven auxiliary feedwater pumps and one 200% capacity (900 gpm) turbine-driven auxiliary feedwater pump. Each of the two motor-driven auxiliary feedwater pumps can supply only two steam generators. The turbine-driven auxiliary feedwater pump can supply all four steam generators.

All three auxiliary feedwater pumps are supplied water from a common header that is normally fed from the non-safety related 300,000 gallon auxiliary feedwater storage tank (CAST). The suction will automatically transfer on low suction pressure to the safety-related nuclear service water system. The source of water is controlled by motor operated valves, with automatic and remote capabilities from the main control room. The nuclear service water system has a capacity of $1.8\ E^{8}$ gallons.

3.3 Balance of Plant

Function "6f" in TS Table 3.3.2-1 pertains to the auxiliary feedwater pump suction transfer on low suction pressure. Table 3.3.2-1 currently specifies that the auxiliary feedwater suction source will transfer to the safety-related nuclear service water system at a nominal setpoint of 3.5 psig. This setpoint is derived to ensure that there is sufficient water remaining in the CAST and suction piping to maintain proper auxiliary feedwater pump operation during the transfer to the safety-related nuclear service water system when the CAST is running low on water.

The licensee stated there are two pressure switches on each of the two motor-driven pump's suction lines. The two switches on each pump's suction comprise one train. Each pressure switch signals to open one of the two required isolation valves arranged in series on the nuclear service water supply (one switch per isolation valve). When a low pressure is sensed on the two switches on the "A" motor-driven auxiliary feedwater pump's suction, the two isolation valves will

automatically open, allowing nuclear service water to flow from the "A" nuclear service water header to the "A" motor-driven auxiliary feedwater pump. Likewise, when the two pressure switches on the "B" motor-driven auxiliary feedwater pump actuate (one switch per isolation valve), they will open the two isolation valves, allowing service water from the "B" header to the "B" motor-driven auxiliary feedwater pump.

The turbine-driven auxiliary feedwater pump (TDAFWP) can be supplied from either the "A" or the "B" nuclear service water header. As such, there are four pressure switches on the turbine-driven pump's suction line. Two of the four pressure switches on the suction line are designated per train and will open two required isolation valves, one switch per valve, for that train of service water. Once the two valves in series to either of the nuclear service water headers open, water from that header will flow to the suction of the turbine-driven auxiliary feedwater pump.

The licensee stated in their amendment, "The TDAFWP utilizes four switches per train." In their May 20, 2014, response to an NRC staff question, the licensee clarified that there are two trains of two switches each. Therefore, the TDAFWP utilizes two switches per train for a total of four switches and for a given train of NSW to automatically align to the associated motor-driven AFW pump, low AFW pump suction pressure must be sensed by two pressure switches on that train of AFW. The licensee further indicated that TS 3.3.2 Condition N is entered when one or more of the two pressure switch channels are inoperable for a given motor-driven AFW pump. Each turbine-driven AFW pump is provided with assured suction supplies from both the A and B trains of NSW. For a given train of NSW to automatically align to the turbine-driven AFW pump, low AFW pump suction pressure must be sensed by two train-associated pressure switches located on the turbine-driven AFW pump suction. There are four switches located on the turbine-driven AFW pump suction; two A-train associated switches, and two B-train associated switches. TS 3.3.2 Condition N is entered when one or more of the four pressure switch channels are inoperable for the turbine-driven AFW pump.

The NRC staff reviewed the licensee's response to this RAI and determined the response to be acceptable since it clarifies the logic associated with the turbine-driven AFW pump suction path. At a minimum, two pressure switches for the 'same train' must actuate to establish one of the suction flow paths from the NSW header to the turbine-driven AFW pump. Condition N of TS 3.3.2 is entered when one or more of the four pressure switch channels are inoperable for the turbine-driven AFW pump. Condition O of TS 3.3.2 is entered when one or more pressure switch channels affect two or more auxiliary feedwater pumps are inoperable.

The licensee indicated their intent to modify the auxiliary feedwater system with an additional automatic non-AC powered transfer to provide an additional suction source for the turbine-driven auxiliary feed water pump that will actuate during a beyond design basis events with a loss of all AC power. The current TS states for the low suction pressure transfer the nominal trip setpoint is 3.5 psig and the allowable value is greater than or equal to 3 psig. In order to install this additional low pressure sensing system, the licensee proposed to increase the setpoints in the current system that transfer to the safety-related supply. The licensee proposed to increase the nominal trip setpoint to greater than or equal to 7.0 psig (8.0 psig for the '2A' motor-driven AFW pump only) and the allowable value to greater than or equal to 6.5 psig (7.5 psig for the '2A' motor-driven AFW pump only). The licensee indicated that the setpoint for this new non-AC powered transfer will be sufficiently lower than the safety-related transfer setpoint in order not to interfere with the

safety-related function. The licensee stated that it has incorporated adequate margin to account for setpoint drift and uncertainty in their selection of new setpoints. Section 3.4 of this Safety Evaluation details the NRC staff's review of the licensee's setpoint calculation.

The basis for the low pressure setpoint is to assure sufficient water remains available in the CAST and supply lines to maintain safe pump operation during the time required to transfer suction to the safety-related nuclear service water system. In their current licensing and design basis, the licensee established a minimum setpoint of 3.0 psig. Increasing the allowable value setpoint from 3.0 psig to 6.5 psig is conservative. This is because the transfer will occur sooner, creating a larger margin of water inventory in the supply lines to assure continued safe pump operation.

In addition, the licensee identified that the location of the pressure sensing instrumentation located on the Unit 2 - '2A' motor-driven auxiliary feedwater pump's suction is approximately two feet lower in elevation than that of the other auxiliary feedwater pump's suction piping. Previously, the licensee compensated for this difference in elevation in the switch calibration procedure to meet the existing TS values. The licensee is proposing now to incorporate this two-foot elevation difference by assigning a different setpoint in TS specifically for this '2A' motor-driven auxiliary feedwater pump. The licensee proposes for the '2A' motor-driven auxiliary feedwater pump a nominal trip setpoint of 8.0 psig and the allowable value of greater than or equal to 7.5 psig. The licensee's evaluation concluded that an increase of one psig would compensate for the two-foot elevation difference.

Since the piping centerline on '2A' motor-driven auxiliary feedwater pump's suction is two-feet lower than the other pump's suction piping, then the '2A' motor-driven auxiliary feedwater pump pressure switch has to be set at a higher value in order to actuate at the same pressure sensed on the other pump's suction lines. The NRC staff evaluated the licensee's proposed one psig difference to account for the two-foot elevation difference. Using the engineering standard of one inch of water equates to 0.036 psi, the two-feet of water would be approximately 0.86 psi difference. Setting the pressure switch setpoint for the '2A' motor-driven auxiliary feedwater pump pressure switch at one psi higher would therefore compensate for the difference in elevation to assure actuation at the proper point. Based on this evaluation, the NRC staff finds the proposed one psi difference for the '2A' motor-driven auxiliary feedwater pump acceptable.

Since installation of the new non-AC powered transfer system for the auxiliary feedwater pumps on both Unit 1 and Unit 2 will occur during different refueling outages the licensee proposed adding a new Note (c):

> Prior to completion of the AC independent AFW pump suction transfer scheme modification on the respective Unit, the Allowable Value for this Function is $\geq$ 3 psig ($\geq$4 psig 2A MDP only) and the Nominal Trip Setpoint for this Function is 3.5 psig (4.5 psig 2A MDP only).

This note will allow for co-existence of new setpoints on one unit and old setpoints on the other unit until the change is implemented on both units. For McGuire, Unit 1, the modification will be installed during the fall 2014 refueling outage. For McGuire, Unit 2, the modification will be installed the during the fall 2015 refueling outage. After full implementation of all the modifications,

the licensee has indicated their intent to process an administrative LAR, such that only the post modification requirements are shown in the TSs.

3.4 Technical Specification Footnotes

Setpoint calculations calculate a Nominal Trip Setpoint (NTSP) based on the Analytical Limit (AL) of the Safety Analysis to ensure that trips or protective actions will occur prior to exceeding the process parameter value assumed by the Safety Analysis calculations. These setpoint calculations may also calculate an allowable limit of change to be expected (i.e., the as-found tolerance (AFT)) between performances of the surveillance tests for assessing the value of the setpoint setting. The least conservative as-found instrument setting value that a channel can have during calibration without requiring performance of a TS remedial action is the setpoint Allowable Value (AV). Discovering an instrument setting to be less conservative than the setting AV indicates that there may not be sufficient margin between the NTSP setting and the AL. Technical Specifications channel calibrations and channel operational tests are performed to verify channels are operating within the assumptions of the setpoint methodology used to calculate the NTSP and that channel settings have not exceeded the TS AVs. When the measured as-found setpoint is non-conservative with respect to the AV, the channel is inoperable and the actions identified in the TSs must be taken.

3.4.1 Surveillance Note (a)

Surveillance Note (a) states:

> "If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service."

The Note requires evaluation of channel performance for the condition where the as-found setting for the channel setpoint is outside its as-found tolerance but conservative with respect to the AV. Evaluation of channel performance will verify that the channel will continue to function in accordance with safety analysis assumptions and the channel performance assumptions in the plant's setpoint methodology and establishes a high confidence of acceptable channel performance in the future. Because the AFT allows for both conservative and non-conservative deviation from the NTSP, changes in channel performance that are conservative with respect to the NTSP will also be detected and evaluated for possible effects on expected performance. The purpose of the assessment is to ensure confidence in the channel performance prior to returning the channel to service. For channels determined to be OPERABLE but degraded, after returning the channel to service the channels will be evaluated under the MNS Corrective Action Program (CAP). Entry into the CAP will ensure required review and documentation of the condition to establish a reasonable expectation for continued operability.

Verifying that a trip setting is conservative with respect to the AV when a surveillance is performed does not by itself verify the instrument channel will operate properly in the future because setpoint drift is a concern. Although the channel was operable during the previous surveillance interval, if it is discovered that channel performance is outside the performance predicted by the plant setpoint calculations for the test interval, then the design basis for the channel may not be met,

and proper operation of the channel for a future demand cannot be assured. Surveillance Note (a) formalizes the establishment of the appropriate AFT for each channel. This AFT is applied about the NTSP or about any other more conservative trip setpoint. The as-found setting tolerance ensures that channel operation is consistent with the assumptions or design inputs used in the setpoint calculations and establishes a high confidence of acceptable channel performance in the future. Because the setting tolerance allows for both conservative and non-conservative deviation from the NTSP, changes in channel performance that are conservative with respect to the NTSP will also be detected and evaluated for possible effects on expected performance.

Implementation of surveillance Note (a) requires the licensee to calculate an AFT. The licensee calculated the AFT using the Square Root of the Sum of the Squares (SRSS) technique for combination of random-independent uncertainty terms. Random-dependent and bias uncertainty terms are addressed through a combination of the SRSS and/or algebraic techniques.

3.4.2 Surveillance Note (b)

Surveillance Note (b) states:

> "The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and the as-left tolerances are specified in the UFSAR."

The second surveillance Note requires that the as-left setting for the channel be returned to within the as-left tolerance (ALT) of the NTSP. Where a setpoint more conservative than the NTSP is used in the plant surveillance procedures, the ALT and AFT, as applicable, will be applied to the surveillance procedure setpoint. This will ensure that sufficient margin to the Safety Limit (SL) and AL is maintained. If the as-left channel setting cannot be returned to a setting within the ALT of the NTSP, then the channel would be declared inoperable. The second surveillance Note also requires that the methodologies for calculating the ALT and the AFT be included in the UFSAR.

To implement surveillance Note (b) the ALT for some instrumentation Function channels is established to ensure that realistic values are used that do not mask instrument performance. The licensee stated that setpoint calculations assume that the instrument setpoint is left at the NTSP within a specific ALT(e.g., 25 psig + 2 psig). A Tolerance is necessary because it is not possible to read and adjust a setting to an absolute value due to the readability and/or accuracy of the test instruments or the ability to adjust potentiometers. The licensee stated that the ALT is normally as small as possible considering the tools and the objective to meet an as low as reasonably achievable calibration setting of the instruments. The ALT is considered in the setpoint calculation. Failure to set the actual plant trip setpoint to the NTSP and within the ALT would invalidate the assumptions in the setpoint calculation because any subsequent instrument drift would not start from the expected as-left setpoint.

The licensee has added surveillance Notes to TS instrumentation specification 3.3.2, "Engineered Safety Feature Actuation System Instrumentation." The licensee stated that the determination to include surveillance Notes for the specific Function in this TS Table is based on this function being an automatic protective devices related to variables having significant safety functions as delineated by 10 CFR 50.36(c)(1)(ii)(A). Furthermore, the licensee stated that if during calibration testing the setpoint is found to be conservative with respect to the AV but outside its predefined AFT band, then the channel shall be brought back to within its predefined calibration tolerance before returning the channel to service. The calibration tolerances are specified in the UFSAR. Changes to the values will be controlled by 10 CFR 50.59. The licensee has applied surveillance Notes to the Auxiliary Feedwater – Auxiliary Feedwater Pump Suction Transfer on Suction Pressure - Low function in TS 3.3.2.

The NRC staff has determined that the addition of the notes to the surveillance requirement will address operability of the subject function in the TS as discussed in TSTF-493, Revision 4, Option A. Therefore, the NRC staff finds the licensee's proposed addition of the notes acceptable.

3.5 Setpoint Calculation

The license performed Setpoint calculation revisions in support of the planned plant modifications, resulting in the need for changes to associated values listed in TS Table 3.3.2-1, "Engineered Safety Feature Actuation System Instrumentation", as described in Section 1 above.

Safety Limits (SL) are the values chosen to reasonably protect the integrity of physical barriers that guard against the uncontrolled release of radioactivity.

Analytical Limits typically are values utilized in the safety analyses, which were specifically chosen to allow the equipment time to act and prevent exceeding the SL.

3.5.1 Basic Setpoint Calculation Methodology

The licensee performed detailed setpoint calculations to establish the followings:

Total Loop Uncertainty
Limiting Trip Setpoint
Allowable Value
As-Found Tolerance
As-Left Tolerance
Nominal Trip Setpoint

Total Loop Uncertainty (TLU):

The licensee's loop uncertainty calculation methodology is primarily based on the "Square-Root-Sum-of-the-Squares" (SRSS) technique for combination of random-independent uncertainty terms.

The licensee addressed Random-dependent and bias uncertainty terms through a combination of the SRSS and/or algebraic techniques. The overall methodology identified applicable sources of instrument uncertainty, and categorization of each as random-independent (i.e., x,y), random-dependent (i.e., w,u), and bias/abnormal distribution (i.e., v,t) terms. The magnitude of each term is then combined to determine the "Total Loop Uncertainty" (TLU) as depicted below. The "+" and "-" convention represents the positive or negative uncertainty limits within the measured setpoint or indication.

$+ TLU = +\{x^2 + y^2 + (w + u)^2\}^{1/2} + v + t$

$- TLU = -\{x^2 + y^2 + (w + u)\}^{1/2} - v - t$

Biases of unknown direction were applied in an additive manner to both the -TLU and +TLU determinations.
The licensee used the following tolerances in calculating TLU :

Seismic Effect Uncertainty (SE_{seis}) = $\pm$ 5% of span based test data from the vendor

Post-seismic Uncertainty ($SE_{post\text{-}seis}$) = $\pm$ 3.5% of span based on qualification test

Reference Accuracy (A) = $\pm$ 1.0% of span based on vendor's data

Drift (D) = $\pm$ 2.5% of span based on vendor's data

Temperature Effect (TE) = $\pm$ (setpoint + waterleg) x 0.0003 x $\{(T_f - T_i)/1^0F]$

Process Measurement Allowance (PMA):

$PMA_{density} = [(p_i - p_f) / p_i]$ x (corrected setpoint)

$PMA_{waterleg} = \pm$ [3 in H_2O x (1 psi/27.68 in H_2O]

Measurement and Test Equipment (MTE) = $\pm$ 0.08% of range

Calibration/Setting Tolerance = Reference Accuracy (A) = $\pm$ 1% of span

Limiting Trip Setpoint:

The Limiting Trip Setpoint is the limiting value for the Nominal Trip Setpoint and represents the AL plus or minus the TLU. The Limiting Trip Setpoint is the minimum total uncertainty allowance adjustment required to ensure trip actuation prior to the AL. The Nominal Trip Setpoint represents the trip setpoint at which the device is actually set in the plant, and is within the bounds of -TLU and +TLU.

Allowable Value (AV):

Allowable Value represents an acceptable benchmark (specified by TS) for which periodic calibrations/checks must fall within to ensure operability. When a channel's "As-found" condition is determined to be less conservative than the AV, the channel must be declared inoperable. The AV determination is based on expected uncertainty influences for the portion of the loop not tested. The licensee used transmitter reference accuracy, calibration uncertainty, temperature effects, process measurement allowances and biases in calculating AV as follows:

$$AV = AL \pm(RU_{NT} + Biases) = AL + / - \{[(TLU - Biases)^2 - RU_{Tcal}^2]^{1/2} \pm Biases\}$$

where:

TLU =	Total loop uncertainty
AL =	limit of a measured or calculated variable established by the safety analyses to ensure that a safety limit is not exceeded
RU_{NT} =	denotes uncertainty associated with the portion of the loop not tested during the channel check, calibration, etc.
RU_{Tcal} =	denotes uncertainty associated with the portion of the loop tested during the channel check, calibration, etc.

3.5.2 TSTF-493 As-Found/As-Left Tolerance

The licensee calculated the channel as-found and as-left acceptable tolerances in accordance with TSTF-493, Rev. 4, to assure that the instrument channels are operating within the bounds defined in the Safety Analysis.

As-Found Tolerance (AFT):

"As-Found" is the condition in which a channel, or portion of a channel, is found after a period of operation and before recalibration (if necessary). The As-Found Tolerance is the allowance the channel or portion thereof is expected to be within based on calculations which ensure the channel is capable of actuating prior to reaching the Safety Analysis AL. Values recorded during a channel as-found surveillance which are within the AFT would clearly indicate a channel is operating as intended. Values recorded during a channel as-found surveillance which exceed the AFT would require a more detailed review to determine the effects of the increased uncertainty on the operability of the channel.

The licensee used the SRSS of reference accuracy, drift, and measurement and test equipment in calculating AFT.

As-Left Tolerance (ALT)

"As-Left" is the condition in which a channel, or portion of a channel, is left after calibration or final setpoint device setpoint verification. The ALT is the acceptable setting variation about the setpoint that the technician may leave the setting following calibration.

The licensee used the SRSS of reference accuracy and measurement and test equipment accuracy in calculating ALT.

Included in the scope of the proposed changes is the reference to two existing lettered footnotes applicable to the affected Surveillance Requirements listed in Table 3.3.2-1 for the AFW Pump Suction Transfer on Suction Pressure - Low. These footnotes are consistent with Technical Specification Task Force Traveler TSTF-493, "Clarify Application of Setpoint Methodology for LSSS Functions," Revision 4.

The reference to the footnote for this channel serves to ensure that unexpected as-found conditions are evaluated prior to returning the channel to service, and ensuring that as-left settings provide sufficient margin for uncertainties.

The final calculation results are:

TLU = $\pm$ 1.63 psig
AFT = $\pm$ 0.5 psig
ALT = $\pm$ 0.16 psig

The tolerances used in calculating TLU, AFT, and ALT are either vendor provided or from test results and have 95/95 confidence level specified in RG 1.105.

In a supplement to the LAR dated May 20, 2014, the licensee provided excerpts from plant calibration procedures which demonstrates that the plant procedures comply with TSTF-493, Rev. 4.

The NRC staff finds that the licensee has performed the necessary setpoint calculations on As-Left and As-Found Tolerances, Loop Uncertainties, Total Loop Uncertainties, Nominal Trip Setpoint, and Allowable value in conformance with RG 1.105, TSTF-493, and RIS 2006-17 and have initiated plant procedures to comply with TSTF-493, and RIS 2006-17. Hence the proposed TS change complies with the requirements of 10 CFR 50.36, GDC 13, GDC 20, and 10 CFR 50, Appendix A. Therefore, the proposed changes for TS Function 6.f in TS Table 3.3.2-1 are acceptable.

3.6 Technical Conclusion

The NRC staff finds the licensee's proposed increase in the setpoint for the auxiliary feedwater automatic swapover to nuclear service water on low suction pressure an increase in margin of safety that assures continued safe auxiliary feedwater pump operation in the event the CAST inventory become unavailable. The NRC staff finds that the nominal trip setpoint of 7.0 psig and the allowable value is greater than or equal to 6.5 psig provide reasonable pump protection for AFW pumps 1A, 1B, 1TD, 2B and 2TD. Accounting for plant elevations differences between AFW pumps, the NRC staff finds that the nominal trip setpoint of 8.0 psig and the allowable value is greater than or equal to 7.5 psig provide reasonable pump protection for AFW pump 2A. The NRC staff finds the proposed TSs will continue to meet the requirements of 10 CFR 50.36.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts and no significant change in the types of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding, which was published in the *Federal Register* on December 10, 2013 (78 FR 74179). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

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

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Date: August 27, 2014

If you have any questions, please call me at 301-415-2481.

Sincerely,

/RA/

G. Edward Miller, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosures:
1. Amendment No. 273 to NPF-9
2. Amendment No. 253 to NPF-17
3. Safety Evaluation

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DATE	8/15/14	7/31/14	8/1/14	8/14/14
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