Duke Energy®
Carolinas

DUKE ENERGY CAROLINAS, LLC
Catawba Nuclear Station
4800 Concord Road
York, SC 29745

ATTACHMENT 5 TO THIS SUBMITTAL CONTAINS PROPRIETARY INFORMATION AND IS REQUESTED TO BE WITHHELD FROM PUBLIC DISCLOSURE IN ACCORDANCE WITH 10 CFR 2.390.

May 31, 2012 10 CFR 50.90

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
McGuire Nuclear Station, Units 1 and 2
Docket Numbers 50-369 and 50-370
Proposed Technical Specifications (TS) Amendment
TS 3.1.3, "Moderator Temperature Coefficient (MTC)"
TS 5.6.5, "CORE OPERATING LIMITS REPORT (COLR)"
License Amendment Request for Conditional Exemption of the End of Cycle (EOC) MTC Measurement Methodology

Pursuant to 10 CFR 50.90, Duke Energy is requesting amendments to Catawba Facility Operating Licenses NPF-35 and NPF-52 and to McGuire Facility Operating Licenses NPF-9 and NPF-17 and the subject TS. This proposed amendment modifies the EOC MTC Surveillance Requirement (SR) by allowing an exemption to the SR if certain conditions are met. This conditional exemption from the SR will be determined on a cycle-specific basis.

The proposed amendment is based on Duke Energy Methodology Report DPC-NE-1007-P, Revision 0, "Conditional Exemption of the EOC MTC Measurement Methodology" (Proprietary). This report describes the Duke Energy methodology to allow for the conditional exemption of the EOC Rated Thermal Power (RTP) MTC TS SR. The exemption of the EOC RTP MTC measurement is predicated on demonstrating that the reactor core is operating as designed. This is accomplished by confirming that predicted and measured physics and power distribution information are within specified limits, and also by demonstrating that the predicted MTC is bounded by the EOC MTC surveillance limit after appropriate adjustments are made for uncertainty and actual core performance. Approval of the conditional exemption of the EOC MTC measurement is being pursued to remove the performance of an infrequent plant evolution, to eliminate a reactivity transient, and to improve plant availability. The methodology presented is applicable to both stations using the CASMO-4 SIMULATE-3 methodology. Therefore, in addition to the TS changes, Duke Energy requests NRC approval of this methodology report.

A001
NRR

This request includes the following attachments:

Attachment 1	Technical and Regulatory Evaluations
Attachments 2A and 2B	Marked-Up TS Pages for Catawba and McGuire, respectively
Attachments 3A and 3B	Marked-Up TS Bases Pages for Catawba and McGuire, respectively (these pages are provided for NRC information only and do not require NRC approval)
Attachment 4	Affidavits for Withholding Proprietary Information from Public Disclosure
Attachment 5	Duke Energy Methodology Report DPC-NE-1007-P, Revision 0, "Conditional Exemption of the EOC MTC Measurement Methodology" (Proprietary)
Attachment 6	Duke Energy Methodology Report DPC-NE-1007, Revision 0, "Conditional Exemption of the EOC MTC Measurement Methodology" (Non-proprietary)

As Attachment 5 contains information proprietary to Duke Energy and/or Westinghouse Electric Company, LLC (Westinghouse), it is supported by affidavits signed by Duke Energy and/or Westinghouse, the owners of the information. The attached affidavits set forth the basis on which the information may be withheld from public disclosure by the NRC and address with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390. Accordingly, it is requested that the information that is proprietary to Duke Energy and/or Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390. Regarding the information that is proprietary to Duke Energy and/or Westinghouse, correspondence with respect to the proprietary aspects of the information listed above or the supporting affidavits should reference the applicable Duke Energy Methodology Report number and/or Westinghouse letter CAW-12-3367 and should be addressed to: 1) the regulatory contact listed at the end of this letter (for Duke Energy proprietary information) and/or 2) J.A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066 (for Westinghouse proprietary information).

This proposed amendment has been reviewed and approved by the Catawba and McGuire Plant Operations Review Committees in accordance with the requirements of the Duke Energy Quality Assurance Program.

Duke Energy requests approval of this submittal within one calendar year of the submittal date and an implementation period of 60 days from the date of amendment issuance.

This submittal will not impact the Catawba and McGuire Updated Final Safety Analysis Reports (UFSARs).

There are no regulatory commitments contained in this letter or its attachments.

In accordance with 10 CFR 50.91, Duke Energy is notifying the applicable state officials of this application for license amendment by transmitting a copy of this letter and its non-proprietary attachments to the designated officials.

Should you have any questions concerning this information, please contact L.J. Rudy at (803) 701-3084.

Very truly yours,

George T. Hamrick
Site Vice President

LJR/s

Attachments

George T. Hamrick affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

George T. Hamrick, Site Vice President

Subscribed and sworn to me: May 31 2012
Date

Notary Public

My commission expires: My Commission Expires September 24, 2018
Date

SEAL

xc (with all attachments):

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xc (with attachments 1, 2A, 2B, 3A, 3B, 4, and 6 only):

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ATTACHMENT 1

Technical and Regulatory Evaluations

Subject: License Amendment Request for Conditional Exemption of the End of Cycle (EOC) Moderator Temperature Coefficient (MTC) Measurement Methodology

1. DESCRIPTION

Pursuant to 10 CFR 50.90, Duke Energy is requesting amendments to Catawba Facility Operating Licenses NPF-35 and NPF-52 and to McGuire Facility Operating Licenses NPF-9 and NPF-17 and the subject Technical Specifications (TS). This proposed amendment modifies the End of Cycle (EOC) Moderator Temperature Coefficient (MTC) Surveillance Requirement (SR) by allowing an exemption to the SR if certain conditions are met. This conditional exemption from the SR will be determined on a cycle-specific basis.

The proposed amendment is based on Duke Energy Methodology Report DPC-NE-1007-P, Revision 0, "Conditional Exemption of the EOC MTC Measurement Methodology" (Proprietary). This report describes the Duke Energy methodology to allow for the conditional exemption of the EOC Rated Thermal Power (RTP) MTC TS SR 3.1.3.2. The exemption of the EOC RTP MTC measurement is predicated on demonstrating that the reactor core is operating as designed. This is accomplished by confirming that predicted and measured physics and power distribution information are within specified limits, and also by demonstrating that the predicted MTC is bounded by the EOC MTC surveillance limit after appropriate adjustments are made for uncertainty and actual core performance. Approval of the conditional exemption of the EOC MTC measurement is being pursued to remove the performance of an infrequent plant evolution, to eliminate a reactivity transient, and to improve plant availability. The methodology presented is applicable to both stations using the CASMO-4 SIMULATE-3 methodology. Therefore, in addition to the TS changes, Duke Energy requests NRC approval of this methodology report.

2. PROPOSED CHANGE

The proposed changes to the TS are as follows:

SR 3.1.3.2 requires verification that the MTC is within the lower limit. This verification is performed once each cycle. NOTE 1 of this SR is modified to read as follows (added text is in **bold type**):

"Not required to be performed until 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm. **Measurement of the MTC may be suspended provided the benchmark criteria specified in DPC-NE-1007-PA, and the Revised MTC Prediction specified in the COLR are satisfied.**"

TS 5.6.5 lists the analytical methods used to determine the core operating limits which have been previously reviewed and approved by the NRC. The following methodology report is added to the list (#18 for Catawba and #17 for McGuire):

"**DPC-NE-1007-PA, "Conditional Exemption of the EOC MTC Measurement Methodology" (Duke and Westinghouse Proprietary).**"

Corresponding changes are made to the TS Bases for NOTE 1 of SR 3.1.3.2, consistent with the above proposed change to the TS itself. Changes are also made to the Applicable Safety Analyses and Limiting Condition for Operation (LCO) sections of the TS Bases.

3. BACKGROUND

One of the controlling parameters for power and reactivity changes is the MTC. The requirements of TS 3.1.3 ensure that the MTC remains within the bounds used in the applicable UFSAR Chapter 15 accident analysis. This, in turn, ensures inherently stable power operations during normal operation and accident conditions.

TS 3.1.3 places limits on the MTC and requires that the MTC be less negative than the specified limit for the All Rods Out (ARO) EOC RTP condition. To demonstrate compliance with the TS 3.1.3 LCO for the most negative MTC, SR 3.1.3.2 requires verification of the MTC after reaching the equivalent of an equilibrium boron concentration of 300 ppm. Because the RTP MTC value will gradually become more negative with increasing core burnup and the corresponding boron concentration reduction, a 300 ppm MTC surveillance value should be less negative than the EOC LCO limit. To account for this effect, the 300 ppm MTC surveillance value is sufficiently less negative than the EOC LCO limit value to provide assurance that the LCO will be met as long as the 300 ppm MTC surveillance criterion is met.

Currently, TS 3.1.3 requires measurement of MTC at Beginning of Cycle (BOC) to verify the most positive MTC limit and near EOC to verify the most negative MTC limit. At BOC, the measurement of the isothermal temperature coefficient is relatively simple to perform since the measurement is at Hot Zero Power (HZP) isothermal conditions and is not complicated by changes in the enthalpy rise or the presence of xenon. On the other hand, the EOC MTC measurement is performed near End of Life (EOL) corresponding to 300 ppm RTP equilibrium conditions. The equilibrium condition requirement is to preclude contamination of the measurement from a pre-existing xenon transient. The core reactivity during the test is kept close to zero to minimize reactor perturbations in power. Control rod positions during the test are typically fixed. The measurement is initiated by the addition of soluble boron to the Reactor Coolant System (RCS) to produce a temperature change. Because the EOC test is performed at power, the reactivity measurement calculated from the boron concentration change must be corrected to account for changes in plant parameters (i.e., power level, xenon concentration, etc.).

In addition, performing the measurement near EOC at or near HFP conditions requires that several plant systems be operated in a mode or condition not typical of steady state operation (e.g., reactor coolant temperature being decreased approximately 5°F from its normal programmed temperature, rod control being placed in the manual mode, and steam bypass control being placed in the pressure mode versus the T_{ave} mode). This increases the likelihood of creating an undesirable plant transient.

This requested amendment proposes an alternate method in order to improve availability and to minimize perturbations on normal reactor operation. The MTC measurement is replaced by a design calculation of the core MTC if predefined requirements are met. The proposed amendment modifies the EOC MTC SR by placing a set of conditions on core operations. If these conditions are met (i.e., if the specified revised prediction of the MTC and limits for several core parameters measured during the cycle are within specified bounds), performing the surveillance measurement is not required.

4. TECHNICAL EVALUATION

The methodology for the conditional exemption of the EOC MTC measurement is described in Attachment 5 to this submittal. Duke Energy intends to implement this method at Catawba and McGuire following NRC approval of this methodology report.

The conditional exemption methodology is independent of the method used to verify the safety analysis MTC assumption and the method used to calculate the value assumed in UFSAR accident analyses. The values of the most negative MTC LCO and SR are not altered. The conditional exemption of the EOC MTC measurement requires demonstrating that the reactor core is operating as designed. It also requires confirming the EOC MTC surveillance limit with a revised predicted MTC. The predicted MTC is adjusted to account for the differences in core characteristics between the operating core and prediction, as well as uncertainty. The core is operating as designed if specific core performance criteria are satisfied. The EOC measurement is not required if the core is operating as designed, and the revised predicted MTC is less negative than the EOC 300 ppm RTP MTC surveillance limit. Conversely, if any of the core performance criteria are exceeded, or if the revised predicted MTC is more negative than the EOC 300 ppm RTP MTC surveillance limit, then the measurement must be performed.

The conditional exemption methodology described in Attachment 5 requires the use of an NRC-approved core design model. Duke Energy uses the CASMO-4/SIMULATE-3 core design model for reload design calculations. This model has been approved by the NRC for use in these types of calculations (DPC-NE-1005-PA, Rev. 1, "Nuclear Design Methodology Using CASMO-4/SIMULATE-3 MOX"). Therefore, the Attachment 5 methodology requirement that an NRC-approved core design model be used is satisfied.

5. REGULATORY EVALUATION

5.1 Applicable Regulatory Requirements/Criteria

10 CFR 50.36(c)(3), *Surveillance requirements* states the following:

"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."

The regulatory basis for SR 3.1.3.2 for Catawba and McGuire is to ensure that the value of the MTC remains within the limiting condition assumed in the plant UFSAR accident and transient analyses. This requirement will continue to be met following NRC approval of this submittal.

5.2 Precedent

This proposed amendment is similar to amendments that the NRC granted for other Westinghouse plants. Following are several cited precedents:

1. South Texas Project, Units 1 and 2 - Issuance of Amendments Approving Technical Specification Changes Revising the End of Life Moderator Temperature Coefficient Surveillance Requirements (TAC Nos. MB5160 and MB5161), November 26, 2002, ADAMS Accession No. ML023400252.

2. Virgil C. Summer Nuclear Station, Unit No. 1 - Issuance of Amendment Re: Reactivity Control Systems - Moderator Temperature Coefficient (TAC No. MC0239), July 21, 2004, ADAMS Accession No. ML042040460.

3. Donald C. Cook Nuclear Plant, Units 1 and 2 - Issuance of Amendments Re: Conditional Exemption from Measurement of End-of-Life Moderator Temperature Coefficient (TAC Nos. MC6318 and MC6319), August 8, 2005, ADAMS Accession No. ML052010575.

4. Seabrook Station, Unit No. 1 - Issuance of Amendment Re: Removal of Requirement to Perform End-of-Life Moderator Temperature Coefficient Measurement (TAC No. MC6566), February 17, 2006, ADAMS Accession No. ML060040160.

5.3 No Significant Hazards Consideration

This proposed amendment modifies the End of Cycle (EOC) Moderator Temperature Coefficient (MTC) Surveillance Requirement (SR) 3.1.3.2 by allowing an exemption to the SR if certain conditions are met. This conditional exemption from the SR will be determined on a cycle-specific basis.

Duke Energy has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by analyzing the three standards set forth in 10 CFR 50.92(c) as discussed below:

Criterion 1:

Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The probability or consequences of accidents previously evaluated in the Updated Final Safety Analysis Report (UFSAR) are unaffected by this proposed change. There is no change to any equipment response or accident mitigation scenario, and this change results in no additional challenges to fission product barrier integrity. The proposed change does not alter the design, configuration, operation, or function of any plant structure, system, or component. Further, the existing limits on MTC established by the Technical Specifications (TS), based on assumptions in the safety analyses, remain unchanged and continue to be satisfied. As a result, the outcomes of previously evaluated accidents are unaffected. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

Criterion 2:

Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed change. The proposed change does not challenge the performance or integrity of any safety related system. The proposed change neither installs nor removes any plant equipment, nor alters the design, physical configuration, or mode of operation of any plant structure, system, or component. The MTC is a variable that must remain within prescribed limits, but it is not an accident initiator. No physical changes are being made to the plant, so no new accident causal mechanisms are being introduced. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

Criterion 3:

Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The margin of safety associated with the acceptance criteria of any accident is unchanged. The proposed change will have no effect on the availability, operability, or

performance of the safety related systems and components. The proposed change does not alter the design, configuration, operation, or function of any plant structure, system, or component. The ability of any operable structure, system, or component to perform its designated safety function is unaffected by this change. A change to a SR is proposed based on an alternate method of confirming that the surveillance is met.

The TS and the Core Operating Limits Report (COLR) establish limits for the MTC based on assumptions in the accident analyses. Applying the conditional exemption from the MTC measurement changes the method of meeting the SR; however, this change does not modify the COLR values and ensures adherence to the current COLR limits. The basis for the derivation of the MTC Limiting Condition for Operation (LCO) and SR limits from the MTC assumed in the accident analyses is unchanged. Therefore, the margin of safety as defined in the TS is not reduced and the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Duke Energy concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

5.4 Conclusions

In conclusion, based on the considerations discussed above, (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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

6. ENVIRONMENTAL CONSIDERATION

Duke Energy has determined that the proposed amendment does not change requirements with respect to the installation or use of a facility component located within the restricted area, as defined by 10 CFR 20. It does, however, represent a change to an inspection or surveillance requirement. Duke Energy has evaluated the proposed amendment and has determined that it does not involve: (1) a significant hazards consideration, (2) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (3) a significant increase in individual or cumulative occupational radiation exposures. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

ATTACHMENT 2A

Marked-Up TS Pages (Catawba)

INSERT 1

Measurement of the MTC may be suspended provided the benchmark criteria specified in DPC-NE-1007-PA, and the Revised MTC Prediction specified in the COLR are satisfied.

INSERT 2

18. DPC-NE-1007-PA, "Conditional Exemption of the EOC MTC Measurement Methodology" (Duke and Westinghouse Proprietary).

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.3.1	Verify MTC is within upper limit.	Once prior to entering MODE 1 after each refueling
SR 3.1.3.2	----------NOTES---------- 1. Not required to be performed until 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm. 2. If the MTC is more negative than the 300 ppm Surveillance limit (not LCO limit) specified in the COLR, SR 3.1.3.2 shall be repeated once per 14 EFPD during the remainder of the fuel cycle. 3. SR 3.1.3.2 need not be repeated if the MTC measured at the equivalent of equilibrium RTP-ARO boron concentration of $\leq$ 60 ppm is less negative than the 60 ppm Surveillance limit specified in the COLR. ---------- Verify MTC is within lower limit.	Once each cycle

INSERT 1

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

12. DPC-NE-2008-P-A, "Fuel Mechanical Reload Analysis Methodology Using TACO3" (DPC Proprietary).

13. WCAP-10054-P-A, "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code" (W Proprietary).

14. DPC-NE-2009-P-A, "Westinghouse Fuel Transition Report" (DPC Proprietary).

15. WCAP-12945-P-A, Volume 1 and Volumes 2-5, "Code Qualification Document for Best-Estimate Loss of Coolant Analysis" (W Proprietary).

16. DPC-NE-1005P-A, "Duke Power Nuclear Design Methodology Using CASMO-4/SIMULATE-3 MOX," (DPC Proprietary).

17. BAW-10231P-A, "COPERNIC Fuel Rod Design Computer Code," (Framatome ANP Proprietary).

INSERT 2

The COLR will contain the complete identification for each of the Technical Specifications referenced topical reports used to prepare the COLR (i.e., report number, title, revision number, report date or NRC SER date, and any supplements).

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.6 Ventilation Systems Heater Report

When a report is required by LCO 3.6.10, "Annulus Ventilation System (AVS)," LCO 3.7.10, "Control Room Area Ventilation System (CRAVS)," LCO 3.7.12, Auxiliary Building Filtered Ventilation Exhaust System (ABFVES)," LCO 3.7.13, "Fuel Handling Ventilation Exhaust System (FHVES)," or LCO 3.9.3, "Containment Penetrations," a report shall be submitted within the following 30 days. The report shall outline the reason for the inoperability and the planned actions to return the systems to OPERABLE status.

(continued)

INSERT 1

Measurement of the MTC may be suspended provided the benchmark criteria specified in DPC-NE-1007-PA, and the Revised MTC Prediction specified in the COLR are satisfied.

INSERT 2

17. DPC-NE-1007-PA, "Conditional Exemption of the EOC MTC Measurement Methodology" (Duke and Westinghouse Proprietary).

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.3.1	Verify MTC is within upper limit.	Once prior to entering MODE 1 after each refueling
SR 3.1.3.2	----------NOTES---------- 1. Not required to be performed until 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm. 2. If the MTC is more negative than the 300 ppm Surveillance limit (not LCO limit) specified in the COLR, SR 3.1.3.2 shall be repeated once per 14 EFPD during the remainder of the fuel cycle. 3. SR 3.1.3.2 need not be repeated if the MTC measured at the equivalent of equilibrium RTP-ARO boron concentration of $\leq$ 60 ppm is less negative than the 60 ppm Surveillance limit specified in the COLR. ---------- Verify MTC is within lower limit.	Once each cycle

INSERT 1

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

14. DPC-NE-2009-P-A, "Westinghouse Fuel Transition Report," (DPC Proprietary).

15. WCAP-12945-P-A, Volume 1 and Volumes 2-5, " Code Qualification Document for Best-Estimate Loss of Coolant Analysis," (W Proprietary).

16. DPC-NE-1005P-A, "Duke Power Nuclear Design Methodology Using CASMO-4/SIMULATE-3 MOX," (DPC Proprietary).

The COLR will contain the complete identification for each of the Technical Specifications referenced topical reports used to prepare the COLR (i.e., report number, title, revision number, report date or NRC SER date, and any supplements).

INSERT 2

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.6 Ventilation Systems Heater Failure Report

When a report is required by LCOs 3.6.10, "Annulus Ventilation System (AVS)," or LCO 3.7.9, "Control Room Area Ventilation System (CRAVS)," a report shall be submitted within the following 30 days. The report shall outline the reason for the inoperability and the planned actions to return the systems to OPERABLE status.

5.6.7 PAM Report

When a report is required by LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

(continued)

ATTACHMENT 2B

Marked-Up TS Pages (McGuire)

INSERT 1

Measurement of the MTC may be suspended for the current operating cycle provided the benchmark criteria specified in DPC-NE-1007-PA, and the Revised MTC Prediction specified in the COLR are satisfied.

INSERT 2

or analytical check (Ref. 5) of the EOC MTC

INSERT 3

or calculated

INSERT 4

During operation, the condition of the upper LCO limit at BOC is ensured through measurement. The lower LCO limit at EOC is ensured either analytically or through measurement.

INSERT 5

5. DPC-NE-1007-PA, "Conditional Exemption of the EOC MTC Measurement Methodology".

BACKGROUND (continued)

If the LCO limits are not met, the unit response during transients may not be as predicted. The core could violate criteria that prohibit a return to criticality, or the departure from nucleate boiling ratio criteria of the approved correlation may be violated, which could lead to a loss of the fuel cladding integrity.

The SRs for measurement of the MTC at the beginning and near the end of the fuel cycle are adequate to confirm that the MTC remains within its limits, since this coefficient changes slowly, due principally to changes in RCS boron concentration associated with fuel and burnable absorber depletion.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for the specified MTC are:

a. The MTC values must remain within the bounds of those used in the accident analysis (Ref. 2); and

b. The MTC must be such that inherently stable power operations result during normal operation and accidents, such as overheating and overcooling events.

The UFSAR, Chapter 15 (Ref. 2), contains analyses of accidents that result in both overheating and overcooling of the reactor core. MTC is one of the controlling parameters for core reactivity in these accidents. Both the most positive value and most negative value of the MTC are important to safety, and both values must be bounded. Values used in the analyses consider worst case conditions to ensure that the accident results are bounding (Ref. 2).

The consequences of accidents that cause core overheating must be evaluated when the MTC is positive. Such accidents include the rod withdrawal transient from any power level (Ref. 3), turbine trip, and loss of forced reactor coolant flow. The consequences of accidents that cause core overcooling must be evaluated when the MTC is negative. Such accidents include sudden feedwater flow increase and steam line break.

In order to ensure a bounding accident analysis, the MTC is assumed to be its most limiting value for the analysis conditions appropriate to each accident. The bounding value is determined by considering rodded and unrodded conditions, whether the reactor is at full or zero power, and whether it is the BOC or EOC life. The most conservative combination appropriate to the accident is then used for the analysis (Ref. 2).

MTC values are bounded in reload safety evaluations assuming steady state conditions at BOC and EOC. An EOC measurement is conducted

INSERT 2

APPLICABLE SAFETY ANALYSES (continued)

INSERT 3

at conditions when the RCS boron concentration reaches approximately 300 ppm. The measured value may be extrapolated to project the EOC value, in order to confirm reload design predictions.

MTC satisfies Criterion 2 of 10 CFR 50.36 (Ref. 4). Even though it is not directly observed and controlled from the control room, MTC is considered an initial condition process variable because of its dependence on boron concentration.

LCO

LCO 3.1.3 requires the MTC to be within specified limits of the COLR to ensure that the core operates within the assumptions of the accident analysis. During the reload core safety evaluation, the MTC is analyzed to determine that its values remain within the bounds of the original accident analysis during operation.

Assumptions made in safety analyses require that the MTC be less positive than a given upper bound and more positive than a given lower bound. The MTC is most positive at or near BOC; this upper bound must not be exceeded. This maximum upper limit occurs at or near BOC, all rods out (ARO), hot zero power conditions. For some core designs, the burnable absorbers may burn out faster than the fuel depletes early in the cycle. This may cause the boron concentration to increase with burnup early in the cycle and the most positive MTC not to occur at BOC, but somewhat later in the cycle. For these core designs, the predicted difference between the BOC MTC and the most positive MTC is used to adjust the BOC measured MTC to ensure that the MTC remains less than the limit during the entire cycle. At EOC the MTC takes on its most negative value, when the lower bound becomes important. This LCO exists to ensure that both the upper and lower bounds are not exceeded.

INSERT 4

During operation, therefore, the conditions of the LCO can only be ensured through measurement. The Surveillance checks at BOC and EOC on MTC provide confirmation that the MTC is behaving as anticipated so that the acceptance criteria are met.

The LCO establishes a maximum positive value that cannot be exceeded. The BOC positive limit and the EOC negative limit are established in the COLR to allow specifying limits for each particular cycle. This permits the unit to take advantage of improved fuel management and changes in unit operating schedule.

APPLICABILITY

Technical Specifications place both LCO and SR values on MTC, based on the safety analysis assumptions described above.

ACTIONS (continued)

be brought to a MODE or condition in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to at least MODE 4 within 12 hours.

The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1

This SR requires measurement of the MTC at BOC prior to entering MODE 1 in order to demonstrate compliance with the positive MTCSURVEILLANCE REQUIREMENTS (continued)

LCO. Meeting the limit prior to entering MODE 1 ensures that the limit will also be met at higher power levels.

The BOC MTC value for ARO will be inferred from isothermal temperature coefficient measurements obtained during the physics tests after refueling. If appropriate, the ARO value is adjusted to account for any increase in the MTC early in the cycle. The ARO value can then be directly compared to the BOC MTC limit of the LCO. If required, measurement results and predicted design values can be used to establish administrative withdrawal limits for control banks.

SR 3.1.3.2

In similar fashion, the LCO demands that the MTC be less negative than the specified value for EOC full power conditions. This measurement may be performed at any THERMAL POWER, but its results must be extrapolated to the conditions of RTP and all banks withdrawn in order to make a proper comparison with the LCO value. Because the RTP MTC value will gradually become more negative with further core depletion and boron concentration reduction, a 300 ppm SR value of MTC should necessarily be less negative than the EOC LCO limit. The 300 ppm SR value is sufficiently less negative than the EOC LCO limit value to ensure that the LCO limit will be met when the 300 ppm Surveillance criterion is met.

SR 3.1.3.2 is modified by three Notes that includes the following requirements:

INSERT 1

a. The SR must be performed within 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm for the reasons discussed above.

SURVEILLANCE REQUIREMENTS (continued)

b. If the 300 ppm Surveillance limit is exceeded, it is possible that the EOC limit on MTC could be reached before the planned EOC. Because the MTC changes slowly with core depletion, the Frequency of 14 EFPD is sufficient to avoid exceeding the EOC limit.

c. The Surveillance limit for RTP boron concentration of 60 ppm is conservative. If the measured MTC at 60 ppm is more positive than the 60 ppm Surveillance limit, the EOC limit will not be exceeded because of the gradual manner in which MTC changes with core burnup.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.

2. UFSAR, Chapter 15.

3. UFSAR, Section 15.4.

4. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

INSERT 5

ATTACHMENT 3B

Marked-Up TS Bases Pages (McGuire)

INSERT 1

Measurement of the MTC may be suspended for the current operating cycle provided the benchmark criteria specified in DPC-NE-1007-PA, and the Revised MTC Prediction specified in the COLR are satisfied.

INSERT 2

or analytical check (Ref. 5) of the EOC MTC

INSERT 3

or calculated

INSERT 4

During operation, the condition of the upper LCO limit at BOC is ensured through measurement. The lower LCO limit at EOC is ensured either analytically or through measurement.

INSERT 5

5. DPC-NE-1007-PA, "Conditional Exemption of the EOC MTC Measurement Methodology".

BACKGROUND (continued)

If the LCO limits are not met, the unit response during transients may not be as predicted. The core could violate criteria that prohibit a return to criticality, or the departure from nucleate boiling ratio criteria of the approved correlation may be violated, which could lead to a loss of the fuel cladding integrity.

The SRs for measurement of the MTC at the beginning and near the end of the fuel cycle are adequate to confirm that the MTC remains within its limits, since this coefficient changes slowly, due principally to changes in RCS boron concentration associated with fuel and burnable absorber depletion.

APPLICABLE SAFETY ANALYSES

The acceptance criteria for the specified MTC are:

a. The MTC values must remain within the bounds of those used in the accident analysis (Ref. 2); and

b. The MTC must be such that inherently stable power operations result during normal operation and accidents, such as overheating and overcooling events.

The UFSAR, Chapter 15 (Ref. 2), contains analyses of accidents that result in both overheating and overcooling of the reactor core. MTC is one of the controlling parameters for core reactivity in these accidents. Both the most positive value and most negative value of the MTC are important to safety, and both values must be bounded. Values used in the analyses consider worst case conditions to ensure that the accident results are bounding (Ref. 2).

The consequences of accidents that cause core overheating must be evaluated when the MTC is positive. Such accidents include the rod withdrawal transient from any power level (Ref. 3), turbine trip, and loss of forced reactor coolant flow. The consequences of accidents that cause core overcooling must be evaluated when the MTC is negative. Such accidents include sudden feedwater flow increase and steam line break.

In order to ensure a bounding accident analysis, the MTC is assumed to be its most limiting value for the analysis conditions appropriate to each accident. The bounding value is determined by considering rodded and unrodded conditions, whether the reactor is at full or zero power, and whether it is the BOC or EOC life. The most conservative combination appropriate to the accident is then used for the analysis (Ref. 2).

MTC values are bounded in reload safety evaluations assuming steady state conditions at BOC and EOC. An EOC measurement is conducted

INSERT 2

APPLICABLE SAFETY ANALYSES (continued)

INSERT 3

at conditions when the RCS boron concentration reaches approximately 300 ppm. The measured value may be extrapolated to project the EOC value, in order to confirm reload design predictions.

MTC satisfies Criterion 2 of 10 CFR 50.36 (Ref. 4). Even though it is not directly observed and controlled from the control room, MTC is considered an initial condition process variable because of its dependence on boron concentration.

LCO

LCO 3.1.3 requires the MTC to be within specified limits of the COLR to ensure that the core operates within the assumptions of the accident analysis. During the reload core safety evaluation, the MTC is analyzed to determine that its values remain within the bounds of the original accident analysis during operation.

Assumptions made in safety analyses require that the MTC be less positive than a given upper bound and more positive than a given lower bound. The MTC is most positive at or near BOC; this upper bound must not be exceeded. This maximum upper limit occurs at or near BOC, all rods out (ARO), hot zero power conditions. For some core deisgns, the burnable absorbers may burnout faster than the fuel depletes early in the cycle. This may cause the boron concentration to increase with burnup early in the cycle and the most positive MTC not occur at BOC, but somewhat later in the cycle. For these core designs, the predicted distance between the BOC MTC, and the most positive MTC is used to adjust the BOC measrued MTC to ensure that the MTC remains less than the limit during the entire cycle. At EOC the MTC takes on its most negative value, when the lower bound becomes important. This LCO exists to ensure that both the upper and lower bounds are not exceeded.

INSERT 4

During operation, therefore, the conditions of the LCO can only be ensured through measurement. The Surveillance checks at BOC and EOC on MTC provide confirmation that the MTC is behaving as anticipated so that the acceptance criteria are met.

The LCO establishes a maximum positive value that cannot be exceeded. The BOC positive limit and the EOC negative limit are established in the COLR to allow specifying limits for each particular cycle. This permits the unit to take advantage of improved fuel management and changes in unit operating schedule.

APPLICABILITY

Technical Specifications place both LCO and SR values on MTC, based on the safety analysis assumptions described above.

The allowed Completion Time is reasonable, based on operating experience, for reaching the required MODE from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1

This SR requires measurement of the MTC at BOC prior to entering MODE 1 in order to demonstrate compliance with the positive MTC LCO. Meeting the limit prior to entering MODE 1 ensures that the limit will also be met at higher power levels.

The BOC MTC value for ARO will be inferred from isothermal temperature coefficient measurements obtained during the physics tests after refueling. If appropriate, the ARO value is adjusted to account for any increase in the MTC early in the cycle. The ARO value can then be directly compared to the BOC MTC limit of the LCO. If required, measurement results and predicted design values can be used to establish administrative withdrawal limits for control banks.

SR 3.1.3.2

In similar fashion, the LCO demands that the MTC be less negative than the specified value for EOC full power conditions. This measurement may be performed at any THERMAL POWER, but its results must be extrapolated to the conditions of RTP and all banks withdrawn in order to make a proper comparison with the LCO value. Because the RTP MTC value will gradually become more negative with further core depletion and boron concentration reduction, a 300 ppm SR value of MTC should necessarily be less negative than the EOC LCO limit. The 300 ppm SR value is sufficiently less negative than the EOC LCO limit value to ensure that the LCO limit will be met when the 300 ppm Surveillance criterion is met.

SR 3.1.3.2 is modified by three Notes that include the following requirements:

a. The SR must be performed within 7 effective full power days (EFPD) after reaching the equivalent of an equilibrium RTP all rods out (ARO) boron concentration of 300 ppm for the reasons discussed above.

INSERT 1

b. If the 300 ppm Surveillance limit is exceeded, it is possible that the EOC limit on MTC could be reached before the planned EOC. Because the MTC changes slowly with core depletion, the Frequency of 14 EFPD is sufficient to avoid exceeding the EOC limit.

c. The Surveillance limit for RTP boron concentration of 60 ppm is conservative. If the measured MTC at 60 ppm is more positive than the 60 ppm Surveillance limit, the EOC limit will not be exceeded because of the gradual manner in which MTC changes with core burnup.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 11.

2. UFSAR, Chapter 15.

3. UFSAR, Section 15.4.

4. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

INSERT 5

ATTACHMENT 4

Affidavits for Withholding Proprietary Information from Public Disclosure

AFFIDAVIT OF David C. Culp

1. I am Acting Vice President of Nuclear Engineering for Duke Energy Carolinas, and as such have the responsibility of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear plant licensing and am authorized to apply for its withholding on behalf of Duke.

2. I am making this affidavit in conformance with the provisions of 10 CFR 2.390 of the regulations of the Nuclear Regulatory Commission (NRC) and in conjunction with Duke's application for withholding which accompanies this affidavit.

3. I have knowledge of the criteria used by Duke in designating information as proprietary or confidential.

4. Pursuant to the provisions of paragraph (b) (4) of 10 CFR 2.390, the following is furnished for consideration by the NRC in determining whether the information sought to be withheld from public disclosure should be withheld.

   (i) The information sought to be withheld from public disclosure is owned by Duke, and has been held in confidence by Duke and its consultants.

   (ii) The information is of a type that would customarily be held in confidence by Duke. The information consists of analysis methodology details, analysis results, supporting data, and aspects of development programs, relative to a method of analysis that provides a competitive advantage to Duke.

   (iii) The information was transmitted to the NRC in confidence and under the provisions of 10 CFR 2.390, it is to be received in confidence by the NRC.

   (iv) The information sought to be protected is not available in public to the best of our knowledge and belief.

   (v) The proprietary information sought to be withheld in the submittal is that which is marked in the proprietary version of Duke methodology report DPC-NE-1007-P, *Conditional Exemption of the EOC MTC Measurement Methodology*. This information enables Duke to:

      (a) Support license amendment and Technical Specification revision request for its McGuire and Catawba reactors.

      (b) Conditionally Exempt the EOC MTC Measurement required by Technical Specification Surveillance Requirement 3.1.3.2.

(Continued)

David C. Culp

(vi) The proprietary information sought to be withheld from public disclosure has substantial commercial value to Duke.

(a) Duke uses this information to reduce vendor and consultant expenses associated with supporting the operation and licensing of nuclear power plants.

(b) The subject information could only be duplicated by competitors at similar expense to that incurred by Duke.

5. Public disclosure of this information is likely to cause harm to Duke because it would allow competitors in the nuclear industry to benefit from the results of its development program without requiring a commensurate expense or allowing Duke to recoup a portion of its expenditures or benefit from the sale of the information.

David C. Culp affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

Approved As to Form

David C. Culp

Subscribed and sworn to me: March 15, 2012
Date

Debra Reese Debra Reese
Notary Public

My Commission Expires: September 6, 2015

SEAL

DEBRA REESE NOTARY PUBLIC MECKLENBURG COUNTY, NC

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Proj letter: NF-DA-12-8

CAW-12-3367

February 8, 2012

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: DPC-NE-1007-P, "Conditional Exemption of the EOC MTC Measurement Methodology" (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-12-3367 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

The subject document was prepared and classified as Westinghouse Proprietary Class 2. Westinghouse requests that the document be considered proprietary in its entirety. As such, a non-proprietary version will not be issued.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Duke Energy Carolinas.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-12-3367, and should be addressed to J. A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, Suite 428, 1000 Westinghouse Drive, Cranberry Township, Pennsylvania 16066.

Very truly yours,

J. A. Gresham, Manager
Regulatory Compliance

Enclosures

CAW-12-3367

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

Before me, the undersigned authority, personally appeared J. A. Gresham, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

J. A. Gresham, Manager
Regulatory Compliance

Sworn to and subscribed before me
this 8th day of February 2012

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Cynthia Olesky, Notary Public
Manor Boro, Westmoreland County
My Commission Expires July 16, 2014
Member, Pennsylvania Association of Notaries

(1) I am Manager, Regulatory Compliance, in Nuclear Services, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is contained in DPC-NE-1007-P, "Conditional Exemption of the EOC MTC Measurement Methodology" (Proprietary), dated February 2012, for submittal to the Commission, being transmitted by Duke Energy Carolinas letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with conditional exemption of the EOC MTC Measurement Methodology for Duke Energy Carolinas, and may be used only for that purpose.

This information is part of that which will enable Westinghouse to:

(a) Assist customers in implementing the conditional exemption of the most negative EOL moderator temperature coefficient measurement.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for purpose of implementing the conditional exemption of the most negative EOL moderator temperature coefficient measurement.

(b) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar fuel design and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith is the proprietary version of a document furnished to the NRC in connection with requests for generic and/or plant-specific review and approval. The document is to be considered proprietary in its entirety.

COPYRIGHT NOTICE