Duke Power
A Duke Energy Company

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October 15, 2003

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

Subject: Duke Energy Corporation
McGuire Nuclear Station, Units 1 and 2
Docket Numbers 50-369 and 50-370
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413, 50-414

Response to the October 2, 2003 Request for Additional Information by the NRC Staff
(TAC NOs: MB8359, MB8360, MB8361 AND MB8362)

References:
1. Letter from W. R. Mc Collum, Jr. to NRC, dated March 24, 2003
2. Letter from W. R. Mc Collum, Jr. to NRC, dated June 25, 2003

On March 24, 2003 Duke Energy Corporation (Duke) submitted proposed amendments to the McGuire and Catawba Nuclear Station Facility Operating Licenses and Technical Specifications (TS) and Bases. On June 9, 2003 Duke personnel met with members of the NRC staff to discuss issues related to that submittal. On June 25, 2003 Duke submitted a revised TS amendment package based on the results of that public meeting. By letter dated October 2, 2003, the NRC requested additional information regarding the license amendment request. During an October 8, 2003 telephone conversation with the Staff, Duke was asked to identify the methodology used to determine each of the

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parameters proposed to be relocated to the COLRs by Duke in its revised June 25, 2003 submittal.

Based upon further evaluation and discussions with the NRC Staff on September 25, October 2, and October 8, 2003, Duke herein submits a revised TS amendment package.

The proposed change revises Duke's previous March 24, 2003 license amendment request, as amended by Duke's June 25, 2003 letter, by reducing the required minimum measured Reactor Coolant System (RCS) flow rate from 390,000 gpm to 388,000 gpm for McGuire Units 1 and 2, and Catawba Unit 1. The required minimum measured RCS flow rate for Catawba Unit 2 will be maintained at the current NRC approved Technical Specification value of 390,000 gpm. Other changes requested by Duke in the June 25, 2003 revised license amendment request are unchanged by the revision contained herein.

The contents of this revised amendment are as follows:

The questions in the October 2, 2003 NRC letter and the corresponding Duke answers, are provided as Attachment 1 to this letter. In response to an NRC Staff request, Attachment 1 identifies the methodology used to determine or validate the values for each of the parameters relocated to the COLRs.

Attachments 2A and 2B each contain revised marked copies of the affected McGuire and Catawba TS pages showing the proposed changes which result from Duke's response to the Staff's Request for Additional Information. These are provided as a complete replacement of the same pages contained in Duke's June 25, 2003 submittal. The other marked pages contained in the June 25, 2003 revised license amendment request remain unaffected by the revision contained herein.

Attachment 3 provides a revised description of the proposed changes and technical justification which includes the results of current safety analyses for the requested reduction in RCS minimum measured flow rate for McGuire

Units 1 and 2, and Catawba Unit 1. Other changes described by Duke in the June 25, 2003 revised license amendment request are unchanged by the revision contained herein.

Pursuant to 10CFR 50.92, Attachment 4 contains a revised No Significant Hazards determination, changed to reflect consideration of the requested reduction in RCS minimum measured flow rate for McGuire Units 1 and 2, and Catawba Unit 1. This is provided as a complete replacement for the No Significant Hazards determination contained in Duke's June 25, 2003 submittal.

The basis for the categorical exclusion from the performance of an Environmental Assessment/Impact Review in the March 24, 2003 letter is unaffected by this revision.

Implementation of this amendment will impact the McGuire and Catawba Updated Final Safety Analysis Reports (UFSARs). Changes to the UFSARs will be submitted in accordance with 10CFR50.71(e) requirements.

Duke requests approval of the proposed changes by December 1, 2003 in order to support the commencement of Catawba Unit 1, Cycle 15 operations, currently scheduled to begin December 14, 2003. Absent this change, Catawba Unit 1 may be limited to 98% rated thermal power.

Pursuant to 10CFR50.91, a copy of this proposed amendment is being sent to the appropriate state officials.

Inquiries on this matter should be directed to J. A. Effinger at (704) 382-8688.

Very truly yours,

H. B. Barron, Jr.
Senior Vice President
Nuclear Operations

H. B. Barron, Jr., being duly sworn, affirms that he is the person who subscribed his name to the foregoing statement, and that all matters and facts set forth herein are true and correct to the best of his knowledge.

H. B. Barron, Jr., Senior Vice President, Nuclear Operations

Subscribed and sworn to me: October 15, 2003
Date

Mary P. Nelms, Notary Public

My commission expires: JAN 22, 2006

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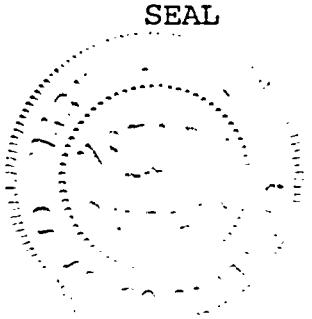

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Catawba Owners: NCMPA-1, SREC, PMPA, NCEMC
McGuire Master File (MG01DM)
Catawba Document Control File 801.01 (CN04DM)
ELL

ATTACHMENT 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REQUEST FOR ADDITIONAL INFORMATION

WILLIAM B. McGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOs 50-369 AND 50-370

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOs 50-413 AND 50-414

CHANGE IN REACTOR COOLANT SYSTEM FLOW RATE

Response to the October 2, 2003 NRC Request For Additional Information:

1. The application dated March 24, 2003, states: "The analyses supporting the RCS minimum total flow rate of 390,000 gpm assumed a minimal steam generator tube plugging percentage. The RCS minimum total flow rates for McGuire and Catawba Units 1 and 2 were increased to make more effective use of available operating analytical margins. This 390,000 gpm RCS total flow rate should be considered a cycle-specific minimum value, reflecting the condition of the McGuire and Catawba steam generators at the time the license amendment request was made." Provide a detailed technical discussion of why the reasons cited above to increase the flow rate to 390,000 gpm are no longer applicable.

   Response: The reasons cited above remain applicable for a minimum total RCS flow rate of 390,000 gpm. However, Duke expects that very little RCS flow margin above the current TS limit of 390,000 gpm will remain after loading a third batch of Westinghouse Robust Fuel Assembly (RFA) fuel into Catawba Unit 1, Cycle 15 in December 2003. Due to this expectation, it is possible operations will be limited by TS action for RCS total flow rate measuring below 390,000 gpm, requiring the reduction of power to 98% Rated Thermal Power. For this reason, Duke has conservatively designed the Catawba Unit 1, Cycle 15 reactor core assuming a minimum total RCS flow rate of 388,000 gpm, and plans to lower the total RCS flow requirement to 388,000 gpm in the Catawba Unit 1, Cycle 15 COLR upon NRC approval of this license amendment request.

Duke has also conservatively designed the McGuire Unit 2, Cycle 16 reactor core assuming a minimum total RCS flow rate of 388,000 gpm. This conservative decision was made early in the 18 month core design process, and Duke has since determined that sufficient flow margin exists with respect to loading a third batch of RFA fuel in the McGuire Unit 2 reactor core. McGuire Unit 2, Cycle 16 has commenced operations using the current TS requirement of 390,000 gpm. Duke plans to implement 388,000 gpm in the McGuire Unit 2, Cycle 16 COLR to be consistent with the UFSAR Chapter 15 analyses since a mid-cycle McGuire Unit 2, Cycle 16 COLR revision will be necessary upon approval of this license amendment request.

Catawba Unit 2 is currently operating with a third batch of RFA fuel and adequate RCS flow margin exists with respect to the minimum TS value of 390,000 gpm. A mid-cycle COLR revision will be necessary upon approval of this license amendment request, but Duke plans to implement 390,000 gpm in the Catawba Unit 2, Cycle 13 COLR to be consistent with the UFSAR Chapter 15 analyses.

Adequate flow margin is also expected for McGuire Unit 1, Cycle 17 when operation with a third batch of RFA fuel begins in March 2004. Similar to Catawba Unit 2, Cycle 13, Duke plans to maintain the current 390,000 gpm requirement for McGuire Unit 1, Cycle 16 in a mid-cycle COLR revision upon approval of this amendment request. McGuire Unit 1, Cycle 16 has only two batches of RFA fuel in the reactor core.

2. As indicated in the NRC staff's safety evaluation for WCAP-14483, the NRC staff considers that a change in observed RCS flow is an indication of a physical change to the plant and such a change should be reviewed by the NRC staff. If the basis for the proposed change in RCS flow rate is an observed change in the plant flow rate, please provide a detailed technical discussion of the cause and its safety related effect on design basis accident and transient analyses.

Response: The basis for the proposed change is a small amount of flow margin expected to remain after loading a third batch of RFA fuel into Catawba Unit 1 in December 2003. Since Westinghouse RFA fuel has a higher pressure drop than Framatome Mk-BW fuel, a third batch of RFA fuel will decrease the RCS flow rate thereby reducing flow margin above the existing TS limit of 390,000 gpm. Instead of requesting a cycle-specific reduced RCS flow requirement for Catawba Unit 1 in a separate submittal, Duke requested that RCS flow and other reload related parameters be moved from the TS to the COLR by citing an NRC approved TSTF-339, revision 2, for WCAP-14483-A and by citing, as precedent, the May 24, 1999 Comanche Peak Nuclear Station amendment request and approving NRC Safety Evaluation Report of August 30, 1999.

While not the basis for the proposed amendment, changes in RCS flow rates have been observed at McGuire Units 1 and 2, and Catawba Unit 1. These changes have been attributed to corrosion and wear products in the RCS causing small but measurable hydraulic changes in system components. The RCS system flow rate changes are monitored as required by the Technical Specifications to ensure that the measured flow is not lower than the required minimum analysis flow assumption. Since the measured flow is not lower than the required minimum analysis flow assumption, there is no safety related effect on design basis accident and transient analyses.

3. The NRC staff's January 19, 1999 safety evaluation for WCAP-14483 addressed the retention of a minimum limit of the RCS flow rate in the TS if the operating value of RCS flow rate is relocated from the TS to the COLR. An underlying assumption for the adequacy of this minimum limit for the RCS flow rate is that it is applicable to the current design of the plant and the current design basis analyses for the plant. Either the design or the analyses may change due to changes in fuel, steam generator tube plugging, RCS coolant temperature measurement concerns or other factors. Therefore, to reference a value of RCS flow rate that was approved at some prior time without establishing that it is currently adequate to ensure that all

applicable acceptance criteria are and will continue to be met for design basis accident and transient analyses is insufficient. Please address this concern and provide the values of the acceptance criteria for all applicable design basis accident and transient analyses based on a flow rate of 382,000 gpm.

Response: It is Duke's understanding that the initial development of WCAP-14483 included a proposal relocating the RCS flow rate to the COLR without a minimum value being retained in the TS. This was recommended as more consistent with other parameters relocated to the COLR in accordance with Generic Letter 88-16. During the review process, the NRC staff suggested that changes in RCS flow rate may be indicative of new flow degradation mechanisms for which the NRC staff should be aware. Therefore, the NRC staff requested that a minimum value be left in the TS as a threshold to identify such a change in RCS flow. The Westinghouse Owners Group complied with this request, and in approving WCAP-14483, the January 19, 1999 NRC Safety Evaluation Report noted that a flow "based on a staff approved analysis (e.g. maximum tube plugging) should be retained in the TS." It is Duke's understanding that the minimum RCS flow rate retained in the TS in accordance with WCAP-14483 and TSTF-339, Revision 2, may be any previous NRC approved value for that plant; there was no indication that the NRC Staff would request or expect new safety analyses to support this minimum value. This understanding was consistent with the May 24, 1999 Comanche Peak Nuclear Station amendment request and approving NRC Safety Evaluation Report of August 30, 1999 cited as industry precedence by Duke in its March 24, and June 25, 2003 submittals.

Based on the above, there was no underlying assumption that the minimum limit for the RCS flow rate retained in the TS had to be the cycle-specific value for the cycle reload. Consequently, it is Duke's opinion that a new analysis to support the minimum flow retained in the TS was not required. This is not true for the operating value relocated from the TS to the COLR, however. TS 5.6.5 requires that each cycle have specific safety analyses developed in accordance with

NRC approved methods for those parameters specified in the COLR. TS 5.6.5c requires that COLR parameters "be determined such that all applicable limits [e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System (ECCS) limits, nuclear limits such as Shut Down Margin, transient analysis limits, and accident analysis limits] of the safety analysis are met.

As stated in the Duke's response to question 1, the McGuire Unit 2, Cycle 16 and Catawba Unit 1, Cycle 15 cores were designed to a minimum RCS total flow rate of 388,000 gpm. This value will be placed in the COLR for these cycles upon approval of this amendment request. The safety analyses for these cores have been evaluated at a total RCS flow rate of 388,000 gpm versus the currently licensed value of 390,000 gpm.

Based upon further evaluation and discussions with the NRC Staff on September 25 and October 2, 2003, Duke herein submits a revised TS amendment package. The proposed change reduces the required minimum measured Reactor Coolant System (RCS) flow rate from 390,000 gpm to 388,000 gpm for McGuire Units 1 and 2, and Catawba Unit 1. The required minimum measured RCS flow rate for Catawba Unit 2 will be maintained at the current NRC approved Technical Specification value of 390,000 gpm.

During an October 8, 2003 telephone conversation with the Staff, Duke was asked to identify the methodologies used to calculate each of the parameters Duke proposed to relocate to the COLRs in its revised June 25, 2003 submittal. The following response is provided:

1. The Reactor Core Safety Limits in TS Figure 2.1.1-1 are determined using the methods described in NRC approved Topical Reports DPC-NE-2004P-A, "Duke Power Company McGuire and Catawba Nuclear Stations Core Thermal-Hydraulic Methodology Using VIPRE-01;" DPC-NE-2005P-A, "Thermal Hydraulic Statistical Core Design Methodology;" and DPC-NE-2009P-A, "Westinghouse Fuel Transition Report."

2. Reactor Trip System Instrumentation TS Table 3.3.1-1 Overtemperature ΔT values for nominal T_{ave} at RTP (T') and nominal operating pressure (P'); TS Table 3.3.1-1 Overpower ΔT values for nominal T_{ave} at RTP (T'') and K_5 and K_6 constant values are validated by re-analyzing UFSAR Chapter 15 transients using the methods described in NRC approved Topical Reports DPC-NE-3000P-A, "Thermal-Hydraulic Transient Analysis Methodology;" DPC-NE-3001P-A, "Multidimensional Reactor Transients and Safety Analysis Physics Parameter Methodology;" and DPC-NE-3002-A, "UFSAR Chapter 15 System Transient Analysis Methodology."

3. RCS DNB Parameters TS Table 3.4.1-1 values for Indicated RCS Average Temperature, Indicated Pressurizer Pressure, and RCS Total Flow Rate are validated by reanalyzing UFSAR Chapter 15 transient DNB analyses using the methods described in NRC approved Topical Reports DPC-NE-3000P-A, "Thermal-Hydraulic Transient Analysis Methodology;" DPC-NE-3001P-A, "Multidimensional Reactor Transients and Safety Analysis Physics Parameter Methodology;" DPC-NE-3002-A, "UFSAR Chapter 15 System Transient Analysis Methodology;" and by reanalyzing steady state DNB analyses described in NRC approved Topical Reports DPC-NE-2004P-A, "Duke Power Company McGuire and Catawba Nuclear Stations Core Thermal-Hydraulic Methodology Using VIPRE-01;" DPC-NE-2005P-A, "Thermal Hydraulic Statistical Core Design Methodology;" and DPC-NE-2009P-A, "Westinghouse Fuel Transition Report."

ATTACHMENT 2A

McGUIRE UNITS 1 AND 2 TECHNICAL SPECIFICATIONS
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Table 3.4.1-1 (page 1 of 1)
RCS DNB Parameters

THE LIMIT SPECIFIED IN THE COLR

PARAMETER		INDICATION	No. OPERABLE CHANNELS	LIMITS
1.	Indicated RCS Average Temperature	meter	4	≤ 581.2°F
		meter	3	≤ 586.9°F
		computer	4	≤ 587.7°F
		computer	3	≤ 587.6°F
2.	Indicated Pressurizer Pressure	meter	4	≥ 2218.8 psig
		meter	3	≥ 2222.1 psig
		computer	4	≥ 2215.8 psig
		computer	3	≥ 2217.5 psig
3.	RCS Total Flow Rate			≥ 390,000 gpm

≥388,000 gpm AND GREATER THAN OR EQUAL TO THE LIMIT SPECIFIED IN THE COLR

ATTACHMENT 2B

CATAWBA UNITS 1 AND 2 TECHNICAL SPECIFICATIONS
MARKED COPY

THE VALUE SPECIFIED IN THE COLR

Table 3.4.1-1 (page 1 of 1)
RCS DNB Parameters

PARAMETER		INDICATION	No. OPERABLE CHANNELS	LIMITS
1.	Indicated RCS Average Temperature – Unit 1	meter	4	≤ 587.2°F
		meter	3	≤ 586.9°F
		computer	4	≤ 587.1°F
		computer	3	≤ 587.5°F
	Indicated RCS Average Temperature – Unit 2	meter	4	≤ 592.9°F
		meter	3	≤ 592.6°F
		computer	4	≤ 593.4°F
		computer	3	≤ 593.2°F
2.	Indicated Pressurizer Pressure	meter	4	≥ 2218.8 psig
		meter	3	≥ 2222.1 psig
		computer	4	≥ 2215.8 psig
		computer	3	≥ 2217.5 psig
3.	RCS Total Flow Rate			≥ 390,000 gpm

≥ 388,000 gpm AND GREATER THAN OR EQUAL TO THE LIMIT SPECIFIED IN THE COLR (UNIT 1),

≥ 390,000 gpm AND GREATER THAN OR EQUAL TO THE LIMIT SPECIFIED IN THE COLR (UNIT 2)

ATTACHMENT 3

REVISED DESCRIPTION OF PROPOSED CHANGES AND TECHNICAL JUSTIFICATION

REVISED DESCRIPTION OF PROPOSED CHANGES AND TECHNICAL JUSTIFICATON

Proposed Changes

The proposed change revises Duke's previous March 24, 2003 license amendment request, as amended by Duke's June 25, 2003 letter, by reducing the required minimum measured Reactor Coolant System (RCS) flow rate from 390,000 gpm to 388,000 gpm for McGuire Units 1 and 2, and Catawba Unit 1. The required minimum measured RCS flow rate for Catawba Unit 2 will be maintained at the current NRC approved Technical Specification value of 390,000 gpm. Other changes requested by Duke in the June 25, 2003 revised license amendment request, and the technical justification for those changes, are unchanged by the revision contained herein.

The safety and quality of operations at Duke's McGuire and Catawba nuclear stations will not be compromised by the implementation of this amendment request.

Basis for Proposed Changes

Reduction in RCS Flow:

The following summarizes the effect on UFSAR analyses of the requested reduction in McGuire Units 1 and 2, and Catawba Unit 1 required minimum measured RCS flow rate from 390,000 gpm to 388,000 gpm:

For the following events, the analysis of record employs a minimum RCS total flow rate of 382,000 gpm and/or a maximum RCS total flow rate assumption of 420,000 gpm. Therefore, in each instance the current analysis of record bounds the current TS minimum RCS total flow requirement of 390,000, and thus a change in the minimum RCS total flow rate limit to 388,000 gpm would also remain unaffected.

A. LOCA Blowdown Reactor Vessel and Loop Forces (UFSAR Sections 3.6.4.1 and 3.9.1.5)

B. Containment Functional Design (UFSAR Section 6.2.1)

C. Feedwater System Malfunction Causing an Increase in Feedwater Flow (UFSAR Section 15.1.2)

D. Turbine Trip (UFSAR Section 15.2.3)

E. Loss of Non-Emergency AC Power to the Station Auxiliaries (UFSAR Section 15.2.6)

F. Startup of an Inactive Reactor Coolant Pump at an Incorrect Temperature (UFSAR Section 15.4.4)

G. Inadvertent Opening of a Pressurizer Safety or Relief Valve (UFSAR Section 15.6.1)

Certain UFSAR Chapter 15 events are not applicable to McGuire and Catawba (e.g., BWR transients) or are addressed in the UFSAR as being bounded by other analyzed transients. In addition, many of the analyses are not sensitive to the reduction in RCS total flow, and a conclusion is reached that the 2000 gpm flow reduction does not affect the transient. Therefore, the following events are either not applicable, bounded by another accident, or are unaffected by the decrease of minimum RCS total flow rate to 388,000 gpm because RCS flow is not a factor in the event:

A. Feedwater System Malfunctions that Result in a Reduction in Feedwater Temperature (UFSAR Section 15.1.1, bounded by 15.1.2 or 15.1.3)

B. Inadvertent Opening of a Steam Generator Relief or Safety Valve (UFSAR Section 15.1.4, bounded by 15.1.5)

C. Steam Pressure Regulator Malfunction or Failure that Results in Decreasing Steam Flow (UFSAR Section 15.2.1, not applicable)

D. Loss of External Load (UFSAR Section 15.2.2, bounded by 15.2.3)

E. Inadvertent Closure of Main Steam Isolation Valves (UFSAR Section 15.2.4, bounded by 15.2.3)

F. Loss of Condenser Vacuum and Other Events Causing a Turbine Trip (UFSAR Section 15.2.5, bounded by 15.2.3)

G. Reactor Coolant Shaft Break (UFSAR Section 15.3.4, bounded by 15.3.3)

H. Dropped RCCA Bank (UFSAR Section 15.4.3b, bounded by 15.4.3a)

I. Statically Misaligned RCCA (UFSAR Section 15.4.3c, bounded by 15.4.3a)

J. BWR Transient (UFSAR Section 15.4.5, not applicable)

K. Chemical Volume and Control System Malfunction that Results in a Decrease in Boron Concentration in the Reactor Coolant System (UFSAR Section 15.4.6, unaffected)

L. Inadvertent Loading and Operation of a Fuel Assembly in an Improper Position (UFSAR Section 15.4.7, unaffected)

M. BWR Transient (UFSAR Section 15.4.9, not applicable)

N. Inadvertent Operation of ECCS During Power Operation (UFSAR Section 15.5.1, bounded by 15.6.1)

O. Chemical and Volume Control System Malfunction that Increases Reactor Coolant Inventory (UFSAR Section 15.5.2, bounded by 15.5.1 and 15.4.6)

P. A Number of BWR Transients (UFSAR Section 15.5.3, not applicable)

Q. Break in Instrument Line or Other Lines from Reactor Coolant Pressure Boundary that Penetrate Containment (UFSAR Section 15.6.2, unaffected)

R. BWR Transient (UFSAR Section 15.6.4, not applicable)

S. A Number of BWR Transients (UFSAR Section 15.6.6, not applicable)

The following summarizes the results of the remaining safety analyses that were either re-evaluated or re-analyzed with the reduced minimum RCS total flow rate of 388,000 gpm. Each of the safety analyses were individually reviewed to determine if the results of the analyses are affected by a 2000 gpm reduction in RCS total flow. For

several of the analyses, there is a potential for the results of the analyses to be impacted, and a reanalysis is performed. For the balance of the analyses, an evaluation was performed. These events are summarized below:

A. Thermal Hydraulic Design (UFSAR 4.4)

The thermal hydraulic design for the McGuire and Catawba replacement steam generator units (McGuire Units 1 and 2; Catawba Unit 1) was evaluated for the decrease in minimum RCS total flow rate limit to 388,000 gpm. The impact of decreasing RCS total flow rate from 390,000 gpm to 388,000 gpm has no effect on the Departure From Nucleate Boiling (DNB) Safety Limit lines figure (Reactor Core Safety Limit Figure 2.1.1-1) since it was never revised to reflect analyses performed at 390,000 gpm. The DNB safety limit lines in this figure, which will be moved to the COLR as part of this license amendment request, are based on 382,000 gpm and were previously determined to be conservative and provide the necessary reactor protection when increasing the minimum RCS total flow rate to 390,000 gpm. By definition, this would also remain true for 388,000 gpm.

Similarly, the current over temperature and overpower ΔT ($OT\Delta T/OP\Delta T$) set point equation constants (see Notes 1 and 2 of Table 3.3.1-1) were determined based on a minimum RCS total flow rate of 382,000 gpm. These were also previously determined to be conservative and provide the necessary reactor protection when increasing the minimum RCS total flow rate to 390,000 gpm, which by definition would also remain true for 388,000 gpm.

B. Feedwater Malfunction Causing an Increase in Feedwater Flow (UFSAR Section 15.1.2)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to demonstrate DNB does not occur. The minimum DNBR was calculated to be 1.90, which is well above the WRB-2M CHF correlation SDL of 1.3 for RFA fuel.

C. Excessive Increase in Secondary Steam Flow (UFSAR Section 15.1.3)

The increase in steam flow accident was originally analyzed at 382,000 gpm and concluded that approximately 6% margin to the OPΔT trip existed during the event. Likewise, the 390,000 gpm analysis concluded that at least 6% margin to the OPΔT trip was maintained during the event. Therefore, the same conclusion would be applicable if this analysis were re-analyzed at 388,000 gpm.

D. Steam system piping failure (UFSAR 15.1.5)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to demonstrate DNB does not occur. The minimum DNBR was calculated to be 1.62, which is well above the W-3S CHF correlation limit of 1.45.

E. Loss of normal feedwater flow (UFSAR Section 15.2.7)

Both the short and long-term core cooling analyses have significant margin to their respective acceptance criteria. The current short-term analysis assumes a nominal power of 3411 MWth and 390,000 gpm while the long-term analysis assumes a non-SCD power level of 102 % of 3411 MWth with 390,000 gpm (less uncertainty). The prior analyses at 100 %FP and 382,000 gpm had significant margin to the acceptance criteria. Therefore, the small decrease in flow will have a negligible affect on the available margin.

F. Feedwater system pipe break (UFSAR Section 15.2.8)

The current analysis assumes a RCS flow of 390,000 gpm and 102 % of 3411 MWth power. The long-term core cooling analysis indicates adequate hot leg subcooling ensuring long-term core cooling capability. The short term analysis is bounded by 15.2.7, but was also satisfactorily analyzed at 382,000 gpm. The marginal reduction in flow represented by 388,000 gpm will not appreciably erode the subcooling margin determined for the long-term analysis. This is because the Reactor Coolant Pumps are assumed lost on LOOP coincident with reactor trip. Therefore, the conclusion of the current

analysis of record reasonably accommodates the proposed RCS flow rate.

G. Partial Loss of Forced Reactor Coolant Flow (UFSAR Section 15.3.1)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to demonstrate DNB does not occur. The minimum DNBR was calculated to be 2.26, which is well above the WRB-2M CHF correlation SDL of 1.3 for RFA fuel.

H. Complete Loss of Forced Reactor Coolant Flow (UFSAR Section 15.3.2)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to demonstrate DNB does not occur. The minimum DNBR was calculated to be 1.85, which is well above the WRB-2M CHF correlation SDL of 1.3 for RFA fuel.

I. Reactor Coolant Pump Shaft Seizure - Locked Rotor (UFSAR Section 15.3.3)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to determine the percentage of fuel rods that experience DNB. The minimum DNBR was calculated to be 1.62, which is well above the WRB-2M CHF correlation SDL of 1.3 for RFA fuel. The existing offsite dose analysis assumes a fuel failure percentage in order to ensure that radiological consequences do not exceed a small fraction of the 10CFR100 limits. For this reason, maximum allowable radial peaking (MARP) curves are generated in order determine the number of fuel rods, if any, experience DNB for a given core design. Although no fuel failures are expected given the large DNB margin shown above, the MARP curves ensure the fuel failure assumption in the current offsite dose calculation remains valid.

J. Uncontrolled RCCA Bank Withdrawal from a Subcritical or Low Power Startup Condition (UFSAR Section 15.4.1)

This analysis addresses adequate core cooling (Case 1) and peak RCS pressure (Case 2) acceptance criteria. Case 1 assumes RCS flow with 3 Reactor Coolant Pumps (RCPs) operational based on nominal flow of 390,000 gpm. Case 2

assumes RCS flow with 4 RCPs operational based on nominal flow of 390,000 gpm. In the former case, considering the marginal reduction in nominal full flow relative to the uncertainty associated with 3 RCP flow it can be concluded the analysis of record is adequate. The delivered flow per RCP increases to between 104 and 107% when an RCP is idled. The 0.5% reduction in nominal full flow is therefore adequately accommodated by the 3 RCP flow assumption.

Case 2 has sufficient margin to the primary pressure acceptance criteria. A reduction in flow from 420,000 gpm to 377,606 gpm increased the peak pressure by only 4 psi. Therefore the marginal reduction in nominal full flow would not have an appreciable affect on the conclusion that 110% of RCS System design pressure is not violated by the postulated event.

K. Uncontrolled RCCA Bank Withdrawal at Power (UFSAR Section 15.4.2)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to demonstrate DNB does not occur. The minimum DNBR was calculated to be 1.45, which is well above the WRB-2M CHF correlation SDL of 1.3 for RFA fuel.

L. Dropped RCCA Rod (UFSAR Section 15.4.3a)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to demonstrate DNB does not occur. The minimum DNBR was calculated to be 1.60, which is well above the WRB-2M CHF correlation SDL of 1.3 for RFA fuel.

M. Single Uncontrolled Rod Withdrawal (UFSAR Section 15.4.3d)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to determine the percentage of fuel rods that experience DNB. The minimum DNBR was calculated to be 2.01, which is well above the WRB-2M CHF correlation SDL of 1.3 for RFA fuel. The existing offsite dose analysis assumes a fuel failure percentage in order to ensure that radiological consequences do not exceed a small fraction of the 10CFR100 limits. For this reason, maximum allowable radial peaking (MARP) curves

are generated in order determine the number of fuel rods, if any, experience DNB for a given core design. Although no fuel failures are expected given the large DNB margin shown above, the MARP curves ensure the fuel failure assumption in the current offsite dose calculation remains valid.

N. Spectrum of Rod Cluster Control Assembly Ejection Accidents (UFSAR Section 15.4.8)

This event was re-analyzed at a minimum RCS total flow rate of 388,000 gpm to determine the percentage of fuel rods that experience DNB. The existing offsite dose analysis assumes a fuel failure percentage in order to ensure that radiological consequences do not exceed a small fraction of the 10CFR 100 limits. For this reason, maximum allowable radial peaking (MARP) curves are generated in order determine the number of fuel rods, if any, experience DNB for a given core design. Since some fuel failure is assured for this event, the minimum DNBR allowed by the MARP curves is 1.24, which is well above the WRB-2M CHF correlation limit of 1.14 for RFA fuel. By restricting the MARP curves to a MDNBR above the CHF correlation limit, it was determined that the fuel failure assumption in the current offsite dose calculation remains valid.

O. Steam generator tube rupture (UFSAR Section 15.6.3)

The steam generator tube rupture event is examined for DNB, radiological consequences and steam generator over fill (Catawba). The thermal-hydraulic input for the radiological calculation bound the proposed RCS System flow rate. The steam generator over fill analysis determined the assumed RCS System flow rate to be inconsequential. The DNB analysis was performed at 100% of 3411 MWth and at 382,000 gpm and therefore bounds the proposed RCS System flow of 388,000 gpm. The Tave reduction dose input analysis was performed at 390,000 gpm less uncertainty. Prior to trip the marginal reduction in flow has an inconsequential impact on the analysis. Upon manual reactor trip, LOOP is assumed to trip the RCPs and the impact of the small change in initial RCS System flow has no effect on the balance of the transient.

P. Loss of coolant accidents (UFSAR Section 15.6.5)

The Large Break BELOCA analysis was evaluated by Westinghouse for the 2000 gpm reduction in RCS total flow rate and determined that the variations in the global model calculations are such that the 95th percentile PCT is not impacted.

The significant factors in Small Break LOCA (SBLOCA) are basically decay heat, RCS mass, break flow, and ECCS delivery. Three of these variables are completely unrelated to initial RCS flow, and the fourth (RCS mass) is insignificantly affected. Changes in initial RCS flow may possibly change the thermal mass in the steam generators, and thus the operating pressure, which would in turn affect the time at which the safety valves would lift. However, this second order effect is considered insignificant to the SBLOCA outcome.

Conclusion:

The UFSAR Chapter 15 transient and accident analyses have been reviewed for a decrease in the TS RCS minimum measured flow rate from 390,000 gpm to 388,000 gpm for McGuire Units 1 and 2, and Catawba Unit 1. Reanalyses were performed for those events sensitive to a decrease in RCS flow. The acceptance criteria were met for all events. Therefore, a reduction in RCS minimum measured flow from 390,000 gpm to 388,000 gpm is justified.

ATTACHMENT 4

REVISED NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

As required by 10CFR50.91(a)(1), this analysis is provided to demonstrate that the proposed license amendment does not involve a significant hazard.

Conformance of the proposed amendment to the standards for a determination of no significant hazards, as defined in 10CFR50.92, is shown in the following:

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

   No. The reduction in McGuire Units 1 and 2, and Catawba Unit 1 RCS minimum measured flow (MMF) from 390,000 gpm to 388,000 gpm will not change the probability of actuation of any Engineering Safeguard Feature or any other device. The consequences of previously analyzed accidents have been found to be insignificantly different when this reduced flow rate is assumed. The system transient response is not affected by the initial RCS flow assumption unless the initial assumption is so low as to impair the steady-state core cooling capability or the steam generator heat transfer capability. This is clearly not the case with a 0.5% reduction in RCS flow.

   The relocation of Reactor Coolant System (RCS) related cycle-specific parameter limits from the Technical Specifications (TS) to the Core Operating Limits Reports (COLR) proposed by this amendment request does not result in the alteration of the design, material, or construction standards that were applicable prior to the change. The proposed change will not result in the modification of any system interface that would increase the likelihood of an accident since these events are independent of the proposed change. The proposed amendment will not change, degrade, or prevent actions, or alter any assumptions previously made in evaluating the radiological consequences of an accident described in the UFSAR. Therefore, the proposed amendment does not result in the increase in the probability or consequences of an accident previously evaluated.

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

No. This change does not create the possibility of a new or different kind of accident from any accident previously evaluated. No new accident causal mechanisms are created as a result of NRC approval of this amendment request. No changes are being made to the facility which should introduce any new accident causal mechanisms. This amendment request does not impact any plant systems that are accident initiators.

3) Does the proposed change involve a significant reduction in margin of safety?

No. Implementation of this amendment would not involve a significant reduction in the margin of safety. The decrease in McGuire Units 1 and 2, and Catawba Unit 1 RCS MMF has been analyzed and found to have an insignificant effect on the applicable transient analyses found in the UFSAR. Previously approved methodologies will continue to be used in the determination of cycle-specific core operating limits appearing in the COLRs. Additionally, the RCS minimum total flow rates for McGuire and Catawba are retained in their respective TS so as to assure that lower flow rates will not be used without prior NRC approval. Consequently, no safety margins will be impacted.

Based on the above, it is concluded that the proposed license amendment request does not result in a reduction in margin with respect to plant safety.

Conclusion

Based on the preceding analysis, it is concluded that the reduction of McGuire Units 1 and 2, and Catawba Unit 1 RCS minimum measured flow from 390,000 gpm to 388,000 gpm and the relocation of Reactor Coolant System (RCS) related cycle-specific parameter limits from the TS to the COLR does not involve a Significant Hazards Consideration Finding as defined in 10CFR50.92.