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January 21, 2003

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

Subject: Duke Energy Corporation
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 Specification Amendment to Modify Requirements Applicable When Actions Require No Positive Reactivity Additions

Reference: 1) Letter from M. S. Tuckman to U.S. Nuclear Regulatory Commission dated November 20, 2002.

In Reference 1 Duke Energy requested an amendment to the Catawba and McGuire Nuclear Station Facility Operating Licenses and Technical Specifications (TS). The proposed changes would revise the Required Actions requiring suspension of operations involving positive reactivity additions and various Notes that preclude reduction in boron concentration.

Recent discussions with the NRC staff have identified a clarification required in the description of proposed changes located in Attachment 3 of Reference 1. Duke has revised Attachment 3 to provide the clarification. A revised Attachment 3 is attached and replaces the Attachment 3 previously submitted in Reference 1 in its entirety.

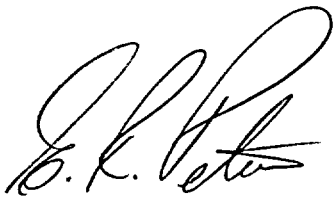
A001

The items discussed in this letter and in the revised Attachment 3 have been reviewed against the No Significant Hazards Evaluation submitted in Reference 1. Duke has determined that the previous No Significant Hazards Evaluation still remains valid and has not been affected by any of these changes. There are no commitments contained within this letter.

Pursuant to 10 CFR 50.91, a copy of this letter is being sent to the appropriate state officials.

Inquiries on this matter should be directed to R. D. Hart at (803) 831-3622.

Very truly yours,



G.R. Peterson

RDH/s

Attachments

Gary R. Peterson, being duly sworn, states that he is Site Vice President of Duke Energy Corporation; that he is authorized on the part of said corporation to sign and file with the Nuclear Regulatory Commission this amendment to the Catawba Nuclear Station Facility Operating Licenses Numbers NPF-35 and NPF-52 and Technical Specifications; and that all statements and matters set forth herein are true and correct to the best of his knowledge.

Gary R. Peterson, Site Vice President

Subscribed and sworn to me: 1-21-2003
Date

Notary Public

My commission expires: 7-10-2012
Date

SEAL

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ATTACHMENT 3

DESCRIPTION OF PROPOSED CHANGES AND TECHNICAL JUSTIFICATION

Background:

This amendment revises several of the Required Actions in the Catawba and McGuire Technical Specifications (TS) that require the suspension of operations involving positive reactivity additions or suspension of operations involving reactor coolant system (RCS) boron concentration reductions. In addition, the proposed amendment revises several Limiting Condition for Operation (LCO) Notes that preclude reductions in RCS boron concentration. This amendment revises these Required Actions and LCO Notes to allow small, controlled, safe insertions of positive reactivity, but limits the introduction of positive reactivity such that compliance with the required margin to criticality, the required SHUTDOWN MARGIN (SDM), or refueling boron concentration limits will still be satisfied.

The proposed changes are required by operational considerations because during conditions in which these ACTIONS may be required, various unit operations must be maintained and reactor coolant system (RCS) temperature must be controlled. These activities make it necessary to add cooler water to the RCS (a positive reactivity change in most cases) or warmer water to the RCS and may involve inventory makeup from sources that are at a boron concentration less than that in the RCS.

Specifically, operational considerations may make it necessary or prudent to use a different shutdown-cooling loop from the one in operation. With the proposed changes, if the newly selected shutdown cooling loop is sampled and the boron concentration is slightly lower than that of the RCS, but sufficiently high that the SDM and refueling boron concentration limits continue to be met, the switch to a different loop would be acceptable. Alternatively, if the shutdown cooling loop is at a lower or higher temperature than the RCS average temperature, but the reactivity effects are small enough to assure that the SDM and refueling boron concentration limits will continue to be met, again the change to an alternate loop may be performed.

Another example of the type of activity that will be acceptable when the proposed changes are in effect is the addition of inventory to the RCS from the refueling water storage tank (RWST) during a refueling outage. Boron concentration in the RWST for Catawba is controlled through the COLR (Core Operating Limits Report) between 2700 and 2975 ppm on Unit 1 and 2700 and 3075 ppm on Unit 2. Boron concentration in the RWST for McGuire is controlled through

the COLR between 2675 and 2875 ppm for both units. The RWST boron concentrations are cycle specific and subject to change based on core design. They are controlled through revisions to the COLR. Provided that the RWST boron concentration is sufficiently high to assure SDM and refueling boron concentration limits will continue to be met, an alternate supply of makeup to the RCS will be available from the RWST.

These activities should not be precluded as long as the required SDM or refueling boron concentration is maintained.

Description of Proposed Changes

Duke Energy proposes to change the Catawba Nuclear Station (CNS) and McGuire Nuclear Station (MNS) TS requirements applicable when ACTIONS or other requirements direct the suspension of activities that involve a positive reactivity change. The proposed changes will also modify the associated TS Bases to clearly delineate which activities are acceptable when operating in a condition requiring suspension of activities that result in positive reactivity changes.

The proposed changes are consistent with approved Industry/ Technical Specification Task Force (TSTF) Technical Specification Traveler, TSTF 286, Revision 2, "Define Operations Involving Positive Reactivity Additions," with exceptions noted in the applicable descriptions of changes.

The TS changes identified below are applicable to both CNS and MNS unless otherwise specified and are as follows:

1. Added a note to TS 3.3.1, "RPS Instrumentation," Required Action G.1 that states, "Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed." Condition G is applicable when the two required Intermediate Range Nuclear Instruments are inoperable and THERMAL POWER is > P-6 and < P-10. Required Action G.1 states, "Suspend operations involving positive reactivity additions." The proposed note will allow limited temperature changes or boron concentration fluctuations associated with RCS temperature control or inventory management.

   Required Action G.1 will continue to require suspension of operations involving positive reactivity additions. Therefore, this proposed change simply clarifies the Required Action. The proposed change to Required Action

G.1 differs from TSTF-286, Revision 2. TSTF-286 inserts a note stating, "Limited plant cooldown or boron dilution is allowed provided the change is accounted for in the calculated SDM." The proposed change does not include, "...provided the change is accounted for in the calculated SDM." In modes 1 & 2, SDM is not normally a "calculated" value. Rather, SDM is assured by operation within rod insertion limits of LCO 3.1.4, "Rod Group Alignment Limits," and LCO 3.1.5, "Shutdown Bank Insertion Limits," and within the temperature limits of LCO 3.4.2, "RCS Minimum Temperature for Criticality." This clarification is also described in the proposed Bases discussion of the note. The use of the words "temperature changes" in place of "cooldown" is considered more accurate, because CNS and MNS Units 1 & 2 TS allow a positive Moderator Temperature Coefficient (MTC) at reduced power levels. Therefore, under positive MTC conditions a temperature increase would cause a positive reactivity addition. The use of the words "Limited boron concentration changes associated with RCS inventory control" in place of "boron dilution" is consistent with the intent of TSTF-286 and provides further clarity of the note.

2. Added a note to TS 3.3.1, "RPS Instrumentation," Required Action I.1 that states, "Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed." Condition I is applicable when the one of the two required Source Range Nuclear Instruments is inoperable in mode 2. Required Action I.1 states, "Suspend operations involving positive reactivity additions." The proposed note will allow limited temperature changes or boron concentration fluctuations associated with RCS temperature control or inventory management.

   Required Action I.1 will continue to require suspension of operations involving positive reactivity additions. Therefore, this proposed change simply clarifies the Required Action. The proposed change to Required Action I.1 differs from TSTF-286, Revision 2, in the same fashion, and for the same reasons, as described above for Required Action G.1 of TS 3.3.1.

3. For MNS only, added a note to TS 3.3.1, "RPS Instrumentation," Required Action L.1 that states, "Plant temperature changes are allowed provided that SDM is maintained and k_{eff} remains < 0.99." Condition L is applicable when the one required Source Range Nuclear Instrument is inoperable in modes 3, 4, or 5 with the reactor trip breakers open. Required Action L.1 states,

"Suspend operations involving positive reactivity additions." The proposed note will allow temperature changes provided SDM is maintained and k_{eff} remains < 0.99.

Required Action L.1 will continue to require suspension of operations involving positive reactivity additions. This proposed change allows a temperature change that would increase reactivity of the reactor. Direct monitoring of core reactivity is not possible with the one required Source Range Nuclear Instrument inoperable, but monitoring is available to control and monitor a reactor coolant system temperature change. The proposed change to Required Action L.1 is consistent with TSTF-286, Revision 2. The k_{eff} requirement was added to the note because if control rods are withdrawn (to provided trippable rod worth or prepare for reactor startup), maintaining SDM is not equivalent to maintaining margin to criticality. This change is consistent with the intent of TSTF-286 and provides plant specific controls for operation.

4. For CNS only, added a note to TS 3.3.9, "Boron Dilution Mitigation System (BDMS)," Required Actions A.2.1 and B.2.1 that states, "Plant temperature changes are allowed provided the SDM is maintained and k_{eff} remains < 0.99." These Required Actions are applicable when one or both required trains of BDMS are inoperable in modes 3, 4, and 5. Required Actions A.2.1 and B.2.1 state, "Suspend operations involving positive reactivity additions." The proposed note will allow temperature changes provided the SDM is maintained and k_{eff} remains < 0.99. Required Actions A.2.1 and B.2.1 will continue to require suspension of operations involving positive reactivity additions. This proposed change would allow a temperature change that would increase reactivity of the reactor. Direct monitoring of core reactivity is not possible with one or both required trains of BDMS inoperable, but monitoring is available to control and monitor a RCS temperature change. This proposed change is consistent with TSTF-286, revision 2 with the exception that the note is also applied to Required Action A.2.1 of TS 3.3.9. The k_{eff} requirement was added to the note because if control rods are withdrawn (to provided trippable rod worth or prepare for reactor startup), maintaining SDM is not equivalent to maintaining margin to criticality. This change is consistent with the intent of TSTF-286 and provides plant specific controls for operation.

5. Revise LCO 3.4.5, "RCS Loops - MODE 3," Note a, LCO 3.4.6, "RCS Loops - MODE 4," Note 1.a, to state, "No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1 and maintain k_{eff} < 0.99." These notes currently state, "No operations are permitted that would cause a reduction of the RCS boron concentration." These notes are intended to preclude dilution of the RCS when no mixing mechanism (i.e., coolant circulation by RHR pump or reactor coolant pump) is in operation.

   Also revise TS 3.4.6 Required Action C.1 to state, "Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1 and maintain k_{eff} < 0.99." This Required Action currently states, "Suspend all operations involving a reduction of RCS boron concentration." This Required Action is intended to preclude dilution of the RCS when no mixing mechanism is in operation.

   The proposed changes allow dilution of the RCS, but the source of boric acid is required to contain a soluble boron concentration not less than the concentration required to meet the SDM requirement of LCO 3.1.1. The k_{eff} requirement was added to the note because if control rods are withdrawn (to provided trippable rod worth or prepare for reactor startup), maintaining SDM is not equivalent to maintaining margin to criticality. This change is consistent with the intent of TSTF-286 and provides plant specific controls for operation.

6. Revise LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," Note 1.a, and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled," Note 1.b, to state, "No operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the SDM of LCO 3.1.1." These notes currently state, "No operations are permitted that would cause a reduction of the RCS boron concentration." These notes are intended to preclude dilution of the RCS when no mixing mechanism (i.e., coolant circulation by RHR pump or reactor coolant pump) is in operation. The proposed changes allow dilution of the RCS, but the source of boric acid is required to contain a soluble boron concentration not less than the concentration required to meet the SDM requirement of LCO 3.1.1. These proposed changes are consistent with TSTF-286, revision 2.

7. Revise TS 3.4.5 Required Action D.2, TS 3.4.7 Required Action B.1, and TS 3.4.8 Required Action B.1 to state, "Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet SDM of LCO 3.1.1." These Required Actions currently state, "Suspend all operations involving a reduction of RCS boron concentration." These Required Actions are intended to preclude dilution of the RCS when no mixing mechanism is in operation. The proposed changes allow dilution of the RCS, but the source of boric acid is required to contain a soluble boron concentration not less than the concentration required to meet the SDM requirement of LCO 3.1.1. These proposed changes are consistent with TSTF-286, revision 2.

8. Revise TS 3.8.2, "AC Sources - Shutdown," Required Actions A.2.3 and B.3, TS 3,8.5, "DC Sources - Shutdown," Required Action A.2.3, TS 3.8.8, "Inverters - Shutdown" Required Action A.2.3 and TS 3.8.10, "Distribution Systems - Shutdown," Required Action A.2.3 to state, "Suspend operations involving positive reactivity additions that could result in loss of required SDM or boron concentration." These Required Actions currently state, "Initiate action to suspend operations involving positive reactivity additions."

   These Required Actions are intended to initiate suspension of operations involving positive reactivity additions based on the loss of LCO required electrical distribution equipment. The proposed changes allow dilution of the RCS, but the source of boric acid is required to contain a soluble boron concentration not less than the concentration required to meet the SDM requirement of LCO 3.1.1. The proposed changes will also allow temperature changes that could increase reactivity provided the reactivity insertions do not result in loss of required SDM. These proposed changes are consistent with TSTF-286, revision 2.

9. For CNS revise TS 3.9.2, "Nuclear Instrumentation," Required Action A.1.2 and for MNS revise TS 3.9.3, "Nuclear Instrumentation," Required Action A.2, to state, "Suspend operations that would cause introduction into the RCS, coolant with boron concentration less than required to meet the boron concentration of LCO 3.9.1." The Required Action currently states, "Suspend positive reactivity additions." This Required Action is intended to initiate suspension of operations involving positive reactivity additions when there is a loss of redundant

means of monitoring core reactivity. The proposed change allows dilution of the RCS, but the source of boric acid is required to contain a soluble boron concentration not less than the concentration required to meet the minimum boron concentration requirement of LCO 3.9.1. This proposed change also removes the implicit limitation on temperature changes that would have resulted in a positive reactivity addition. No limitation on temperature change induced reactivity insertion is needed, because appropriate shutdown margin in MODE 6 is maintained by compliance with LCO 3.9.1. These proposed changes are consistent with TSTF-286, revision 2.

10. For CNS revise the LCO 3.9.4, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," Note and for MNS revise the LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," Note, to state, "The required RHR loop may be removed from operation for $\leq$ 1 hour per 8 hour period, provided no operations are permitted that would cause introduction into the Reactor Coolant System, coolant with boron concentration less than required to meet the minimum required boron concentration of LCO 3.9.1." This LCO Note currently states, "The required RHR loop may be removed from operation for $\leq$ 1 hour per 8 hour period, provided no operations are permitted that would cause reduction of the Reactor Coolant System boron concentration." This note is intended to preclude dilution of the RCS when no mixing mechanism is in operation. The proposed change allows dilution of the RCS, but the source of boric acid is required to contain a soluble boron concentration not less than the concentration required to meet the minimum boron concentration requirement of LCO 3.9.1. This proposed change is consistent with TSTF-286, revision 2.

11. For CNS revise the LCO 3.9.4, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," Required Action A.1 and LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level," Required Action B.1 and for MNS revise the LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," Required Action A.1 and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level," Required Action B.1 to state, "Suspend operations that would cause introduction into the Reactor Coolant System, coolant with boron concentration less than required to meet the minimum required boron concentration of LCO 3.9.1." These Required Actions currently state, "Suspend operations involving a

reduction in reactor coolant boron concentration." This note is intended to preclude dilution of the RCS when no mixing mechanism is in operation. The proposed change allows dilution of the RCS, but the source of boric acid is required to contain a soluble boron concentration not less than the concentration required to meet the minimum boron concentration requirement of LCO 3.9.1. This proposed change is consistent with TSTF-286, revision 2.

12. The TS Bases related to the above changes were revised accordingly to support the discussions of the above changes. These proposed changes are consistent with TSTF-286, revision 2.

13. The Bases for TS 3.9.1, "Boron Concentration," Required Action A.1 and A.2 were revised to clarify that Operations that individually add limited positive reactivity (e.g., temperature fluctuations, inventory addition, or temperature control fluctuations), but when combined with all other operations affecting core reactivity (e.g., intentional boration) result in overall net negative reactivity addition, are not precluded by the requirement to suspend positive reactivity additions.

14. For MNS only, the Bases for TS 3.9.2, Unborated Water Source Isolation Valves, was revised to add a clarification that reduction of boron concentration during mode 6 is permitted as long as the minimum shutdown margin or boron concentration limits are met.

15. An editorial change is made to the Bases for TS 3.9.1 Required Action A.3. The discussion regarding immediately suspending CORE ALTERATIONS or positive reactivity additions is corrected. The "or" between "CORE ALTERATIONS" and "positive reactivity additions" should be an "and" consistent with the requirements of the TS 3.9.1 Required Actions.

Safety Evaluation

SDM requirements provide sufficient reactivity margin to ensure that acceptable fuel design limits will not be exceeded for normal shutdown condition and anticipated operational occurrences. As such, the SDM defines the degree of subcriticality that would be obtained immediately following the insertion or trip of all shutdown and control rods, assuming the single rod cluster control assembly of highest reactivity worth is fully withdrawn. In mode 2 with $k_{eff} < 1.0$ and in modes 3, 4, and 5, the SDM requirements are applicable to provide sufficient negative reactivity to meet

the assumptions of the safety analyses in the UFSAR. In modes 3 and 4, some rods may be withdrawn to provide trippable rod worth and in preparation for reactor startup, but acceptable margin to criticality ($k_{eff} < 0.99$) is maintained. In mode 6, the shutdown reactivity requirements are given in TS 3.9.1. In modes 1 and 2 with $k_{eff} \geq 1.0$, SDM is ensured by complying with TS 3.1.5, "Shutdown Bank Insertion Limits," and TS 3.1.6, "Control Bank Insertion Limits."

In modes 1 and 2, the fuel and moderator temperatures are changed to the normal hot zero power values. However, small changes in reactivity occur as a result of temperature changes that occur associated with RCS inventory management or RCS temperature control. At the beginning of core life a positive moderator temperature coefficient must be considered as allowed by TS 3.1.3, "Moderator Temperature Coefficient (MTC)."

During mode 6, the limit on the boron concentrations of the RCS, the refueling canal and the refueling cavity during refueling ensures that the reactor remains subcritical. Refueling boron concentration is the soluble boron concentration in the coolant in each of these volumes having direct access to the reactor core during refueling. The soluble boron concentration offsets the core reactivity and is measured by chemical analysis of a representative sample of the coolant in each of the volumes. The refueling boron concentration limit is specified in the Core Operating Limits Report (COLR).

Two independent reactivity control systems are provided at CNS and MNS Units 1 & 2. One of these systems maintains the core subcritical under cold conditions by the use of movable control and shutdown RCCAs. The other system uses the chemical and volume control system (CVCS) that uses soluble boric acid in the RCS. In modes 1 & 2, the two independent reactivity control systems are used to compensate for the reactivity effects of the fuel and water temperature changes that accompany power level changes over the range from full load to no load. In addition, the RCCAs together with the CVCS provide SDM during power operation and are capable of making the core subcritical rapidly enough to prevent exceeding acceptable fuel damage limits, assuming that the RCCA of highest reactivity worth remains fully withdrawn. In modes 3, 4, & 5, soluble boron is used to compensate for reactivity changes caused by temperature and reactor poisons, such as xenon, to maintain the reactor subcritical under shutdown conditions. During plant startup, some rods are withdrawn in mode 3 and 4 to provide trippable rod worth

and to prepare for reactor startup. In mode 6, the CVCS is used to control boron concentration to meet required limits.

SDM is a core design condition that can be ensured during operation through RCCA positioning (control and shutdown banks) and through adjustment of the soluble boron concentration. In modes 1 through 4, the minimum required SDM is assumed as an initial condition in the safety analyses and ensures that specified acceptable fuel design limits are not exceeded for normal operation and anticipated operational occurrences, assuming that one of the highest worth RCCAs is fully withdrawn following a reactor scram. In modes 5 & 6, the reactivity condition of the core is consistent with the initial conditions assumed for the boron dilution accident analysis. The required boron concentration, in mode 6, ensures that the k_{eff} of the core will remain within the required value during the refueling operations.

The Main Steam Line Break (MSLB) and Boron Dilution accidents are the most limiting analyses that establish the SDM value for LCO 3.1.1 and the minimum boron concentration requirement of LCO 3.9.1. For MSLB accidents, if LCO 3.1.1 is not met, there is a potential to exceed the DNBR limit and the required actions of LCO 3.1.1 are necessary to restore compliance with the LCO. For the Boron Dilution accident, if LCO 3.1.1 or LCO 3.9.1 are not met, the minimum required time assumed for operator action to terminate dilution may no longer be sufficient and the required actions of LCO 3.1.1 or 3.9.1 are necessary to restore compliance with the LCO.

The ACTIONS and Notes that preclude positive reactivity additions and reduction in boron concentration were intended to ensure that under the specified plant conditions, further power increases, or reductions in the margin to core criticality are precluded. The proposed change, to add notes to the ACTIONS and to modify existing Notes and ACTIONS, allows the small reactivity effects that result from temperature or boron concentration fluctuations associated with RCS inventory management or temperature control to be performed provided the minimum SDM of LCO 3.1.1 or the minimum boron concentration of LCO 3.9.1 are maintained. The additional notes and changes to notes and ACTIONS continue to provide assurance that the assumptions of the most limiting accident analyses are maintained. Therefore, necessary activities that involve additions to the RCS of cooler water (a positive reactivity effect in most cases) and that may involve makeup from borated sources of water that are at boron concentrations less than the RCS

boron concentration should not be precluded if the overall effect on core reactivity still assures that compliance with the required margin to criticality, the required SHUTDOWN MARGIN (SDM), or refueling boron concentration limits will still be satisfied.

Conclusion

As discussed above, these proposed changes are based on TSTF-286, revision 2. These changes revise actions that either require suspension of operations involving positive reactivity additions, or preclude reduction in boron concentration less than the RCS. The proposed changes instead limit the introduction into the RCS of reactivity more positive than that required to meet the required SDM, k_{eff}, or refueling boron concentrations, as applicable. The operational flexibility allowed in these proposed license amendments will be performed under administrative controls in order to limit the potential for excess positive reactivity additions. Therefore, the proposed changes are deemed safe and acceptable.

Precedent Licensing Actions

This proposed license amendment is modeled after those changes approved by the NRC in TSTF traveler 286, revision 2. This proposed license amendment is similar to the license amendments listed below.

Plant Name	Application Date	Amendment Date
San Onofre	09/22/00	12/20/00
HB Robinson	08/10/00	03/14/01
South Texas	12/20/00	08/13/01
St. Lucie	08/22/01	11/19/01
Callaway	12/06/01	05/01/02
Wolf Creek	02/21/02	07/29/02
Diablo Canyon	04/10/02	
Sequoyah	07/10/02	