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DUKE POWER

April 3, 1996

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

Subject: Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414
Proposed Technical Specifications (TS) Changes
TS 3/4.6.4.3 and Bases, Hydrogen Mitigation System

Gentlemen:

Pursuant to 10 CFR 50.4 and 10 CFR 50.90, please find attached the following proposed TS changes for Catawba Units 1 and 2. The proposed TS changes adopt the Improved Technical Specifications (ITS) requirements for the Hydrogen Ignition System (HIS), as delineated in NUREG-1431, Revision 1, "Standard Technical Specifications, Westinghouse Plants", April 1995. The ITS requirements and Bases for this system are being adopted and converted to the Catawba current Technical Specifications (CTS) format.

This Technical Specification Amendment Request has been reviewed and approved by the Plant Operations Review Committee (PORC) and the Nuclear Safety Review Board (NSRB).

Attachment 1 contains a description of the proposed TS changes. Attachment 2 contains the required technical justification and safety analysis in support of the proposed changes. Attachment 3 contains the required No Significant Hazards Consideration analysis which is provided to show that the standards of 10 CFR 50.92 are satisfied. Attachment 3 also contains an Environmental Impact Analysis for the proposed changes. Attachments 4a and 4b contain the marked-up TS pages. Attachments 5a and 5b contain the reprinted TS pages. In addition, Duke Power Company is forwarding a copy of this request package to the appropriate South Carolina state officials.

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Should there be any questions concerning these proposed TS changes, or should additional information be required, please call D. Tower at (803) 831-3419.

Very truly yours,

William R. McCollum, Jr.
Vice President
Catawba Nuclear Station

Attachments

xc (with attachments):
S.D. Ebneter, Regional Administrator
Region II

R.J. Freudenberger, Senior Resident Inspector
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B.G. Addis	CT01A
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ELL	EC050

NCMPA-1
NCEMC
PMPA
SREC
Document Control File CN-801.01
Group File CN-801.01

William R. McCollum, being duly sworn, states that he is Vice President of Duke Power Company; Catawba Nuclear Station, that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission these revisions to Appendix A, Technical Specifications, to the Catawba Nuclear Station License Nos. NPF-35 and NPF-52; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

William R. McCollum, Jr.
Vice President
Catawba Nuclear Station

Subscribed and sworn to before me this 3 th day of APRIL, 1996.

Notary Public

My commission expires: MY COMMISSION EXPIRES JANUARY 20, 2005

ATTACHMENT 1

DESCRIPTION OF PROPOSED TS CHANGES

DESCRIPTION OF CHANGE

Change to Technical Specification 3.6.4.3, Hydrogen Mitigation System

Catawba is requesting changes to Technical Specification 3.6.4.3, Hydrogen Mitigation System, to provide the same requirements as NUREG - 1431, Rev 1, Standard Technical Specifications , Westinghouse Plants, April 1995. These changes include:

1) In the title of the specification, change "Mitigation" to "Ignition". The title will become Hydrogen Ignition System.

2) In the LCO statement change "Mitigation" to "Ignition"

3) Under the ACTION section, replace the entire paragraph with attached Paragraph 1. This will provide guidance that addresses appropriate action to take with no OPERABLE hydrogen ignitors in one containment region.

4) Under the SURVEILLANCE REQUIREMENTS section, change "Mitigation" to "Ignition" in the first statement.

5) In surveillance requirement 4.6.4.3a, delete the first two words "At least", change to upper case "O" on the word "Once", and delete the asterisk, (*) and the word "and" at the end of the sentence.

6) Following surveillance requirement 4.6.4.3a, insert additional surveillance requirement with attached Statement 1.

7) In surveillance requirement 4.6.4.3b, change identifier of surveillance requirement from "b" to "c", delete the first two words, "At least", and change to upper case "O" on the word "Once".

8) At the bottom of page 3/4 6-40, delete the statement that begins with an asterisk (*).

9) On page B 3/4 6-4 of the Bases, replace the second paragraph under 3/4.6.4 COMBUSTIBLE GAS CONTROL with the Bases paragraphs from the attached pages.

ATTACHMENT 2

TECHNICAL JUSTIFICATION
AND SAFETY EVALUATION

TECHNICAL JUSTIFICATION AND SAFETY EVALUATION

10 CFR 50.44 (Ref. 1) requires units with ice condenser containments to install suitable hydrogen control systems that would accommodate an amount of hydrogen equivalent to that generated from the reaction of 75% of the fuel cladding with water. The Hydrogen Ignition System (HIS) provides this required capability. This requirement was placed on ice condenser units because of their small containment volume and low design pressure (compared with pressurized water reactor dry containments). Calculations indicate that if hydrogen equivalent to that generated from the reaction of 75% of the fuel cladding with water were to collect in the primary containment, the resulting hydrogen concentration would be far above the lower flammability limit such that, if ignited from a random ignition source, the resulting hydrogen burn would seriously challenge the containment and safety systems in the containment.

The HIS is based on the concept of controlled ignition using thermal ignitors, designed to be capable of functioning in a post accident environment, seismically supported, and capable of actuation from the control room. A total of 70 ignitors are distributed throughout the various regions of containment in which hydrogen could be released or to which it could flow in significant quantities. The ignitors are arranged in two independent trains such that each containment region has at least two ignitors, one from each train, controlled and powered redundantly so that ignition would occur in each region even if one train failed to energize.

The HIS causes hydrogen in containment to burn in a controlled manner as it accumulates following a degraded core accident. Burning occurs at low concentration, where the resulting temperatures and pressures are relatively benign. Without the system, hydrogen could build up to higher concentrations that could result in a violent reaction if ignited by a random ignition source after such a buildup.

The hydrogen ignitors are not included for mitigation of a Design Basis Accident (DBA) because an amount of hydrogen equivalent to that generated from the reaction of 75% of the fuel cladding with water is far in excess of the hydrogen calculated for the limiting DBA loss of coolant accident (LOCA). The hydrogen concentration resulting from a DBA can be maintained less than the flammability limit using the hydrogen recombiners. The hydrogen ignitors, however, have been shown by probabilistic risk analysis to be a significant contributor to limiting the severity of accident sequences that are commonly found to dominate risk for units with ice condenser containments. As such, the hydrogen ignitors are considered to be risk significant in accordance with the NRC Policy Statement.

Operation with at least one HIS train ensures that the hydrogen in containment can be burned in a controlled manner. Unavailability of both HIS trains could lead to hydrogen buildup to high concentrations. Hydrogen combustion at high concentration could lead to high temperatures and overpressurization of containment and, as a result, breach containment or cause containment leakage rates above those assumed in the safety analyses. Damage to safety related equipment located in containment could also occur.

The major change proposed to the Technical Specification is in the required actions in the event of inoperable hydrogen ignitors. The action remains essentially unchanged for the case of one inoperable HIS train. With one HIS train inoperable, the inoperable train must be restored to OPERABLE status within 7 days or the OPERABLE train must be verified OPERABLE frequently by performance of SR 4.6.4.3a. The 7 day Completion Time is based on the low probability of the occurrence of a degraded core event that would generate hydrogen in amounts equivalent to a metal water reaction of 75% of the core cladding, the length of time after the event that operator action would be required to prevent hydrogen accumulation from exceeding this limit, and the low probability of failure of the OPERABLE HIS train. Alternative Required Action, b, by frequent surveillances, provides assurance that the OPERABLE train continues to be OPERABLE.

For the case of no operable ignitors in the same containment region (No A Train or B Train ignitor operable in the same containment location), the proposed action requirement is to restore one hydrogen ignitor in the affected containment region to OPERABLE status within 7 days. The current Technical specification did not address this condition. When this condition exists, there would always be ignition capability in the adjacent containment regions that would provide redundant capability by flame propagation to the region with no OPERABLE ignitors.
The 7 day completion time to restore at least one hydrogen ignitor to OPERABLE status is also based on the low probability of the occurrence of a degraded core event that would generate hydrogen in amounts equivalent to a metal water reaction of 75% of the core cladding, the length of time after the event that operator action would be required to prevent hydrogen accumulation from exceeding this limit, as well as the redundant capability by flame propagation to the region without operable ignitors.

An additional action requirement is being added to address actions to take if the HIS subsystem cannot be restored to OPERABLE status within the associated action time. The unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within 6 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

An additional surveillance requirement (4.6.4.3b) is being added to verify at least one hydrogen ignitor is OPERABLE in each containment region. This surveillance is to be performed on a 92 day frequency. This SR confirms that the two inoperable hydrogen ignitors allowed by SR 4.6.4.3a (i.e., one in each train) are not in the same containment region. The Frequency of 92 days is acceptable based on the Frequency of SR 4.6.4.3a, which provides the information for performing this SR.

REFERENCES

1. 10 CFR 50.44.

2. 10 CFR 50, Appendix A, GDC 41.

3. FSAR, Section 6.2.

4. An Analysis of Hydrogen Control Measures at McGuire Nuclear Station, as Revised by Revision 9 to be Applicable to Catawba Nuclear Station.

ATTACHMENT 3

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION AND ENVIRONMENTAL IMPACT ANALYSIS

No Significant Hazards Consideration Determination

As required by 10CFR50.91, this analysis is provided concerning whether the requested amendments involve significant hazards considerations, as defined by 10CFR50.92. Standards for determination that an amendment request involves no significant hazards considerations are if operation of the facility in accordance with the requested amendment would not: 1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or 2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) Involve a significant reduction in a margin of safety.

The requested Technical Specification amendments adopt the same requirements for the Hydrogen Ignition System (HIS) that are contained NUREG - 1431, Revision 1, Standard Technical Specifications, Westinghouse Plants, April 1995.

In 48FR14870, the Commission has set forth examples of amendments that are considered not likely to involve significant hazards considerations. Example (vi) describes a change which either may result in some increase to the probability or consequences of a previously-analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan. In this case, the proposed change is even more conservative than the change described in example (vi) in that it does not result in any increase to the probability or consequences of a previously-analyzed accident and does not reduce any safety margin. In addition, the results of the change do not have any adverse impact upon any Standard Review Plan acceptance criteria.

Criterion 1

The requested amendments will not involve a significant increase in the probability or consequences of an accident previously evaluated. No impact upon accident probabilities will be created, since the HIS System is not an accident initiating system. In addition allowance for a single location in the containment to be without an operable ignitor, is afforded by the low probability of the occurrence of a degraded core event that would generate hydrogen in amounts equivalent to a metal water reaction of 75% of the core cladding and the length of time after the event that operator action would be required to prevent hydrogen accumulation from exceeding this limit. Adjacent areas to the single area without an operable hydrogen ignitor provide capability to maintain the hydrogen concentrations during degraded core accidents acceptable limits by flame propagation to the region without operable hydrogen ignitors.. No impact on the plant response to any accident will be created (either design basis or beyond-design basis).

Criterion 2

The requested amendments will not create the possibility of a new or different kind of accident from any accident previously evaluated. As stated previously, the HIS System is not an accident initiating system. No new accident causal mechanisms will be created as a result of adopting the requirements of NUREG - 1431. Plant operation will not be affected by the proposed amendments and no new failure modes will be created.

Criterion 3

The requested amendments will not involve a significant reduction in a margin of safety. No adverse impact upon any plant safety margins will be created. As discussed previously, the allowance for a single containment region to be without operable hydrogen ignitors for 7 days will have no adverse consequences. No fission product barriers are being degraded. No change to the manner in which the units are operated is being made,

Based upon the preceding analyses, Duke Power Company concludes that the requested amendments do not involve a significant hazards consideration.

Environmental Impact Analysis

The proposed amendments have been reviewed against the criteria of 10CFR51.22 for environmental considerations. The proposed amendments do not involve a significant hazards consideration, nor increase the types and amounts of effluents that may be released offsite, nor increase individual or cumulative occupational radiation exposures. Therefore, the proposed amendments meet the criteria given in 10CFR51.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement.

ATTACHMENT 4

MARKED-UP TS PAGES