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VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
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April 29, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. B. J. Youngblood, Project Director
PWR Project Directorate No. 4

Re: Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414
Technical Specification Amendment for
Maximum Total Weight of Uranium Per Fuel Rod

Dear Mr. Denton:

This letter contains a proposed amendment to the Technical Specifications for Facility Operating License Nos. NPF-35 and NPF-48 for Catawba Units 1 and 2. The attachment contains the proposed change and a discussion of the justification and safety analysis. The analysis is included pursuant to 10 CFR 50.91 and it has been concluded that the proposed amendment does not involve significant hazards consideration.

This change request to Technical Specification 5.3.1 involves the deletion of the number specifying the maximum total weight, in grams, of uranium contained in each fuel rod (i.e. 1619 grams uranium). Duke Power was notified by Westinghouse the afternoon of April 25, 1986 that this number was incorrect for Catawba Units 1 and 2. The Catawba core has 700 fuel rods (approximately 1.4% of the total number of fuel rods) with a uranium weight of greater than 1619 grams but less than 1632 grams. The Unit 1 reload will contain slightly more than 3000 rods with a uranium weight greater than 1619 grams. The Unit 2 initial core has slightly more than 4500 rods (approximately 9%) with a uranium weight between 1619 grams and 1633 grams.

It is requested that this change be handled on an emergency basis as outlined in 10 CFR 50.91(a)(5) since failure to act promptly may delay the issuance of the Catawba Unit 2 Full Power Operating License. This, in effect, would be a derating of Unit 2, causing the Unit to be held to power levels of less than or equal to 5% of rated thermal power.

It is felt that Duke has acted in a timely and expeditious way in applying for this amendment. Duke was notified of the error late in the day on Friday April 25, 1986. A quorum of the Nuclear Safety Review Board was convened to review the request on April 29, 1986.

B021 1/1 w/check $150.00 #18262437

This request contains one amendment which is applicable to both units, accordingly, pursuant to 10 CFR 170.21 a check for $150.00 is enclosed.

Pursuant to 10 CFR 50.91 (b) (1) the appropriate South Carolina State Official is being provided a copy of this amendment request .

Very truly yours,

Hal B. Tucker

Hal B. Tucker

RWO:slb

Attachment

xc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. Heyward Shealy, Chief
Bureau of Radiological Health
South Carolina Department of Health &
Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

INPO Records Center
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

American Nuclear Insurers
c/o Dottie Sherman, ANI Library
The Exchange, Suite 245
270 Farmington Avenue
Farmington, CT 06032

M&M Nuclear Consultants
1221 Avenue of the Americas
New York, New York 10020

Mr. P. H. Skinner
NRC Resident Inspector
Catawba Nuclear Station

HAL B. TUCKER, being duly sworn, states that he is Vice President of Duke Power Company; that he is authorized on the part of said Company to sign and file will the Nuclear Regulatory Commission this revision to the Catawba Nuclear Station Technical Specifications, Appendix A to License No. NPF-35 and NPF-48; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

Hal B. Tucker, Vice President

Subscribed and sworn to before me this 29th day of April, 1986.

Notary Public

My Commission Expires:

May 1, 1989

LINDA L. KESSLER
NOTARY PUBLIC
MECKLENBURG COUNTY, N.C.

DISCUSSION OF PROPOSED AMENDMENT

REASON FOR CHANGE

Design Features Section 5.3.1, Fuel Assemblies, of the Technical Specifications, identifies a maximum total fuel rod weight of 1619 grams of uranium. Recent improvements to the fuel design, (including chamfered pellets with a reduced dish and a nominal density increase), have increased fuel weight slightly. The weight increases have caused the maximum fuel rod weight to exceed the specified maximum value of 1619 gram limit. This change will delete the specified maximum weight limit to allow the current fuel to be in compliance with the Catawba Units 1 and 2 Technical Specifications (see the attached marked-up specification).

SAFETY/ENVIRONMENTAL EVALUATION

Summary of Change

The proposed change to Design Features Section 5.3.1 of the Catawba Units 1 and 2 Technical Specification deletes the maximum fuel rod weight limit of 1619 grams of uranium. The purpose of the change is to permit the use of assemblies with fuel rods over the weight limit and also to reflect the relative insensitivities of this technical specification parameter in the safety analysis. It is judged that this weight difference does not have a significant impact on the safety analyses. Other Technical Specifications cover more important fuel related parameters, therefore, deletion of the Design Features fuel rod weight limit is not significant to the safe operation of the plant.

Evaluation

The proposed change of Technical Specification Design Features Section 5.3.1 is attached. This is the only reference to fuel rod uranium weight in the Technical Specifications. In addition, the FSAR identifies a nominal core total weight of 204,200 lbs. of UO-2 for the initial (Cycle 1) core.

Although a number of safety analyses are affected indirectly by fuel weight, the analyses are more sensitive to fuel configuration, length, enrichment and physical design which are also specified in the plant Technical Specifications. The Technical Specifications limit power and power distribution, thus controlling the fission rate and the rate of decay heat production. Fuel rod weight does not have any direct bearing on the power limits, power operating level, or decay heat rate. The composition of the fuel is closely monitored to assure acceptable fuel performance. The fuel weight changes that could be made without a Technical Specification limit are not of sufficient magnitude to cause a significant difference in fuel performance as analyzed by Westinghouse. There are no expected observable changes in normal operation due to the noted fuel rod weight changes, and the remaining fuel parameters listed in the Technical Specifications are to be considered in the Reload Safety Evaluation.

Other Design Basis Events were examined to assess the effects of possible changes in fuel rod weight. Fuel rod weight will only change as a result of a specific change in the physical design, which would be addressed in the Reload Safety Evaluation, or within the manufacturing tolerances, in which case the changes in fuel rod weight are relatively insignificant. Changes in nuclear design resulting from fuel rod weight changes are controlled as discussed above. For these changes, the effect on new and spent fuel criticality and fuel handling analyses remain bounded by the existing analyses and Technical Specification Design Feature limits. Fuel-handling equipment and procedures are not affected by these weight changes. Seismic/LOCA analyses contain sufficient conservatism to bound these weight changes. Other accident analyses are not affected by rod weight as a direct parameter, and the existing analyses remain bounding.

Conclusion

In summary, the deletion of the maximum fuel rod weight limit in the Technical Specifications is proposed because the limit is not significant to the safe operation of the plant.

SAFETY EVALUATION JUSTIFYING CONTINUED OPERATION WITH URANIUM ROD WEIGHT DISCREPANCY

The Design Features section of the Technical Specifications identifies a maximum total weight of uranium in each fuel rod. Due to fuel pellet design improvements such as chamfered pellets with reduced dish and a nominal density increase, the fuel weight has increased slightly. The actual uranium weight has no bearing on the power limits, power operating level or decay heat rate. Although a number of areas involving safety analysis are affected by fuel uranium weight, the areas of safety significance have their own limits which are reflected in the FSAR and Technical Specifications. Technical Specifications on power and power distribution control the fission rate and, hence, the rate of decay heat production. The composition of the fuel is closely monitored to assure acceptable fuel performance for such things as thermal conductivity, swelling, densification, etc. The important fuel parameters have been considered and are addressed in the following evaluation as pertaining to Westinghouse supplied components and services.

Seismic Effects on Fuel/Internals and New and Spent Fuel Storage Racks

The fuel rod uranium weight as stated in the Technical Specifications is not a direct input to the analyses of maximum seismic/LOCA fuel assembly dynamic response, seismic response of reactor vessel and internals, or seismic analyses of new and spent fuel storage racks.

Radiological Source Terms

Fission product generation is not sensitive to the mass of fuel involved but to the power level. As long as the power generated by the core is unaffected, there will be no significant impact on the radiological source terms.

Fuel Handling

Any postulated increase in the amount of uranium in the fuel rods would not have a significant impact on the fuel handling equipment. The spent fuel pit bridge and hoist is designed with a load limit of approximately twice the weight of a nominal fuel assembly. The manipulator crane is provided with two load sensors. One load sensor provides primary protection of the fuel assemblies from structural damage if any assembly were to "hang-up". A second load sensor provides backup protection against high lift force with a setpoint above that of the first load sensor. If the setpoint were unchanged despite a slight overall increase in uranium weight, the impact would be to decrease the potential for fuel damage since reducing the difference between the fuel assembly weight and the lift force limit reduces the amount of stress the fuel assembly structure would be exposed to if the assembly were to "hang-up". The manipulator crane margin to capacity limit far exceeds any potential increase in assembly weight due to increases in the fuel rod uranium weight.

LOCA Safety Analysis

Uranium mass has no impact on ECCS LOCA analyses. LOCA analyses are sensitive to parameters such as pellet diameter, pellet-clad gap, stack height shrinking factor and pellet density as they relate to pellet temperature and volumetric heat generation. Fuel mass is not used in ECCS LOCA analyses.

Non-LOCA Safety Analysis

Individual fuel rod uranium weight, as reported in the Technical Specifications, is not explicitly modeled in any non-LOCA event. Total uranium present in the core is input into the transient analyses, but is generated using a methodology independent of the value presented in the Technical Specifications. Thus, any change in the number currently in the Technical Specifications does not impact the non-LOCA transient analyses.

Core Design

The mass of uranium is explicitly accounted for in the standard fuel rod design through appropriate modeling of the fuel pellet geometry and initial fuel density. Variations in uranium mass associated with allowable as-built variations but within the specification limits for the pellet dimensions and initial density are accounted for in the reactor core design analyses. The Technical Specification uranium mass value has no impact on margin to reactor core design criteria.

The conclusion of these evaluations is that there is no unreviewed safety question associated with operation of the units(s) with a fuel rod weight in excess of that defined in Section 5.3.1 of the Technical Specifications.

BASIS FOR NO SIGNIFICANT HAZARDS DETERMINATION

The proposed amendment discussed above shall be deemed to involve a significant hazards consideration if there is a positive finding in any of the following areas.

(1) Will operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The deletion of the fuel rod uranium weight limit does not significantly increase the probability or consequences of previously evaluated accidents. The variation in fuel rod weight that can occur even without a Technical Specification limit is small based on other fuel design constraints, e.g., rod diameter, gap size, UO-2 density and active fuel length; all of which provide some limit on the variation in rod weight. The current safety analyses are not based directly on fuel rod weight, but rather on design parameters such as power, and fuel dimensions. These parameters are either (1) not affected at all by fuel rod weight, or (2) are only slightly affected. However, a review of design parameters which may be affected indicated that a change in fuel weight does not cause other design parameters to exceed the values assumed in the various safety analyses, or to cause acceptance criteria to be exceeded. The effects are not significant with respect to measured nuclear parameters (power, power distribution, nuclear coefficients), i.e., they remain within their Technical Specification limits. Thus, it is concluded that the Technical Specification modification does not involve a significant increase in the probability or consequences of a previously evaluated accident.

(2) Will operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The creation of a new, different kind of accident from any previously evaluated accident is not considered a possibility. All of the fuel contained in the fuel rod is similar to and designed to function similar to previous fuel. Thus, the existing new and spent fuel storage criticality analyses bound the changes observed. This change is considered as administrative in nature and does not create the possibility of a new or different kind of accident.

(3) Will operation of the facility in accordance with the proposed change involve a reduction in a margin of safety.

Response: No

The margin of safety is maintained by adherence to other fuel related Technical Specification limits and the FSAR design bases. The deletion of fuel rod weight limits in the Technical Specifications Design Features Section 5.3.1 does not directly affect any safety system or the safety limits, thus, not affecting the plant margin of safety.