

**DUKE POWER COMPANY**

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September 30, 1982

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

Attention: Ms. E. G. Adensam, Chief  
Licensing Branch No. 4

Re: Catawba Nuclear Station  
Docket Nos. 50-413 and 50-414  
Natural Circulation Cooldown (Generic Letter 81-21)

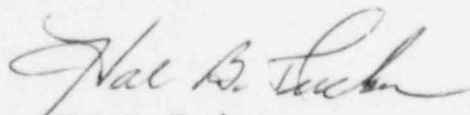
Dear Mr. Denton:

Mr. D. G. Eisenhut's (NRC/NRR) letter of May 5, 1981 (NRC Generic Letter 81-21), discussed generic concerns relative to void formation in the vessel head during transients such as that which occurred during the St. Lucie natural circulation cooldown event of June 11, 1980. It requested that a review of plant operations be conducted in light of the St. Lucie event. Duke Power Company has completed this review with respect to Catawba Nuclear Station, and has implemented the necessary procedures and training.

In addition, Generic Letter 81-21 requested an assessment of the facility procedures and training program with respect to the matters discussed in the letter. Three specific requirements for this assessment were outlined in the letter. The requested assessment for Catawba Nuclear Station is attached. Should you have any questions concerning the information, please advise.

I declare under penalty of perjury that the statements set forth herein are true and correct to the best of my knowledge.

Very truly yours,



Hal B. Tucker

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Attachment

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cc: Mr. James P. O'Reilly, Regional Administrator  
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ATTACHMENT

AN ASSESSMENT OF DUKE POWER COMPANY'S CATAWBA NUCLEAR STATION  
PROCEDURES AND TRAINING PROGRAM WITH RESPECT TO NRC GENERIC LETTER 81-21

- 1). "A demonstration (e.g., analysis and/or test) that controlled natural circulation cooldown from operating conditions to cold shutdown conditions, conducted in accordance with your procedure, should not result in reactor vessel voiding."

Response:

In June of 1980 a loss of component cooling water to the RC pumps occurred at the St. Lucie Unit 1 nuclear power plant which led to a natural circulation cooldown during which a void formation occurred in the reactor vessel upper head region. In response to NRC concerns the Westinghouse Owners Group undertook a study with Westinghouse to evaluate the potential for void formation in Westinghouse-design NSSSs during natural circulation cooldown/depressurization transients, and to develop appropriate modifications to Westinghouse Owners Group Reference Operating Instruction Guidelines. This study was completed and a summary report sent to the NRC via Owners Group letter OG-57 dated April 20, 1981, from R. W. Jurgensen (Chairman, Westinghouse Owners Group) to P. S. Check (NRC). The Westinghouse Owners Group Reference Abnormal Operating Instructions were modified to take the results of the study into account so as to preclude void formation in the upper head region during natural circulation cooldown/depressurization transients, and to specify those conditions under which upper head voiding may occur. These Westinghouse Owners Group Generic Guidelines have been submitted to the NRC via Owners Group letter OG-64 dated November 30, 1981, from R. W. Jurgensen (Chairman, Westinghouse Owners Group) to D. G. Eisenhut (NRC).

The referenced analysis is applicable to Catawba Nuclear Station, and demonstrates the capability of a  $T_{cold}$  plant such as Catawba to sustain a natural circulation cooldown without void formation in the upper head area. In addition, Catawba is a UHI plant, making the referenced analysis conservative with respect to Catawba since additional bypass flow is directed into the upper head region.

The generic guidance developed by the Westinghouse Owners Group (augmented as appropriate with plant specific considerations) was utilized in the implementation of Catawba Nuclear Station Operating Procedures.

- 2). "Verification that supplies of condensate-grade auxiliary feedwater are sufficient to support your cooldown method".

Response:

The condensate-grade sources and maximum and normal capacities per unit for Catawba Nuclear Station are as follows:

Source	Maximum Capacity	Normal Capacity
Upper Surge Tanks	85,000 gallons	55,000 gallons
Auxiliary Feedwater Condensate Storage Tanks	21,250 gallons	21,250 gallons
Condenser Hotwell	170,000 gallons	170,000 gallons
Total	276,250 gallons	246,250 gallons

In view of the consequences of unnecessary alignment of nuclear service water to the steam generators, maintaining a minimum condensate inventory is an important operational consideration. The NSSS manufacturer has recommended that a condensate reserve of 65 gallons per rated megawatt thermal, plus 2200 gallons per hour per reactor coolant pump operated during cooldown, be maintained as a minimum reserve. Approximately 225,000 gallons should be maintained as a minimum reserve for cooldown with natural circulation or approximately 240,000 gallons for cooldown using one reactor coolant pump. This is based on two hours hot standby followed by approximately five hours cooldown. One reactor coolant pump will normally be operated during cooldown, provided that offsite power is available, to aid the transfer of heat from the reactor core to the steam generators and to ensure thermal and chemical mixing of the reactor coolant.

The maximum capacity of 276,250 gallons allows sufficient operating margin above the required 225,000 gallons.

- 3). "A description of your training program and the provisions of your procedures (e.g., limited cooldown rate, response to rapid change in pressurizer level) that deal with prevention or mitigation of reactor vessel voiding."

Response:

1. The Catawba Nuclear Station Procedure "Natural Circulation Cooldown with Steam Void in the Vessel Upper Head" is written in accordance with the Westinghouse Owners Group Emergency Response Guidelines.
2. The provisions of this procedure are covered in both license preparatory training and requalification training. Establishing and maintaining natural circulation is also covered in the simulator portion of License Training.