ENCLOSURE I

DUKE POWER COMPANY
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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

June 20, 1988

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

Subject: Catawba Nuclear Station, Unit 1
Docket No. 50-413
Discretionary Enforcement Relief from
Technical Specification 3.6.5.1

Gentlemen:

This letter constitutes written follow-up of a request for temporary waiver of Technical Specification 3/4.6.5 requirements via a telecon between Duke Power Company personnel and members of the NRC/Region II Staff on June 17, 1988. This temporary emergency relief from compliance with Technical Specification Limiting Conditions for Operation (LCO) Action Statement was requested to avoid unnecessarily forcing Catawba Unit 1 to Mode 5 (Cold Shutdown). The requested emergency relief allowed for a 4 hour extension of the Technical Specification 3.6.5.1 Action Statement ice condenser bed inoperability time.

The proposed relief request was the result of frost accumulation in flow passages between ice baskets in the ice condenser in excess of the maximum amount allowed by Surveillance Requirement 4.6.5.1.b.3. The Action Statement for Technical Specification 3.6.5.1 ended at 1430 hours on June 17, 1988. Unit 1 was operating in Mode 1 at 100% power when the Action Statement ended. Continued inoperability of the ice condenser bed without Discretionary Enforcement would have required the Unit to enter Mode 3, Hot Standby, by 2030 hours on June 17, 1988 and to enter Mode 5, Cold Shutdown, within the following 30 hours. Duke Power personnel initiated appropriate action to remove excess frost accumulation upon discovery of the situation. The ice bed was declared operable at 1710 hours on June 17, 1988.

It should be noted that the discovered frost accumulation in flow passages between ice baskets in the ice condenser would have resulted in less than 15% flow blockage of steam through the ice condenser in the event of a hypothetical LOCA. Duke Power personnel have evaluated the Westinghouse flow blockage analysis and determined that all affected subcompartment walls and steel shell can withstand the differential pressures associated with a hypothetical LOCA with up to 15% blockage in the ice condenser bays.

A Safety Evaluation was completed in accordance with 10 CFR 50.59. This Safety Evaluation concluded that no unreviewed safety question exists and that granting this request has no affect on the health and safety of the public.

Very truly yours,

JW Hampton, for
Hal B. Tucker

JGT/33/sbn

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. P. K. Van Doorn
NRC Resident Inspector
Catawba Nuclear Station

Westinghouse Electric Corporation

Power Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

Mr. H. A. Rutherford Jr.
Duke Power Company
PO Box 33189
Charlotte, NC 28242

DCP-88-557
June 17, 1988

Attention: P.G. Leroy

Duke Power Company
Catawba Unit 1
Allowable Ice Condensor Flow Blockage Area

Dear Mr. Rutherford:

Westinghouse was informally requested via telecon on 6/17/88 to assess the allowable percentage of ice condensor flow blockage at Catawba Unit 1. The attached includes the results of our evaluation.

Sincerely,

WESTINGHOUSE ELECTRIC CORPORATION

S. S. Kilborn, Manager
Duke Power Project

cc: P. G. Leroy
E. W. Fritz
H. J. Lee
R. C. Futrell
K. S. Canady
H. R. Gibson
S. E. Lawson
T. R. Puryear

SUPPORT FOR 15% ICE CONDENSER FLOW BLOCKAGE

Introduction And Background

Frost or ice accumulation in flow passages between ice baskets may momentarily restrict the flow of steam through the ice condenser in the event of a hypothetical LOCA. This restriction will only be momentary, as the high energy steam will quickly melt any accumulation. Hence, the only design basis accident that may be appreciably affected by such accumulation is the Containment Subcompartment Analysis of the loop compartments presented in Section 6.2.1.2 of the Catawba FSAR. This analysis is performed to ensure the subcompartment walls and the steel shell of the containment structure can maintain their structural integrity during the short pressure pulse (generally less than 3 seconds) which accompanies the rupture of a high energy line within the lower compartment. A flow restriction in the ice condenser flow paths could result in a momentary pressure build-up in the lower compartment or lower plenum of the ice condenser bays and challenge the integrity of the operating deck, the upper or lower crane wall, or the containment's steel shell. A detailed analysis has shown that up to 15% flow blockage in the ice condenser bays is acceptable for the Catawba Nuclear Plant.

15% Flow Blockage Analysis

An allowable ice condenser flow blockage level of 15% for the Catawba Nuclear Plant is supported by a conservative detailed subcompartment pressurization analysis of a similar ice condenser plant. A comparison of the key parameters between these plants shows that the plants are virtually identical. The similar ice condenser plant contained more restrictive flow passages in the lower compartment than those in the Catawba Nuclear Plant. Consequently, the similar plants results are applicable to Catawba. It is expected that a detailed Catawba specific analysis would demonstrate that the allowable flow blockage level would be greater than 15%.

The detailed analysis for the similar plant was performed with the USNRC approved TMD code (Reference 1). The TMD code was employed to perform the subcompartment pressurization calculations of Section 6.2.1.2 of the Catawba FSAR. This conservative analysis utilized experimentally determined loss coefficients for flow through the ice condenser flow paths. The corresponding average flow area employed in the analysis was assumed to be 85% of the total flow area (15% blockage assumption) which occurs at a lattice frame elevation. This limiting flow area was assumed to be uniform along the flow passage length, and throughout the ice condenser bays. This reduced flow area was assumed to be permanent throughout the duration of the accident, conservatively neglecting the fact that much of the blockage would be blown out by the high energy flow through the ice condenser passages. As a result of TMD's one-dimensional ice condenser flow path model, the code conservatively neglects the benefits that cross-flow will provide in venting the steam and air around actual blockages in the ice bed.

In addition, the TMD analysis contains many other conservatisms. The hypothetical accident was conservatively assumed to be initiated by the instantaneous double-ended rupture of one of the main coolant pipes. The break plane was assumed to be completely displaced instantaneously, such that the effective break flow area is twice the main coolant pipe flow area. Mechanistic pipe break technology has demonstrated that a double-ended guillotine break of the reactor coolant piping is highly unlikely. In addition, the analysis conservatively neglected the heat removal capability of the structural heat sinks. Hence, this 15% blockage analysis provides a conservative basis for defining an acceptable limit of effective flow blockage in the ice condenser.

Table 1 contains the percent changes in the peak differential pressures for a 15% blockage assumption.

Conclusions

Application of the results from Table 1 to the peak pressures reported in Tables 6.2.1-11, 6.2.1-12, and Table 6.2.1-13 of the Catawba FSAR are reported in Table 2. Assuming that the subcompartment walls and steel shell can withstand the differential pressures reported in Table 2, then 15% blockage per ice condenser bay will be acceptable.

FSAR Tbl 383-2

Statement is appropriate per conference with D. Kulla.

JGT
June 17, 88

Table 1
Change In Maximum Peak Differential
Pressure For 15% Flow Blockage

Differential Pressure	% Change
Maximum Peak Pressure In The IC Compartment	+4
Operating Deck Or Lower Crane Wall	+2
Upper Crane Wall	+6