DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

March 10, 1989

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

Subject: Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414
McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
NRC Bulletin No. 88-11
Alternative Schedule for Evaluating
Pressurizer Surge Line Thermal Stratification

On December 20, 1988, the NRC issued Bulletin No. 88-11 "Pressurizer Surge Line Thermal Stratification." This bulletin requests all addresses to establish and implement a program to confirm pressurizer surge line integrity in view of the occurrence of thermal stratification, and it requires addresses to inform the staff of the actions taken to resolve this issue.

Pursuant to satisfying the requirements and schedules of Bulletin 88-11 for Catawba and McGuire Nuclear Station, Duke Power Company is participating in a program for partial resolution of this issue through the Westinghouse Owner's Group (WOG).

The WOG program was approved at the October 1988 meeting and has the following objectives:

(i) Develop a generic Justification for Continued Operation (JCO to assure that plant safety is not compromised while the effects of thermal stratification are being determined).

(ii) Collect and summarize relevant design, operational, analytical, and test data for as many WOG plants as possible. In addition, a representative sampling, of approximately ten plants, will be selected to perform a review of plant records and conduct interviews with operations personnel.

(iii) Evaluate data and identify and prioritize significant parameters contributing to this issue. Categorize (group) plants based on these parameters.

(iv) Recommend additional monitoring to supplement the existing transient database required to bound all WOG plants.

(v) Estimate the effect of thermal stratification on fatigue life as a function of key parameters.

(vi) Recommend short term and long term actions.

IE11
1/0

The WOG program is designed to benefit from the experience gained in the performance of several plant specific analyses on Westinghouse PWR surge lines. These detailed analyses included definition of revised thermal transients (including stratification) and evaluations of pipe stress, fatigue usage factor, thermal striping, fatigue crack growth, leak before-break, and support loads. The overall analytical approach used in all of these analyses has been consistent and has been reviewed, in detail, by the NRC staff. A significant amount of surge line thermal monitoring data has been obtained in support of these plant specific analyses. Additional surge line thermal monitoring and plant system data continues to be made available within the WOG, resulting in a steadily increasing database. A significant amount of progress has been accomplished toward meeting these objectives.

To date, the WOG has completed approximately 80% of the effort of assembling plant specific design information on all domestic Westinghouse PWRs (55 units total). This effort will establish the range of key design parameters and permit grouping of plants based on these parameters.

Based on the information assembled to date, and the experience gained in plant specific analyses and monitoring programs, the WOG evaluation has resulted in the following observations regarding plant similarity and thermal stratification:

(1) Thermal stratification (>100 degrees F) has been measured on all surge lines for which monitoring has been performed and which have been reviewed by the WOG to date (7 plants).

(2) The amount of stratification measured and its variation with time *cycling) varies. This variation has been conservatively enveloped and applicability demonstrated for plant specific analyses. Additional monitoring data representing a wider range of surge line configurations may be needed in order to demonstrate the applicability of these thermal stratification transients to other Westinghouse units.

(3) Significant factors which can influence the structural effects of stratification are:

a. Location and design of rigid supports and restraints
b. Pipe layout geometry and size
c. Type and location of piping components

(4) Although the material and fabrication techniques for Westinghouse surge lines are reasonably consistent and of high quality, the design parameters listed in item 3 vary among Westinghouse PWRs. This variation in design is primarily a result of plant specific routing requirements. This variability is currently being examined in order to assess the feasibility of a bounding analysis approach.

These observations developed through the on-going WOG program, indicate that the development of thermal stratification loadings and the evaluation of fatigue, considering these loadings, is a complex process. Therefore, in order to precisely evaluate stratification, additional time is needed.

While more time is needed to evaluate the stratification issue in detail, the Pressurizer Surge Line inspection history at Catawba and McGuire, as well as all other domestic Westinghouse designed PWR's, has not revealed any service induced degradation in the surge line piping that has been attributed to thermal stratification. Results of a Catawba Unit 1 Pressurizer Surge Line inspection performed in January 1989 pursuant to the requirements of NRC Bulletin 88-11 Action Item No. 1.a were transmitted to the NRC per my February 1, 1989 letter to the Document Control Desk. This inspection included a visual examination of pipe welds, exterior pipe surfaces, rupture restraints, and all associated pipe supports. No discernible damage to the pressurizer surge line was discovered which could be attributed to thermal stratification. Pressurizer Surge Line inspections at Catawba Unit 1 and McGuire Unit 1 are scheduled for January 1990. The McGuire Unit 2 surge line will be inspected in July 1989.

In addition, all the plant specific analyses performed to date that have included the loadings due to stratification and striping have validated the "leak-before break" concept and have substantiated a 40-year plant life. Thus, a prudent approach for providing a detailed evaluation of the effects of surge line stratification would be to follow the WOG program grouping evaluation recommendations and monitor as determined to be appropriate.

The WOG has already completed a grouping evaluation, for the purpose of recommending a list of additional plants where thermal monitoring is needed. The time required for this additional monitoring will be dependent on plant outage schedules.

To assure that the plant safety is not compromised within the requested period of schedule extension, a JCO will be submitted to the staff. The McGuire and Catawba Nuclear Station JCO, which is currently being developed, will be submitted to the staff prior to May 10, 1989. The JCO will utilize the information, experience, and monitoring data obtained through the WOG program, and will support the alternate schedule discussed herein.

I hereby request an alternate schedule to that specified in NRC Bulletin 88-11. A schedule of two years, from receipt of the bulletin, is considered sufficient time to obtain the necessary additional monitoring data, define thermal transients, perform all required analyses and update the stress and fatigue analyses to ensure compliance with applicable code and regulatory requirements. This schedule, though different from that requested in action 1.b of Bulletin 88-11, is consistent with the requirement to update the stress and fatigue analyses within two years as stated in action 1.d of the Bulletin. As previously stated, the JCO which is currently being developed, will be submitted to the staff as required per Bulletin 88-11.

At this time, my request for an alternate schedule applies only to item 1.b of NRC Bulletin 88-11. I intend to comply with all other requirements of the Bulletin as appropriate.

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,

H. B. Tucker

JGT04-D4.lcs

xc: Mr. Stewart D. Ebneter
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

Mr. P. K. VanDoorn
NRC Resident Inspector
McGuire Nuclear Station