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DUKE POWER

September 9, 1988

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

Subject: **Catawba Nuclear Station**
Docket Nos. 50-413 and 50-414
McGuire Nuclear Station
Docket Nos. 50-369 and 50-370

Gentlemen:

By letter dated June 1, 1988, Duke Power identified to NRC two issues relative to the ATWS/AMSAC design modification for McGuire and Catawba. These issues were discussed during a conference call on July 13, 1988.

In followup to these licensing activities, attached please find a response from Westinghouse. Please note that reference 4 in the Westinghouse letter contains the same information as Duke letter to the NRC dated June 1, 1988.

With this letter, Duke continues to conclude that the McGuire/Catawba ATWS/AMSAC design is acceptable.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

RLG/400/mmf

Attachment

xc: w/attachment
Mr. Darl Hood
Office of Nuclear Reactor Regulations
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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

Dr. J. Nelson Grace, Regional Administrator
U.S. Nuclear Regulatory Commission
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DAP-88-620
August 25, 1988

Ref: NS-SAT-TA-II-88-316
DAP-88-614
CH 15028

Attention: Mr. W. E. O'Neal

Duke Power Company
McGuire and Catawba Nuclear Station
ATWS Mitigation System Actuation Circuitry (AMSAC)
Response

Dear Mr. Wyke:

The referenced letter provided responses to Duke Power Company AMSAC questions and were marked Proprietary Class 2. After receiving the responses, Mr. B. T. Duke of Duke Power requested that non-proprietary responses be provided. After reviewing the information in the referenced letter, the response to Question 3 was slightly revised and the proprietary classification removed. Attached to this letter are the non-proprietary responses.

If you have any questions please contact R. L. Haessler at 412-374-4714.

Sincerely,

WESTINGHOUSE ELECTRIC CORPORATION

for S. S. Kilborn, Manager
Duke Power Project

cc: W. E. O'Neal 1L 1A
T. B. Duke 1L 1A
J. M. Roth 1L 1A
T. R. Puryear 1L 1A
S. E. Lawson 1L

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Question 1:

The first issue concerns the number of auxiliary feedwater (AFW) pumps required once an ATWS event is detected. Duke Power Company's specific AMSAC design for the Catawba and McGuire Nuclear Stations currently requires that two motor driven auxiliary feedwater (AFW) pumps start. This Duke specific AMSAC design requirement is based upon normal plant response to loss of both main feedwater pumps. During previous telephone conversations with Gary Amant of Westinghouse's Nuclear Safety Department, it was stated that while the boundary of the calculation is based on a flow almost double Duke Power's motor driven capacity, the sensitivity to lower flow rates is very low. Based on the low sensitivity of an ATWS event to lower levels of AFW flow rates, Duke Power Company concluded that the present AMSAC design is acceptable and that additional AFW capacity was not required for Duke Power Company's specific AMSAC design. To support this conclusion, Duke Power Company requests a written response from Westinghouse evaluating this conclusion.

Response 1:

The Westinghouse generic ATWS analyses (Reference 1) conservatively model a Westinghouse 4 loop plant with Model 51 steam generators. In these analyses the initiation of full AFW capability at 60 seconds is modeled. The AFW flow rate used in the ATWS analyses is 1760 gpm which corresponds to 2 motor driven AFW pumps plus the turbine driven AFW pump.

For the most limiting ATWS events, e.g., Loss of Load / Turbine Trip and Loss of Normal Feedwater, sensitivities to various AFW related parameters are provided in Reference 1. Included in these sensitivities are; 1) one-half AFW flow (e.g., 880 gpm, equivalent to having only 2 motor driven AFW pumps or the turbine driven AFW pump), 2) ± 10% AFW flow rate, and 3) AFW initiation delay (from 60 seconds to 120 seconds into the transient).

For these limiting ATWS events, the largest sensitivity to having one-half AFW flow is a peak reactor coolant system pressure increase of 64 psi. Relative to the 3200 psig allowable peak reactor coolant system for ATWS events, this increase is very small. With the inclusion of this additional pressure increase to the peak RCS pressures given in the generic analysis results presented in Reference 1, the allowable peak RCS pressure limit of 3200 psig is still met.

The final ATWS rule for Westinghouse plants requires the installation of AMSAC. The generic AMSAC designs developed for the Westinghouse Owners Group (WOG) and presented in the Reference 2 state "A turbine trip and start-up of all auxiliary feedwater pumps will occur upon receipt of an AMSAC signal". No explicit definition of AFW flow rate is provided in Reference 2 since AFW flow rates vary among Westinghouse plants.

Westinghouse has recognized the need for flexibility in plant specific AMSAC design requirements for AFW flow. Consequently, Westinghouse has considered the impact of different (reduced) AFW flow capability in the joint WOG/Westinghouse ATWS Rule Administration program (Reference 3) currently in progress. In the ATWS Rule Administration process defined in Reference 3, the capability of assessing and, if necessary, accounting for less than full AFW flow is presented. Upon final issuance of the ATWS Rule Adminstration program report, Westinghouse recommends that Duke Power Company employ this process to determine the impact of their specific AMSAC design requirements related to AFW flow.

Question 2:

After the original AMSAC design was completed and approved, plant operating procedures at McGuire were slightly modified to allow operation above 50 percent power with the Feedwater Control-Bypass Valves (FCBV) fully open. The new operating procedure was analyzed and found to have flowpath arrangements which are very similar to those associated with the feedwater arrangements of the D5 model steam generators. The conclusion was reached that because of this similarity flowpath blockage can only occur if both the Feedwater Control Valve (FCV) and FCBV are closed or the Feedwater isolation Valve (FIV) is closed. Westinghouse is asked to evaluate this design change.

Response 2:

Westinghouse has reviewed the logic diagrams and description of the AMSAC design provided in Reference 4. The conclusion of the review is that the logic modification shown for the McGuire units will provide at least the level of ATWS protection as the WOG pump and valve status logic in WCAP-10858P-A, Rev.1, "AMSAC Generic Design Package" (Reference 2). It is appropriate to monitor the valve position of the FCBVs and the FCVs with an "And" logic gate and couple that with the FIV position in an "Or" gate for the AMSAC actuation on valve position. This conclusion is based on the assumption that the flow through the FCBVs will be sufficient should the FCVs fail close (as stated in Reference 4).

Question 3:

In the July 18, 1988 conference call with B. T. Duke, it was also requested that Westinghouse comment on the turbine power interlock logic for the McGuire units, particularly the 120 second time delay.

Response 3:

The McGuire AMSAC logic as presented in Reference 4 will maintain the turbine power permissive for 120 seconds after turbine power is below 40%. The time delay in the feedwater valve status portion of the circuit is 30 seconds. Therefore, the 120 seconds is a sufficient length of time to maintain the turbine power permissive. Note that the range for the pump and valve logic turbine power permissive delay, in Rev. 0 of WCAP-10858P-A, was 90 to 180 seconds (refer to WCAP Fig. 3-4). The range was increased to 180 to 420 seconds in Rev. 1 of WCAP-10858P-A (Ref. 2) because of the revised time delay added to the design. Because Duke has not incorporated the revised time delay into the McGuire AMSAC design, the turbine power permissive delay does not need to be increased as it was Ref. 2.

The turbine power permissive for the Catawba units does not include the 120 second delay. Thus, the valve position AMSAC actuation will be armed below 40% power until the operator takes action to remove the turbine power permissive. After reviewing the logic diagrams, Westinghouse concludes that the McGuire turbine power permissive logic could be applied to the Catawba units.

References

1) Letter NS-TMA-2182, Anderson, T. M., (Westinghouse Electric Corporation) to Hanauer, S. H. (USNRC), "ATWS Submittal", December 30, 1979.

2) Adler, M. R., "ANSAC Generic Design Package," WCAP-10858P-A, Rev. 1, July, 1987.

3) Westinghouse Preliminary Report, "ATWS Rule Administration Process", ESSD/WOG-88-106, June 14, 1988.

4) Duke Power Company letter of May 23, 1988, from J. E. Thomas to S. S. Kilborn.