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Carolina Power & Light Company

May 9, 1980

FILE: NG-3513 (R) SERIAL: NO-80-679

Mr. James P. O'Reilly, Director
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, GA 30303

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET 50-261
LICENSE NO. DPR-23
IE BULLETIN 80-04, MAIN STEAM LINE BREAK WITH CONTINUED FEEDWATER

Dear Mr. O'Reilly:

Your bulletin of February 8, 1980, requested that we reexamine the assumptions used in the calculation of the potential consequences of a main steam line break inside containment with continued feedwater flow. That review has been completed and each of your concerns is addressed by number below:

1. The conservative assumptions used in the analysis for containment pressure following a main steam line break in containment have been reviewed as requested in IE Bulletin 80-04. The analysis documented in the H. B. Robinson Unit 2 FSAR, Page 14.2.5-10 included allowance for 100 seconds of auxiliary feedwater flow. We have extended the analysis to consider auxiliary feedwater flow for 10 minutes, as well as main feedwater flow for 10 seconds; a conservative estimate of the time for isolation of the system. The resultant containment pressure, including allowance for auxiliary feedwater flow to 10 minutes, is 34.4 psig compared with a design value of 42 psig. No difficulties are anticipated with extended auxiliary feed pump operation at runout conditions. Cavitation is not expected at the anticipated flow rate.

   A main steam line break in containment will result in blowdown to containment with resultant increase in containment pressure and increase in cooling of the RCS. Increased cooling of the RCS would lead to low or falling pressurizer pressure and level. The operator would make the determination of a steam line break on the basis of abnormally low steam pressure in one or more steam generators; a continuously decreasing T_{avg} would also indicate a steam line break.

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Determination of the affected steam generator (to allow isolation by the operator) would be made by comparison of steam generator pressures or imbalance in pressures or flows. Additionally, the operator will watch for possible first-out annunciation of any of the following:

a. Steam/feedwater flow mismatch

b. Low-low steam generator water level

c. High steam line flow

d. High steam line differential pressure

2. The analysis of the reactivity increase resulting from a main steam line break has been reviewed.

The worst case steam line break is assumed to occur at hot zero power condition outside containment with offsite power available. At this time, the steam generator secondary side water inventory is at a maximum, prolonging the duration and increasing the magnitude of the primary loop cooldown. With a negative moderator temperature coefficient, this causes reactivity insertion into the core. For conservatism, the most reactive control rod is assumed to be stuck out of the core when evaluating the shutdown capability.

With respect to additions of feedwater to the steam generator, main feedwater flow at hot zero power when the accident initiates is approximately 100-150 gpm/steam generator. Main feedwater isolates after approximately 10 seconds, so main feedwater flow additions to the steam generator inventory are insignificant. Upon safety injection actuation, auxiliary feedwater flow is initiated. It is estimated that this flow would be established at approximately t + 40 seconds. At t + 38 seconds, safety injection has reached the core, and the cooldown reactivity transient has peaked and core power is declining. The auxiliary feedwater flow will not be sufficient to reverse this trend.

In summary, the core cooldown transient is driven by the blowdown of the full-steam generator. Continued small flow additions represented by auxiliary flow capability are not significant contributions to the reactivity transient.

3. As discussed above, no potential for containment overpressurization exists, and the return to power response is very insensitive to the addition of auxiliary feedwater. Therefore, no corrective action is required.

I trust that this information is suitable for your use. If you have any further questions, please contact my staff.

Yours very truly,

L. W. Eury
Vice President
Power Supply

WMB/CSB/tma*

cc: Mr. N. C. Moseley (NRC)