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CP&L

Carolina Power & Light Company

August 14, 1980

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

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 & 2
LICENSE NOS. DPR-71 AND DPR-62
DOCKET NOS. 50-325 AND 50-324
RESPONSE TO IE BULLETIN 80-17, SUPPLEMENT 1, SECTION B

Dear Mr. O'Reilly:

In response to your letter of July 18, 1980, transmitting IE Bulletin 80-17, Supplement 1, Carolina Power & Light Company submits the following response to Section B and supplemental responses to items A.1 and A.5 for the Brunswick Steam Electric Plant (BSEP):

B.1. Most BWR's have scram discharge volume (SDV) subsystems similar to the design at Browns Ferry 3. It has been shown that that design, where the discharge volume and instrument volumes are distinctly separate, is such that water can accumulate in the SDV's without being detected by the existing level instrumentation. This condition forms the basis for the short-term requirement of a system to continuously monitor water levels in the scram discharge volumes.

The SDV subsystem design at BSEP is significantly different from most other BWR's in that the SDV is intimately connected to the instrument volume by an 8" x 12" expanding elbow. Since there is a direct connection with no constriction between the two volumes, (they are essentially one volume), water cannot accumulate in the SDV without first filling the instrument volume. The level instrumentation on the instrument volume will function as designed to detect significant inleakage of water before it builds up in the SDV.

This system effectively meets the requirements of the NRC Bulletin supplement in that:

- It continually monitors for water in both SDV's.
- The process computer provides continuous documentation of the status of the level switches and records whenever there is a buildup of water in the instrument volume. Since protective action is taken before water could build up in the SDV, it is unnecessary to record its level since it would always be zero.

A001 s 1/1 SEND Drawings + TERA (return to Reg Files after filming)

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- Annunciators alert the operator to the accumulation of water.

- Although lacking in diversity of type of instrumentation, this system is no less diverse than a UT-augmented system on other BWR's in that their present level instrumentation is on a separate volume from the SDV (the SIV) and does not monitor the parameter of concern (SDV level).

- While there is some concern regarding the reliability of the level instrumentation being used, there have been only two known failures to date. At this time, it is believed that these failures were caused by hydro/pneumatic transients which can occur during a scram. There has been no evidence or postulated mechanism for failure during normal operation. When the current investigations determine the cause of failure, action will be taken to eliminate the mechanism. Until then, functional testing of the switches periodically and following each scram from power will provide the needed assurance regarding their operability. The presence of six redundant level switches assures that the operator will be properly warned of excessive water levels even if there is a failure of a level switch. In neither of the two failures to date have all the level switches on a volume failed to function.

The UT approach recommended by General Electric to meet the short-term requirements of the bulletin is appropriate for those BWR's with the Brown's Ferry 3 SDV design because of the identified problems with the indirect method of measurement of level in the SDV, a consequence of remote instrumentation. This is not a concern with the BSEP level instrumentation because of its direct method of measurement. In addition, the BSEP arrangement offers several significant advantages over the direct UT measurement of level in the SDV's.

- Water must be present in the headers and already 1-½" deep to register on UT instrumentation. At this point, the minimum required available volume would already be exceeded. The BSEP instrumentation will sense a problem well before this point.

- The UT system takes no immediate, automatic action. Operator action is still required.

- An active, temporary UT system is probably less reliable than a passive, permanently installed system.

We find that the existing SDV level instrumentation provides a method for the continuous monitoring of water level in the SDV subsystem which meets the requirements and intent of IE Bulletin 80-17, Supplement 1. It offers a high level of reliability and is acceptable until the long-term fix requirements are defined. An additional measure of confidence in this system results from the basic similarity between it and the permanent fixes proposed by General Electric.

B.2. We have reviewed the design of the SDV subsystem and its vents at BSEP and evaluated it with respect to the design of those at the plants which have encountered venting and draining problems. Each of the failures at these plants appear to have resulted from a design where there is a constriction between the SDV and the instrument volume. This constriction provides a site behind which water can accumulate in the SDV without being detected by the instrument volume instrumentation. The lack of a vent path might have contributed to the backup of water in some of the cases; however, it is possible for water to back up even with perfect venting.

Without a constriction, there can be no backup of water in the SDV without it being detected by the level instrumentation in the instrument volume. The installed instrumentation thus provides the necessary protective functions of shutting down the plant and maintaining it shut down. The capability of the vent and drain lines are not a factor in this design because the large diameter connection will promptly direct any water to the instrument volume regardless of the pressure. Should a vent or drain line fail to operate properly, it may increase the time it takes to drain the SDV, but it would not impair the protective function of the level instrumentation. Presently there is no standard for determining what is a safe SDV drain time. Following a scram, it is quite possible the SDV could not be drained for an extended period of time due to an inability to reset the scram.

The sole benefit obtained by increased venting capability is to decrease the SDV drain time. A shorter drain time has limited benefit because the reactor would be shut down. The current times of less than ten minutes are acceptable.

Significant shortening of the SDV drain time would require increasing the drain line size. Increasing the drain line size would also increase the amount of leakage into the SDV's that could be accommodated without a buildup of water in the SDV. There are no proven operational or safety benefits to be derived by increased drainage capacity. The net effect could be to simply mask a significant leakage problem until the situation became worse. We, therefore, see little benefit to be gained by increasing the drain line capacity.

The addition of another parallel vent valve or of vacuum breakers increases the number of paths through which leaks could occur from primary containment into the Reactor Building. Past experience at other plants with direct, open vents have demonstrated that this is a pathway which can transport significant portions of reactor coolant radioactivity to the Reactor Building atmosphere. Such a change is inconsistent with the desire to reduce primary coolant release paths and to reduce personnel exposure, especially since no significant improvement in safety is obtained in return.

The key factor in evaluating the safe function of the SDV subsystem is to assure that any water that appears in the SDV is immediately directed to the instrument volume for detection. The BSEP system design with its intimate, direct connection between the SDV and instrument volume has this characteristic. The vent line does not affect this capability or provide any other significant improvements in safety; therefore, no changes are warranted.

A.1. Enclosed are "as built" field verified drawings for the Unit No. 2 scram discharge volume vent and drain subsystems as committed to in our letter of August 7, 1980, Serial No. NO-A-1169.

A.5. We will continue the daily monitoring for the presence of residual water in the SDV's by checking for water at a drain valve on the instrument volume for one week after startup of each unit. After that, we plan to cease monitoring by the instrument drain valve method and depend on daily channel checks of the SDV level instrumentation alarms, if no problems were noted during the week of monitoring.

We trust that this satisfies the request of IE Bulletin 80-17, Supplement 1.

Very truly yours,

B. J. Furr
Vice President
Nuclear Operations

RMP/JSB/bd

cc: Mr. N. C. Moseley

Sworn to and subscribed before me this 15th day of August 1980.

Notary Public

My commission expires: April 3, 1984