



Commonwealth Edison

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December 11, 1985

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Station Units 1 and 2
Braidwood Station Units 1 and 2
Environmental Effects of High
Energy Line Breaks
NRC Docket Nos. 50-454, 50-455,
50-456 and 50-457

References (a): August 2, 1985 letter from K. A. Ainger
to H. R. Denton

(b): August 23, 1985 letter from K. A. Ainger
to H. R. Denton

Dear Mr. Denton:

References (a) and (b) described our design of plant modifications to automatically detect and isolate high energy line breaks in the Steam Generator Blowdown (SD) and Auxiliary Steam (AS) systems before auxiliary building environmental conditions exceeded predicted values. During the review of these modifications, the NRC staff requested additional information in the following areas:

1. surveillance plans for the temperature sensors
2. setpoint of the temperature sensors
3. routing of temperature sensor wiring with respect to jet impingement
4. time for backup manual operator action in the event of single failure
5. Unit 1 and Unit 2 steam generator blowdown condenser cross-tie

Attachment A to this letter provides the response to these questions.

With respect to Item 4, additional calculations have determined that sufficient time for backup manual operator action may not exist. As a result, additional modifications have been initiated to account for this and are described in Attachment A. A schedule for completion of these modifications and our actions to address this situation in the interim are also discussed in Attachment A.

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Ans.

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H. R. Denton

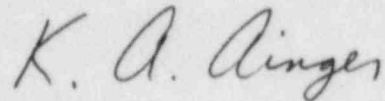
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Please direct any further questions regarding this matter to this office.

One signed original and fifteen copies of this letter and attachment are provided for NRC review.

Very truly yours,

A handwritten signature in cursive script, reading "K. A. Ainger".

K. A. Ainger
Nuclear Licensing Administrator

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Attachment

cc: Byron Resident Inspector
Braidwood Resident Inspector

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ATTACHMENT A

The following is provided to address questions raised by the NRC concerning HELB monitoring of the Steam Generator Blowdown (SD) and Auxiliary Steam (AS) Systems during conference calls on September 24, October 11 and 12, and November 1, 1985:

- 1) The temperature switches will be added to the existing administrative surveillance program that will require a channel calibration and analog channel operational test once every 18 months.
- 2) The design basis requirements for equipment qualification in the HELB affected general areas of the auxiliary building are governed by an abnormal temperature rise to 140°F for two hours at a frequency of once per year due to a postulated HVAC failure. To be conservative, the maximum temperature at which the temperature switches will initiate valve closure will be lowered from the previous 150°F down to the qualification temperature of 140°F. This setting will account for setpoint tolerance.
- 3) Review of the temperature switch and wiring locations in relationship to HELB locations indicate that jet impingements will not impede proper system response.
- 4) As a result of the November 1, 1985 conference call, additional calculations were performed to quantify the available time that exists for operator action given an initiating HELB event and taking a postulated single active failure of the isolation valves. Calculations indicate that the available time between when the temperature switches sense the HELB and when the temperature at the affected equipment in the general areas of the auxiliary building reach the governing qualification temperature of 140°F may be insufficient to allow for manual operator action to locate and close the appropriate (SD001 or AS012) manual isolation valves previously described in reference (a).

As a result of this new information, modifications to the SD and AS HELB detection systems have been initiated to obviate the need for manual operator action due to postulated single active failures as follows:

- (a) Concerning the SD system, a second automatic valve (SD054) is being added in series with the SD002 valve in each of the four normally operating (lower tap) steam generator blowdown lines. Each additional valve will receive a signal to close concurrent with the SD002 valve upon the actuation of the temperature switches. The normally closed (upper tap) lines are not used for normal blowdown and do not require modification for HELB purposes.

- (b) Concerning the AS system, backup automatic valve closure in series with the AS013 and AS167 valves will be added. This backup isolation will receive a signal to close concurrent with the AS013 and AS167 valves upon actuation of the temperature switches. At this time, the isolation scheme has not been finalized. Designs including isolation of the Unit 1 and 2 extraction steam and auxiliary boiler input lines to the common header upstream of the AS013 and AS167 valves, as well as downstream isolation of the main header supply, are being considered.
- (c) The above described modifications to our SD and AS HELB detection systems are currently under design and/or installation. Although we are proceeding with this activity expeditiously, we do not expect completion until February 28, 1986 for Byron Unit 1. These modifications will be complete prior to the operation of Byron Unit 2 and Braidwood Units 1 and 2. It is for the following reasons that we believe interim operation of Byron Unit 1 can be justified until completion is achieved:
- The SD and AS systems have been operating less than one year and as such, the piping is not in a degraded condition as would result from high fatigue, stress or corrosion.
 - The probability of the postulated single active valve failure concurrent with the HELB is low.
 - Double-ended pipe ruptures (DER) are less likely to occur than pipe cracks. The additional calculations that were discussed above were based on DER. By comparison, pipe cracks would yield a slower temperature rise in the general areas of the auxiliary building.

Until such time as the SD and AS modifications are complete, operators will be assigned full time locally both in the vicinity of the SD001 valves on the SD system and in the vicinity of valve AS012 on the AS system, each equipped with a means of direct communication with control room personnel. This action will allow for immediate closure of the respective valves after receipt of the HELB alarm. The alarm response procedure is being revised to reflect this action.

- 5) The Unit 1 and Unit 2 steam generator blowdown condenser cross-tie is normally positioned closed during two unit plant operation. Therefore, this issue is not a concern at Byron Unit 1 at this time. However, to mitigate the potential consequences of additional blowdown flow out the HELB from the unaffected unit if the Unit 1 to Unit 2 steam generator blowdown cross-tie valves (1 and 2SD037) were positioned open, the annunciator response will be revised to require operator verification of the cross-tie valve positions. If open, operator action will be required at the main control board to close the double isolation valves (SD002 and SD054) of the unaffected unit's normally operating four steam generator blowdown lines.