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August 17, 1982

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  
Fire Protection Questions  
NRC Docket Nos. 50-454, 50-455,  
50-456 and 50-457

- Reference (a): July 15, 1982, letter from  
B. J. Youngblood to L. O. DelGeorge.
- (b): June 14, 1982, letter from  
T. R. Tramm to H. R. Denton.

Dear Mr. Denton:

This is to provide advance copies of information regarding Byron/Braidwood fire protection which was requested in reference (a). This information will be included in the FSAR in the next amendment.

Enclosed are responses to FSAR questions 010.55 through 010.59 regarding the Byron/Braidwood safe shutdown report provided in reference (b). NRC review of this information should close Outstanding Item 13 of the Byron SER.

Please direct questions regarding this information to this office.

One signed original and fifteen copies of this letter and the enclosures are provided for your use.

Very truly yours,

T. R. Tramm  
Nuclear Licensing Administrator

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Enclosures

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10.55 The informal preliminary response (from T. Tramm dated April 19, 1982) to our concern involving spurious actuations of associated circuits whose fire induced failure could affect safe shutdown is not complete. Provide the following additional information:

- a. Part 2. of this response indicates that you have considered spurious operation due to fires of equipment listed in Table 2.4-2, 2.4-3 and 2.4-4 of the Fire Protection Report. For the equipment listed in Tables 2.4-2 and 2.4-4 as being required for hot standby (hot shutdown) and their support systems you indicate that manual operations would be employed to correct any problems caused by spurious actuations. Describe the manual actions necessary to prevent an unacceptable plant condition following spurious operations. Include discussion on the time required from detection of the spurious actuation to taking corrective action in order to assure the action can be taken soon enough to prevent an unacceptable plant condition.
- b. Verify that equipment listed in Table 2.4-3 of the Fire Protection Report as being required for cold shutdown will be aligned in its normal configuration prior to initiating cold shutdown.
- c. The informal response of April 19, 1982 to the associated circuit concern should be formally included in the "Safe Shutdown Analysis," Section 2.4 of the Fire Protection Report.

#### RESPONSE

- a). This question is apparently asking for a detailed analysis of the consequences of and corrective actions required for the spurious actuation of each piece of equipment listed on Tables 2.4-2, 3 and 4 of the Fire Protection Report. Such an analysis has not been performed and is considered to be impractical. In general, the manual action required following the spurious actuation of a piece of equipment is to return the piece of equipment to its previous state. For example, if a valve were to spuriously change position the corrective action would be to return it to its previous position. The time frame in which this would need to be accomplished is dependent on the plant status at the time of the spurious actuation, and of course on the particular piece of equipment involved.

It is the applicants position that the actions to be taken and the time frame in which to take those actions in response to the spurious actuation of equipment is best determined by the operating staff at the time of occurrence. The plant operators have received extensive training in the area of accident and transient response. In this regards,

the response to a fire-induced spurious equipment actuation event should be no different from the response to any other plant transient, regardless of the cause. In the event of a fire, the operators would be particularly alert to the possibility of abnormal plant conditions. They would be observing critical plant parameters as displayed by the instrumentation. As the transient progressed, the operators would make a determination of the probable cause and any required corrective and/or mitigating actions, based on the plant status as displayed. Adequate time should be available to evaluate the transient, determine corrective actions and carry them out while maintaining the plant in a safe condition.

- b) Plant procedures require that the proper alignment of plant systems and equipment be verified prior to placing them into operation. The equipment listed on Table 2.4-3 are covered by these procedures. Thus, prior to bringing the plant to cold shutdown, the proper alignment of the listed equipment will be verified.
- c) Refer to Subsection 2.4.1.5 of the Fire Protection Report.

10.56 Attachment A "Byron/Braidwood Safe Shutdown Analysis" to your June 14, 1982 letter describes the need for repair for equipment required for cold shutdown after a fire in a number of separate plant fire zones. Provide a description of the repairs required for each fire zone and verify that proper plant procedures and adequate personnel will be available for effecting these repairs.

RESPONSE

Refer to Subsection 2.4.1.6 of the Fire Protection Report.

10.57 Table 2.4-4a of the safe shutdown analysis identifies safe shutdown instrumentation. However, the analysis indicates that following a fire in a number of separate plant fire zones, redundant channels of certain of these instruments which must be available during hot shutdown will be lost. This is unacceptable. It is our position that at least one channel of instrumentation essential for safe shutdown be protected from fire damage in accordance with Section III.G.2 of Appendix R or an alternate be provided which meets the requirements of Section III.L of Appendix R. The backup instrumentation justification discussion of these fire zones in the safe shutdown analysis does not comply with Section III.L. Instrumentation affected includes source range neutron flux monitoring, steam generator wide range level indication, reactor coolant hot and cold leg indication and auxiliary feedwater flow indication in the following areas:

- a. Control room
- b. Lower cable spreading room
- c. Auxiliary electrical equipment room
- d. Auxiliary building general Area, elevation 383'-0"
- e. Radwaste and remote shutdown control room; and
- f. Radwaste drumming station and tunnel

#### RESPONSE

A discussion of each of the areas listed in the question follows. Note that the lower cable spreading rooms are divided into five fire zones. A discussion is provided for each zone. Table 10.57-1 lists the number of channels of instrumentation affected in each fire zone for each of the instrumentation types listed in the question.

a. Control Room (Fire Zone 2.1-0)

Both channels of source range neutron monitoring instrumentation would be affected by a fire in this zone. This is due to the fact that the neutron monitoring system panel 1PM07J is located in the control room. It is the applicant's position, however, that the source range neutron monitoring instruments are not required to achieve or maintain the plant in the hot standby or hot shutdown conditions. In the event of a fire in this zone, the operators would have sufficient time to scram the reactor prior to evacuating the room. Once the control rods are inserted into the core, sufficient negative reactivity has been inserted to ensure subcriticality while hot standby or hot shutdown conditions are maintained. Should it be necessary to determine or verify the available shutdown margin, a primary coolant system sample can be drawn and analyzed for boron concentration. This operation can be performed onsite by station personnel.

Thus, no reliance is placed on the neutron monitoring system instrumentation until actions are begun to take the plant to cold shutdown.

The applicant believes this position meets Appendix R requirements. In particular, Section III.L.1.a, which states that alternative shutdown capability shall be capable of achieving and maintaining subcriticality, is met by manually scrambling the reactor, since subcriticality is assured by inserting the control rods into the core and maintaining hot standby conditions. Section III.L.2.d, which states that direct indication of process variables necessary to perform and control the reactivity control function shall be provided, is met because once the control rods have been inserted

into the core, directed indication of neutron flux is not required to control reactivity while hot standby is maintained. Credit is taken for repairing fire damage to neutron monitoring system cables prior to initiating cold shutdown actions, as per Appendix R.

In summary, the current position meets Appendix R and protection of neutron monitoring system cables from fire damage is not warranted.

b. Lower Cable Spreading Rooms:

- 1) Fire Zone 3.2A-1 -- This zone does not contain any of the instrumentation cable listed for this question.
- 2) Fire Zone 3.2B-1 -- This zone contains cables from both trains of the neutron monitoring system. Refer to part a of this response for the applicant's position on this system. For instrumentation other than source range neutron monitoring mentioned in this question, cables for not more than one of the two trains provided are routed through this zone. Thus, additional fire protection features are not required for this zone.
- 3) Fire Zone 3.2C-1 -- This zone contains cables from both trains of the neutron monitoring system. Refer to part a of this response for the applicant's position on this system. For instrumentation other than source range neutron monitoring mentioned in this question, cables for not more than one of the two trains provided are routed through this zone. Thus, additional fire protection features are not required for this zone.
- 4) Fire Zone 3.2D-1 -- For instrumentation mentioned in this question, cables for not more than one of the two trains provided are routed through this zone. Thus, additional fire protection features are not required for this zone.

5) Fire Zone 3.2E-1 -- For instrumentation mentioned in this question, cables for not more than one of the two trains provided are routed through this zone. Thus, additional fire protection features are not required for this zone.

c. Auxiliary Electric Equipment Room (Fire Zone 5.5-1)  
The response for this fire zone will be completed by September 15, 1982.

c. Auxiliary Building General Area -- El. 383'-0"  
(Fire Zone 11.4-0)  
The response for this fire zone will be completed by September 15, 1982.

e. Radwaste and Remote Shutdown Control Rooms (Fire Zone 11.4C-0)  
The response for this fire zone will be completed by September 15, 1982.

f. Radwaste Drimming Station and Tunnel (Fire Zone 14.1-0)  
The fire zone boundary of this zone is redefined in the revised Fire Protection Report. The original boundary was arbitrary and did not conform to plant structural features. The new boundary follows a structural concrete wall. As a result of this change, the area on elevation 383'-0" roughly between column-rows 21 to 25 and P to Q was deleted from Fire Zone 14.1-0 and added to Fire Zone 11.4-0. This area included the cables from the safe shutdown instrumentation listed in this question. Fire Zone 14.1-0 now contains no safe shutdown cables. Refer to part e of this question for a resolution of this question for Fire Zone 11.4-0.

Table 10.57-1

## Instrumentation Channels Routed Through Fire Zones

Area	Fire Zone	Instrumentation			
		Neutron Monitoring	SG Wide Range Level	RC Hot & Cold Leg Temperature	Aux. Fdwtr. Flow
a. Control Room	2.1-0	SR: 2/2	---	---	---
b. Lower Cable Spreading Rooms	3.2A-1	---	---	---	---
	3.2B-1	SR: 2/2	2/4	Cold Leg: 4/4	4/8 (One Train)
	3.2C-1	SR: 2/2	---	Cold Leg: 4/4	4/8 (One Train)
	3.2D-1	---	2/4	Cold Leg: 4/4	4/8 (One Train)
	3.2E-1	SR: 1/2	2/4	Hot Leg: 4/4	4/8 (One Train)
c. AEER	5.5-1	SR: 2/2 (Power Sources)	4/4	Hot Leg: 4/4 Cold Leg: 4/4	---
d. Aux. Bldg. El. 383'-0"	11.4-0	SR: 1/2	4/4	Hot Leg: 4/4 Cold Leg: 4/4	8/8
e. RSP	11.4C-0	SR: 1/2	4/4	Hot Leg: 4/4 Cold Leg: 4/4	8/8
f. Radwaste	14.1-0	(1/2)*	(4/4)*	---	(8/8)*

\*Due to redefinition of fire zone boundaries, Fire Zone 14.1-0 now has no Safe Shutdown cables routed through it.

10.58 The safe shutdown analysis indicates that a fire at the remote shutdown control (Section 2.4.2.45, Fire Zone 11.4C-0) will result in a loss of operability of all main steam atmospheric relief valves. Credit is taken for maintaining hot standby utilizing the main steam safety valves. This approach is unacceptable as the capability to maintain hot shutdown and achieve cold shutdown within 72 hours can not be demonstrated without a means to depressurize the secondary side. It is our position that one division of atmospheric relief valves be protected from fire, or provide discussion on the capability to locally manually control the atmospheric dump valves and maintain communication with the control room.

RESPONSE

The response to this question will be completed by September 15, 1982.

10.59 Provide a detailed discussion in the safe shutdown analysis on the method employed to determine which cables are required for assuring a safe shutdown and how it was verified that the separation criteria of Section III.G.2 were satisfied.

RESPONSE

Refer to Subsection 2.4.1.3 (b) of the Fire Protection Report.