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May 6, 1980

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
Responses to Questions by Argonne National Laboratory
NRC Docket Nos. 50-454, 50-455, 50-456, and 50-457

Dear Mr. Denton:

On December 20, 1979 a meeting among representatives of Argonne National Laboratory, NRC Staff, Commonwealth Edison Company, Sargent & Lundy Engineers and Westinghouse Electric Corporation was held to discuss the content of Chapter 7 of the Byron/Braidwood FSAR which concerns instrumentation and controls. In the course of this meeting, a number of questions involving items within Westinghouse's scope were left unresolved. Attached are Commonwealth Edison's responses to those questions.

Please address any questions that you might have concerning this matter to this office.

One (1) signed orignal and fifty-nine (59) copies of this transmittal are provided for your use.

Very truly yours,

R. J. Naughton
for D. L. Peoples
Director of Nuclear Licensing

DLP:WFN:rap

attachment

cc: Ira Charak, ANL w/att.

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Questions by Argonne National Laboratory

on

Byron/Braidwood FSAR Chapter 7

At a meeting held at Argonne National Laboratory on December 20, 1979 numerous questions were asked on Chapter 7 of the Byron/Braidwood FSAR concerning instrumentation and control. The majority of these questions were answered at the meeting by Commonwealth Edison Company, Sargent and Lundy, and Westinghouse. The following questions involve items in Westinghouse scope that could not be readily addressed at the meeting.

1. Should SNUPPS be referenced as a plant with similar instrumentation and control, since Byron/Braidwood is now ahead of SNUPPS in the NRC review process?

Response

The instrumentation and control systems discussed in Chapter 7 for Byron/Braidwood are functionally similar to those systems implemented by Comanche Peak, W. B. McGuire, and Trojan. The instrumentation and control systems for all of these plants have been reviewed by the NRC and have been accepted in an NRC Safety Evaluation Report (SER). Trojan is currently in commercial operation. An operating license is anticipated in mid-1980 for McGuire. An SER is anticipated by the end of 1980 for Comanche Peak.

2. Definitions and their usage. Calibration and setpoint errors.

Response

A number of interrelated questions were asked concerning the definitions of errors and their usage, and the means employed to measure plant thermal output and calibrate the neutron level detectors. These matters are con-

sidered in a Westinghouse Topical Report in much greater detail than would be appropriate for inclusion in an FSAR. The subject report is: WCAP-8567-P, "Improved Thermal Design Procedure," July 1975 by H. Chelemer, L. H. Boman and D. R. Sharp (Proprietary), and WCAP-8568, July 1975 (Non-Proprietary). Although WCAP-8567-P has been reviewed and accepted by the NRC, it is not as yet appropriate for inclusion as a reference in the Byron/Braidwood FSAR, but the information it contains does address the Argonne questions concerning the statistical treatment of errors and calibrations. Since the improved thermal design procedures are employed by Westinghouse for the analysis of plants using Optimized Fuel, WCAP-8567-P will be referenced when Byron/Braidwood files an Optimized Fuel amendment.

In a new Westinghouse topical report being finalized, the following definitions are being used to insure clear understanding of tolerances related to I&C Protection system setpoints. Although this report will not be referenced in Chapter 7 of the FSAR for Byron/Braidwood, these definitions should aid in understanding those already provided.

They are also believed to be consistent with the present definitions provided as well as the manner in which they are used in the discussions of Chapter 7 of the FSAR. The following definitions are for information:

a. <u>Trip Accuracy</u>

The tolerance band containing the highest expected value of the difference between (a) the desired trip point value of a process variable and (b) the actual value at which a comparator trips (and thus actuates some desired result). This is the tolerance band, in percent of span, within which the complete channel must perform its intended trip function. It includes comparator setting

e. Channel Accuracy

The accuracy of an analog channel which includes the accuracy of the primary element and/or transmitter and modules in the chain where calibration of modules intermediate in a chain is allowed to compensate for errors in other modules of the chain. Rack environmental effects are not included here to avoid duplication due to dual inputs, however, normal environment effects on field mounted hardware is included.

3. Numbering of Interlocks and Permissives

Response

Sequential numbering of interlocks and permissives is not maintained because design control does not permit safety system interlock designation to be duplicated unless the design functions are identical from plant to plant. Consequently, missing numbers indicate an interlock used in a nuclear plant with a dis-similar system function than Byron/Braidwood.

4. Overcurrent devices, type

Response

The overcurrent devices mentioned on page 7.2-12 are fuses and circuit breakers. No reliance is placed on any overcurrent device for ensuring automatic initiation of the system nor would failure of these devices prevent the required safety action.

5. Manual Reactor Trip and Safety Injection

Response

Manual initiation of Reactor Trip or Safety Injection energizes the shunt trip coil of the reactor trip breakers directly and in addition de-energizes the undervoltage coil of the reactor trip breakers thru the Solid State Protection System. This arrangement meets the requirements of Regulatory Guide 1.62 - Manual Initiation of Protective Actions.

6. Size of lines going to pressure sensors

Response

The lines to pressure sensors are typically stainless steel, 3/8 inch OD lines with 0.065 inch walls.

7. What does the reactor coolant bypass line manifold for the temperature sensors look like?

Response

See drawing 583F499, Sub 2, attached.

8. How are display temperatures and protective temperatures derived from the sensors for T_{hot}, T_{cold}, ΔT, T_{avg}, etc.

Response

WCAP-7913, referenced in Section 7.2 for information only, describes how the necessary control and protective temperature information is derived from the sensors in a manner that assures non-interaction between control and protection functions.

9. Status of NRC Review of WCAP-7488

Response

WCAP-7488, "Solid State Protection System," has been reviewed and approved by the NRC for all applications having designs with similar functional requirements for reactor protection.

10. Figure 7.2-1, sheet 4. What do notations X>7%, etc. signify?

Response

All notes such as that shown on the subject sheet, X>7%, X>10%, etc., are internal notations which have no functional relationship to the logic diagrams. These notations will be deleted the next diagram submittal for the Byron/Braidwood FSAR - Chapter 7.

11. Revisions of Logic Diagrams, Fig. 7.2-1

Response

The logic diagrams of Figure 7.2-1 in the FSAR have not yet been updated to agree with the corresponding logic diagrams currently in effect. The FSAR will be amended at the earliest opportunity to delete reactor trip on loss of feedwater flow, for example, and incorporate other revisions.

12. Does a trip on undervoltage trip the reactor coolant pump as well as the reactor?

Response

No. Only the reactor is tripped on undervoltage.