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March 31, 1981

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
Seismic Analysis
NRC Docket Nos. 50-454/455/456/457

References (a): January 2, 1981 letter from Robert L. Tedesco to J. S. Abel

Dear Mr. Denton:

This is to provide an outline of Commonwealth Edison's proposed seismic reassessment program for Byron and Braidwood. This program is being undertaken as a result of discussions with the NRC Staff in regard to FSAR question 130.06 transmitted in reference (a).

Attachment A to this letter discusses our program for seismic reassessment of the safety related main plant structures. Attachment B covers evaluation of the seismic margin in the systems, equipment, and components necessary for safe shutdown and cooldown. Attachment C describes the manner in which these reviews will consider interactions with non-seismically qualified systems, components and equipment.

We understand that the NRC Staff wishes to review this program before a significant committment of engineering manpower is made to the project. Please contact me if additional information is needed.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator
Pressurized Water Reactors

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Attachment A

Commonwealth Edison Company will perform a reassessment of the Byron and Braidwood plants' safety related main plant structures. The purpose of this reassessment is to identify structural areas that are overstressed in comparison to the Marble Hill design. The Marble Hill plant is being used as a comparison because its structural design utilized the Regulatory Guide 1.60 spectra and because the plant design replicates the design of the Byron and Braidwood plants in sufficient degree to justify the use of the Marble Hill design for the basis of the reassessment.

Based on the Marble Hill design the stress level in structural elements unique to Marble Hill as compared to Byron and Braidwood will be identified. This identification process for unique structural elements will be performed by comparing structural steel member properties and reinforced concrete member properties between the Byron and Marble Hill projects.

For those elements governed by safe shutdown earthquake (SSE), the stress levels will be reassessed using the average actual material strength. Reassessed elements with an SSE stress level less than or equal to 1.20 of yield limit but below the ultimate limit will be considered acceptable due to the localized nature of these stresses. Elements exceeding this stress level will be reviewed on a case basis to determine their impact on the safe shutdown of the plant.

Attachment B

Commonwealth Edison Company will perform an evaluation of systems, equipment and components necessary for safe shutdown and cooldown of the Byron and Braidwood plants. The purpose of this evaluation is to determine that margin exists in the design to accomodate a seismic event as defined in Regulatory Guide 1.60 accompanied by a loss of offsite power event. The evaluation will be done with the Marble Hill plant safe shutdown earthquake (SSE) spectra as the basis for seismic input. The Marble Hill spectra meets the guidelines of Regulatory Guide 1.60 and the plant design replicates the design of the Byron and Braidwood plants in sufficient degree to justify the use of the spectra for basis of our evaluation.

The margin factor to be calculated for this evaluation is defined as the ratio of allowable stress/load to the total combined stress/load, as discussed in the sections below. Damping values used will be as specified in Regulatory Guide 1.61 for SSE.

The systems to be considered in this evaluation are listed in Table I. Representative samples of portions of these systems and the associated equipment and components will be selected to be evaluated to determine the existing margin factor. The process of selection is described in the sections below.

Acceptable design margin is defined as a margin factor greater than unity. Unacceptable margins will be evaluated and resolved.

PIPING AND PIPING SUPPORTS

Selected portions of fluid systems will be evaluated to determine the margin factor. The total combined stress of the system piping will be calculated based on the Marble Hill spectra. The sample will include pipe sizes and wall thicknesses that bracket the entire range for the systems listed in Table I. The sample will be biased toward elevated temperature systems due to the thermal stress component in the combined total stress. Selected subsystems will be representative of all elevations of the auxiliary and containment buildings where the piping systems of Table I exist. The margin factor is defined as the ratio of code allowable stress to total combined stress.

Piping supports associated with the sample systems selected above will also be evaluated. Piping support load carrying capability will be compared against the manufacturers' load capacity data sheets. In the case of the supports, the margin factor is defined as the ratio of manufacturers' allowable load to total load.

CONDUIT, CABLE TRAYS AND SUPPORTS

Representative portions of the conduit and cable tray systems which support the systems listed in Table I will be selected and evaluated to determine the margin factor with the Marble Hill spectra. Selected portions will include all elevations in the auxiliary building and containment where these systems exist. Particular emphasis will be placed on the upper above grade levels of the auxiliary building which contain the bulk of the cable tray and conduit systems. The margin factor is defined as the ratio of allowable load to total load.

HVAC DUCTWORK AND SUPPORTS

Representative sections of HVAC ductwork listed in Table I will be selected and evaluated based upon buckling considerations. Ductwork supports will be selected for evaluation based upon the highest loadings for the existing analyses. In the case of both the ductwork and supports, the loads will be calculated using a ratio of the existing Byron/Braidwood spectra to the Marble Hill spectra. The margin factor is defined as the ratio of allowable load to total load.

MECHANICAL, ELECTRICAL EQUIPMENT AND INSTRUMENTATION

Selected components which are representative of mechanical, electrical and instrumentation components in the systems listed in Table I will be evaluated. Components that represent those qualified by both test and analyses will be selected. The selected sample will include pumps, tanks, heat exchangers, valves, switchgear, control panels, motors and diesels. Existing seismic test or analyses will be used to determine the margin factor with the Marble Hill spectra. Where necessary the equipment vendor will be involved in determining the margin factor. The margin factor is defined as the ratio of allowable stress to total stress.

Attachment B

TABLE I

LIST OF SYSTEMS REQUIRED FOR SAFE SHUTDOWN AND COOLDOWN

A. Piping Systems

1. Main steam system from steam generator to main steam line isolation valve
2. Main feedwater system from containment isolation valve to steam generator
3. Auxiliary feedwater system
4. Emergency diesel generator and diesel fuel oil transfer system
5. Component cooling system
6. Essential service water system
7. Makeup and letdown systems
8. Borated water systems
9. Residual heat removal system from RCS
10. Reactor coolant system

B. Ventilation Systems

1. Diesel driven auxiliary feedwater pump
2. Control room
3. ESS switchgear room
4. Battery room
5. Emergency diesel generator room
6. Containment fan coolers
7. RHR pump room
8. Auxiliary building supply and exhaust
9. Essential service water pump room
10. Centrifugal charging pump room

ATTACHMENT C

Commonwealth Edison Company will conduct a review of the systems listed in Table I of Attachment B to determine and evaluate seismically induced interactions between non-seismically qualified systems, equipment and components and those required for safe shutdown and cooldown of the Byron and Braidwood plants. The review will include only seismic induced interaction and is not intended to include other types of interaction due to floods, pressurization or the like unless these types result from a seismic event.

For purposes of this review a target item is a system, component or piece of equipment which is required for safe shutdown and cooldown of the plant. A source item is an item that is not seismically qualified. The target items will be reviewed in relation to their location in the existing fire zones, where appropriate.

The review will incorporate both in-office evaluations and field walkdowns to identify potential interactions. Potential undesirable interaction effects will be evaluated and plant modifications will be implemented, if warranted. All potential interactions will be documented, resolved and the resolution identified in the final report.