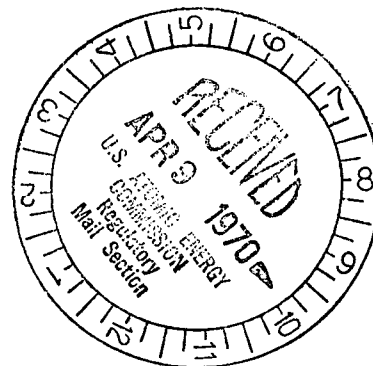


JOHN A. BLUME & ASSOCIATES, ENGINEERS  
612 HOWARD STREET • SAN FRANCISCO, CALIFORNIA 94105 • (415) 397-2525

JOHN A. BLUME  
ROLAND L. SHARPE  
JOSEPH P. NICOLETTI  
DONALD M. TEIXEIRA  
JAMES M. KEITH  
LLOYD A. LEE

April 3, 1970



Mr. Edson G. Case, Director  
Division of Reactor Standards  
U. S. Atomic Energy Commission  
Washington, D.C. 20343

Contract No: AT(49-5)-4011  
Blume Project No: 2085511  
Subject: Oconee Nuclear Station Units 1, 2, and 3  
Duke Power Company  
Docket Nos. 50-269, 270, 287

Dear Mr. Case:

In accordance with your request, we have reviewed two Babcock & Wilcox Topical Reports, BAW-10008, Part 1, "Reactor Internals Stress and Deflection Due to Loss-of-Coolant Accident and Maximum Hypothetical Earthquake," and BAW-10008, Part 2, "Fuel Assembly Stress and Deflection Analysis for Loss-of-Coolant Accident and Seismic Excitation."

Our opinion in general has been discussed with members of the DRL staff. Attachment A presents a more specific listing of our comments and questions with regard to the adequacy of the analyses.

Very truly yours,

JOHN A. BLUME & ASSOCIATES, ENGINEERS

*Roland L. Sharpe*  
Roland L. Sharpe  
Executive Vice President

RLS:nlk

Enclosure

RECEIVED

1970 APR 9 AM 10 12

U.S. ATOMIC ENERGY COMM.  
FEDERAL GOVERNMENT  
MAIL & RECORDS SECTION

ATTACHMENT A

SEISMIC REVIEW

OCONEE NUCLEAR STATION UNITS 1, 2, AND 3

DUKE POWER COMPANY

(Docket Nos. 50-269, 270, 287)

The following is a list of comments and questions resulting from a review of two Babcock & Wilcox Topical Reports: BAW-10008, Part 1, "Reactor Internals Stress and Deflection Due to Loss-of-Coolant Accident and Maximum Hypothetical Earthquake," June, 1969; and BAW-10008, Part 2 "Fuel Assembly Stress and Deflection Analysis for Loss-of-Coolant Accident and Seismic Excitation," October, 1969.

BAW-10008, Part 1

1. Section 1: It is stated that both time-histories and response spectra are used as input to the seismic analyses. Please provide a copy of the spectra used in the analysis, and comparisons of this spectra and the response spectra from the time-history with the OConee response spectra.
2. Section 1: Please discuss the applicability of the design ground response spectra at the support of the reactor vessel. How were possible modifications of the spectra due to soil-structure interaction effects accounted for in the design.
3. Section 2: It is stated that horizontal accelerations of 0.25g and vertical accelerations of 0.16g were applied to the internals. Are these accelerations actually applied "to the internals" or are they used as input to the model of the reactor vessel and internals? This statement seems to imply that a static approach is employed rather than a dynamic approach. If this is so, justify the approach.
4. Par. 3.1.4: It is stated that the core contacts the upper grid during a LOCA. The size of the gap is not stated nor is there any explanation of how the impact is considered in the analysis. The results

shown indicate a smooth response with no indication of impact effects. Please explain in detail how this analysis was performed.

5. Par. 3.1.5: Explain what is meant by "appropriate dynamic load factors." How were they derived and applied in the analysis? How were the reactor vessel and internals analysed for the LOCA pressure load? How was this load applied to the model of the reactor vessel and internals?
6. Par. 3.1.6.2: Describe and present the results of the investigations leading to the selection of the nine-mass model shown in Figure 22. Show that the nine-mass model adequately represents the behavior of the physical system.
7. Par. 3.1.6.2: Please justify the decoupling of the reactor vessel from the remainder of the nuclear steam system (steam generators, piping, etc.).
8. Please describe in detail (including equations) the analytical techniques used in both the LOCA and seismic analyses. It is not clear whether digital or analog techniques were used, where the time-history or response spectrum methods were used, or when linear or non-linear analyses were used.

BAW-10008, Part 2

1. Par. 4.1.2: Please describe and present the results of the detailed investigations leading to the selection of the nine-mass model shown in Figure 5 for the "first segment." Show that it adequately represents the behavior of the physical system. Please justify the decoupling of the reactor vessel from the remainder of the nuclear steam system (steam generators, piping, etc.).
2. Par. 4.1.3: Please describe in detail the non-linear analysis performed. What assumptions were made and how do these relate to the physical system?

- 14
3. Par. 4.1.3: The curve labeled "El Centro" in Figure 6 does not appear to be the spectrum of the El Centro earthquake but the Ocone design spectrum. Please clarify.
  4. Par. 4.1.4: Show a diagram of the model used for the "second segment." Show how the input forces and motions were applied for both the LOCA and earthquake.
  5. Par. 4.2: It is not clear how the mathematical model is shown in Figure 7 relates to the physical system shown in Figure 2. Please explain in more detail.
  6. Please describe in detail (including equations) the analytical techniques used in both the LOCA and seismic analyses. It is not clear whether digital or analog techniques were used, where the time-history or response spectrum methods were used, or when linear or non-linear analyses were used.

RECEIVED

1970 APR 9 AM 10 12

U.S. ATOMIC ENERGY COMM.  
RECORDS DIV.  
MAIL & RECORDS SECTION