TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

April 8, 1986

BLRD-50-438/84-43
BLRD-50-439/84-39

U.S. Nuclear Regulatory Commission
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear D. . Grace:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - DEFICIENCY IN OVERLAP MODELING TECHNIQUES - BLRD-50-438/84-43, BLRD-50-439/84-39 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector P. E. Fredrickson on August 1, 1984 in accordance with 10 CFR 50.55(e) as NCR BLN CEB 8412. This was followed by our interim reports dated August 28, 1984 and March 19, 1985. Enclosed is our final report.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. A. Domer

R. L. Gridley
Manager of Licensing

Enclosure
cc: Mr. James Taylor, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center (Enclosure)
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
DEFICIENCY IN OVERLAP MODELING TECHNIQUES
NCR BLN CEB 8412
BLRD-50-438/84-43, BLRD-50-439/84-39
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

TVA has identified that the Bellefonte Nuclear Plant (BLN) MA-3 Rigorous Analysis Handbook (RAH) was deficient in overlap modeling techniques before March 15, 1984. (Part of Unresolved Item 390/82-27-09, Watts Bar Nuclear Plant.) The aforementioned procedure, section P-2, does not meet NUREG/CR-1980 in that: seismic response spectra of two or more problems being overlapped were not required to be enveloped and support loads in the lap region were enveloped but were not increased by ten percent.

A similiar condition was reported on Watts Bar Nuclear Plant as NCR WBN CEB 8221 (CDR # 390,391/83-03). Other TVA plants are not affected by this condition.

The apparent cause of this deficiency stemmed from two conditions: (1) the Bellefonte MA-3 handbook, section P-2, was written in 1978 in accordance with a previous NRC recommendation (NUREG/CR-1980 did not exist at the time) and (2) lack of understanding by the analysis section that all deviation from the techniques defined in the rigorous analysis handbook must be addressed and documented as acceptable.

Safety Implications

The use of nonconservative analyses in the design of seismic piping supports could result in inadequate support designs and installations. Therefore, if this condition had remained uncorrected, the safe operation of the plant could have been adversely affected.

Corrective Action

All analysis problems have been reviewed and those deficient in overlap modeling have been identified (50 problems). Approximately 50 percent of these problems will only require a documentation change, and the remainder will require reanalysis. To date, 12 problems have been corrected. Support redesign and rework may be required for those problems which require reanalysis.

All action to correct the deficient condition for units 1 and 2 will be complete six months before fuel loading of the respective unit.

The Rigorous Analysis Handbook was revised to incorporate the modeling technique reflected in NUREG/CR-1980. Analysts and checkers were notified of the new modeling technique and also of the requirement that any exception to the RAH requirements must be addressed and documented as acceptable. Also, with the implementation of Office of Engineering Procedures (OEPs) in June 1985, TVA employees were trained in the requirement to document exceptions as governed by Office of Engineering Procedure (OEP) -10, Review. This completes the action required to prevent recurrence.