



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO MARK 1 CONTAINMENT LONG-TERM PROGRAM

POOL DYNAMIC LOADS REVIEW

GEORGIA POWER COMPANY

DOCKETS NOS. 50-321 & 366

1.0 INTRODUCTION

In July 1980, the staff issued a report, NUREG-0661, "Safety Evaluation Report, Mark 1 Containment Long-Term Program," to address the NRC acceptance criteria for the Mark 1 containment Long-Term Program, which are intended to establish design basis loads that are appropriate for the anticipated life of each Mark 1 BWR facility, and to restore the originally intended design safety margins for each Mark 1 containment system.

Since the issuance of NUREG-0661, the Mark 1 owners submitted additional reports in which they provided additional justification for the adequacy of: (1) the data base for specifying torus wall pressure during condensation oscillations; (2) the consideration given to asymmetric torus loading during condensation oscillations; and (3) the effect of fluid compressibility in the vent system on pool-swell loads. As a result of the staff's and its consultant's (Brookhaven National Laboratory) evaluation of these reports, Supplement 1 to NUREG-0661, dated August 1982, has been issued.

2.0 EVALUATION

Georgia Power Company submitted a Plant Unique Analysis Report (PUAR) on the pool dynamic loads for the E. I. Hatch Nuclear Plant Units 1 and 2 Mark 1 containments. This report provides a description of the specific application of the generic Mark 1 pool dynamic loads and methods for the Hatch Plants and the plant unique loads used in assessing the capability of the containment and components to accommodate the pool dynamic loading phenomena. The Brookhaven National Laboratory (BNL) was contracted to review the PUAR for compliance with the staff's acceptance criteria and to evaluate the acceptability of any proposed alternative load specification.

A summary of the BNL review and status for each of the pool dynamic loads is presented in the attached report titled "Technical Evaluation of the Hatch (Units 1 and 2) Plant Unique Analysis Report." As indicated in the report, Georgia Power Company has adopted all but a few of the generic criteria. For those few exceptions alternative criteria were proposed. The BNL evaluation of these criteria is included in the attached report. Based on its review, the staff endorses the BNL evaluation and conclusion.

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torus attached piping at the Hatch Units 1 and 2. Areas covered by the report include the torus shell, external support system, vent header system, internal structures, torus attached pipings, SRV lines and vent pipe penetrations. The materials, design and fabrication requirements of the modifications were in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Division 1, Section III with Addenda through Summer 1977 and Code Case N-197, "Service Limits for Containment Vessels".

Modifications were performed in accordance with the requirements of Section XI of the same code. To determine the appropriate code allowable service limits for the specified loading combinations, the report followed guidelines of NUREG-0661 and the GE report, NEDO-24583-1, "Mark 1 Containment Program Structural Acceptance Criteria Plant Unique Analysis Application Guide." The portion of the report applicable to loadings and loading combinations was audited by BNL, and results of that audit are discussed in a separate Safety Evaluation.

Using the properly determined loadings and loading combinations, Bechtel employed the computer programs NASTRAN and SUPERPIPE as the major tool to perform the analyses. These programs have been used widely in the industry and have been approved by the NRC. Results of the analyses were summarized to show that modifications are adequate under various loading combinations.

The adequacy of the modified containment structures and torus attached piping was audited by the FRC. FRC developed audit procedures for all Mark 1 long-term program users, which is described in detail in the FRC TER-C5506-308, "Audit Procedures for Mark 1 Containment Long-Term Program - Structural Analysis." The review performed by FRC followed this document closely. Results and conclusions of this effort were reported in FRC TER-C5506-329 "Audit for Mark 1 Containment Long-Term Program-Structural Analysis for Operating Reactors-Georgia Power Company, E. I. Hatch Nuclear Plant Units 1 and 2." The audit verified analyses by examining mathematical models and loading combinations used, and summarized the results to see whether the modifications met the required criteria. A check list was compiled to ensure the completeness of the auditing. The staff has reviewed the FRC report and concurs with its conclusions that the modifications meet the Mark 1 Containment Long-Term Program objective. An augmented fatigue evaluation method for ASME Code Class 2/3 piping was developed by MPR for GE in MPR Report-751, titled, "Augmented Class 2/3 Fatigue Evaluation Method and Results for Typical Torus attached on SRV Piping System", dated November 1982. This report was reviewed by the staff and the conclusion that all torus piping systems have a fatigue usage of less than 0.5 during the plant life is acceptable for the Hatch Units 1 and 2.

3.0 CONCLUSIONS

The modifications performed at the E. I. Hatch Nuclear Plant Units 1 and 2 followed the guidelines of NUREG-0661 and its supplement and met the respective requirements of Sections III and XI of the ASME Boiler and Pressure Vessel Code and are therefore acceptable. Georgia Power Company analyses have been verified by the FRC audit and approved by the staff under the LOCA and SRV discharge loads.

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Date: January 25, 1984

Attached: TER prepared by
Franklin Research Center,
dated September 27, 1983.