

D. O. Foster
Vice President and General Manager
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April 2, 1984

Mr. Harold R. Denton
Director, Office of Nuclear
Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

File: X6AB01
X6BB06
Log: GN-337

- References: (1) Letter from D. O. Foster (GPC) to H. Denton
(NRC) dated September 26, 1983 (Log: GN-261)
- (2) Letter from D. O. Foster (GPC) to H. Denton
(NRC) dated October 25, 1983 (Log: GN-267)

NRC DOCKET NUMBERS 50-424 AND 50-425
CONSTRUCTION PERMIT NUMBERS CPPR-108 AND CPPR-109
VOGTLE ELECTRIC GENERATING PLANT - UNITS 1 & 2
ALTERNATIVE PIPE BREAK DESIGN CONSIDERATIONS

Dear Mr. Denton:

On September 26, 1983 Georgia Power Company (GPC) provided you with advanced notification of our intent to file a request and provide justification for the application of alternative pipe break design criteria on the Vogtle Electric Generating Plant (VEGP) Units 1 and 2 (Reference 1). On October 25, 1983 GPC requested your approval to eliminate postulated longitudinal and circumferential breaks in the reactor coolant system (RCS) main loop piping and associated dynamic effects from design consideration (Reference 2). Technical justification for elimination of these breaks was provided based on the application of plant specific advanced fracture mechanics technology, which supports the leak-before-break concept, and the availability of the installed reactor coolant pressure boundary leak detection system, which satisfies the requirements of NRC Regulatory Guide 1.45.

Subsequent to GPC's request, the NRC issued Generic Letter 84-04 which summarized the results of the staff's review of the Westinghouse fracture mechanics analysis as a basis for elimination of asymmetric blowdown loads and resolution of Unresolved Safety Issue (USI) A-2. In this generic letter, the NRC concluded that, with respect to USI A-2, the generic Westinghouse fracture mechanics analysis provided an acceptable basis for the elimination of discrete RCS main loop pipe breaks and associated asymmetric blowdown loads, and that this generic work, in conjunction with plant specific analyses, provided an adequate basis for the application of alternative pipe break criteria to Westinghouse PWRs,

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such as VEGP. Generic Letter 84-04 also indicated that in order to obtain NRC concurrence with the proposed application of alternative pipe break criteria, it was necessary to request an exemption to General Design Criterion (GDC) 4. This letter constitutes GPC's request for the required exemption.

Pursuant to 10 CFR 50.12(a), GPC hereby applies, in connection with Construction Permit Numbers CPPR-108 and CPPR-109 for an exemption from the provisions of 10 CFR Part 50, Appendix A, GDC 4 as it relates to the dynamic effects associated with RCS main loop pipe breaks. The requested exemption is based upon the application of advanced fracture mechanics technology as described in GPC's report MT-SME-3082, dated September 1983, which was transmitted to you in Reference 2.

Specifically, we request the elimination of postulated circumferential and longitudinal breaks in the RCS main loop piping and the associated dynamic effects from consideration in the structural design basis of VEGP. The pipe breaks in the RCS main loop are those identified in Westinghouse Topical Report WCAP 8172. The bases for the requested exemption are as follows:

1. Extensive operating experience has demonstrated the integrity of the RCS main loop piping including the fact that there has never been a leakage crack.
2. In-shop, pre-service and in-service inspection performed on piping for VEGP minimize the possibility of flaws existing in such piping. The application of advanced fracture mechanics has demonstrated that if such flaws exist they will not grow to a leakage crack when subjected to the worst case loading condition over the life of the plant.
3. If one postulates a through-wall crack, large margins against unstable crack extension exist for the stainless steel PWR primary coolant piping when subjected to the worst case loading conditions over the life of the plant.

The application of advanced fracture mechanics technology has demonstrated that small flaws or leakage cracks (postulated or real) will remain stable and will be detected either by in-service inspection or by leakage monitoring systems long before such flaws can grow to critical sizes which otherwise could lead to large break areas such as the double-ended rupture of the largest pipe of the reactor coolant system. To date, use of this advanced fracture mechanics technology has been limited by the definition of a LOCA in Appendix A to 10 CFR Part 50 as including postulated

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double-ended ruptures of piping regardless of the associated probability. Strict application of the LOCA definition, as has been the practice, without applying this advanced technology to large diameter thick-walled piping such as the primary coolant pipes of a PWR imposes a severe penalty in terms of both cost and occupational radiation exposure.

For VEGP, analysis contained in the enclosed safety-balance assessment demonstrate that a nominal occupational radiation exposure savings in excess of 700 man-rem can be achieved over the 40 year life of both units as a result of not installing the protective devices (pipe whip restraints and jet impingement barriers) currently employed in the VEGP design to mitigate the dynamic effects associated with postulated breaks in the RCS main loop piping. As shown in the same analyses, this is to be contrasted with an increase in accidental radiation exposure (to the general public and plant workers) of 1.3 man-rem, which would also result from elimination of the same protective devices.

Accordingly, for design purposes associated with protection against dynamic effects, this exemption from the regulations is requested in order to eliminate the need to postulate circumferential and longitudinal pipe breaks. This exemption request does not affect the containment, the emergency core cooling system, or environmental design bases for VEGP.

It is requested that the exemption authorize, with respect to the plant structural design basis, the elimination of pipe breaks in the RCS main loop and associated dynamic effects. Thus, the use of advanced fracture mechanics would permit a deterministic evaluation of the stability of postulated flaws/leakage cracks in piping as an alternative to the current mandate of overly conservative postulations of piping ruptures. This exemption request is consistent with the provisions of footnote 1 to 10 CFR Part 50, Appendix A, which contemplated the development of "further details relating to the type, size and orientation of postulated breaks in specific components of the reactor coolant pressure boundary."

In support of this request, and in addition to references 1 and 2 and the enclosed safety-balance assessment, your consideration of the following is requested:

1. Letter from Darrell G. Eisenhut (NRC) to E. P. Rahe (Westinghouse) dated February 1, 1984.
2. Memorandum from Darrell G. Eisenhut (NRC) to All Operating PWR Licensees, Construction Permit Holders and Applicants for Construction Permits dated February 1, 1984 - Subject: Safety Evaluation

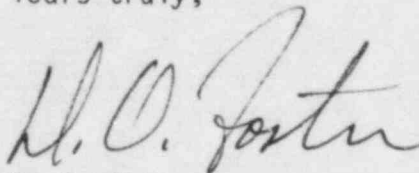
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of Westinghouse Topical Reports Dealing with Elimination of
Postulated Pipe Breaks in PWR Primary Main Loops (Generic Letter
84-04).

3. CRGR resolution of generic issue A-2.
4. ACRS letter dated June 14, 1983, re: "Fracture Mechanics Approach to Pipe Failure".
5. Memorandum from William J. Dircks, EDO, to ACRS dated July 29, 1983, re: "Fracture Mechanics Approach to Postulated Pipe Failure".
6. Memorandum from Harold Denton (NRC) to Murray Edelman (AIF), dated May 2, 1983.

Further, pursuant to 10 CFR 50.12(a), GPC believes the requested exemption will not endanger life or property or the common defense and security and is in the public interest. In order to achieve the early benefits of substantially reduced occupational radiation exposure, and to avoid as much of the purchase and installation costs as possible, we look forward to a reasonable determination and expeditious action on this exemption request.

Yours truly,



D. C. Foster

DOF/vpj

Enclosure: Safety Balance for the Elimination of Reactor
Coolant System Main Loop Pipe Break Protective
Devices, dated March 23, 1984

xc: w/enclosure
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