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P.O. Box 780, M/C F21
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July 2, 1996

MFN# 098-96

RJR 96-080

Mr. R.C. Jones Jr.
Chief, Reactor Systems Branch
Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: **Implementation of Improved GE Steady-State Nuclear Methods**

References: 1) Letter, R. M. Gallo (NRC) to C. P. Kipp (GE), *NRC Inspection Report N0. 99900003/95-01,* March 5, 1996

2) Letter, R. J. Reda (GE) to R.C. Jones (NRC), *GE Fuel Technology Update,* December 12, 1995.

Dear Mr. Jones:

In accordance with the agreement between the NRC staff and GE, this letter is provided to inform the NRC staff that the use of GE's improved steady-state nuclear methods will commence in the fall of 1996. It provides the background for the methods and a roadmap for the implementation of these methods. Both the three-dimensional simulator (PANACEA) and lattice physics (TGBLA) codes have undergone revisions. The improved nuclear simulation package is able to model advanced fuel designs and accommodate spectral mismatch between bundles in a superior fashion to previous versions of the codes. These methods were reviewed during the NRC inspection at GE's Wilmington facility in August of 1995 (Reference 1) and presented to the NRC staff in December 1995 (Reference 2). The NRC inspection team observed that these methods are an improvement over the currently employed methods in every measure of steady-state nuclear model performance. The NRC team concluded that "given that the introduction of the new nuclear models and codes constitutes a major upgrade of GENE's nuclear design methods, the use of the new models as design tools after the first quarter of 1996 is not an unreasonable schedule." The qualification of these new methods also addresses an "observed weakness" in certain aspects of the previous qualification database by expanding the scope of benchmarks versus both analytical standards and live plant data. The proprietary attachment to this letter contains a background of the methods and a synopsis of the improvements.

As was discussed during the inspection, GE has performed calculations to quantify the effect of the change-over on plant dynamic response. Nuclear cross sections, dynamic parameters and state conditions are supplied to the transient analysis codes through the steady-state physics codes. Several plants were analyzed for several different events. Core tracking was performed on these plants using the current version of the steady-state physics codes and the improved version. The initial statepoints for the transients are somewhat different owing to the tracking through several cycles with the improvements in the newer version of the methods.

The results of these analyses are shown in Tables 2 through 4 of the attachment. In summary, the sum total effect of the new initial statepoints for the transients and the change in nuclear parameters on the dynamic response is an average change of 0.004 on the predicted ΔCPR and a change of less than 0.013 ΔCPR in all cases, which is within the range of the resolution of the calculational accuracy. Hence, there is a negligibly small impact of the improved methods on the licensing analysis.

This evaluation was performed utilizing the same application process which will be followed in the change-over to the improved methods. Specifically, to assure that the full time-integrated effect of the improved methods was considered, a part of the plant operating history was simulated. The beginning of these simulations (typically three cycles back) was chosen such that the dominant fuel types now resident were tracked with the improved methods over their entire lifetimes. Where necessary, operation to the end of the current operating cycle was projected using standard licensing analysis procedures. Transient and critical power analyses were then performed in the usual manner and the results compared to the current licensing basis results.

Our implementation plan, following the completion of the code revisions, testing and release, is divided into the completion of three areas followed by an implementation review as follows:

- Address all technical issues related to implementation of the new methods (critical eigenvalue selection, Standby Liquid Control System design margin requirements, etc.),

- Modify all interface computer codes and related databases to retain compatibility with the new methods,

- Revise the technical documentation (Design Procedures, Design Bases and related documents) to provide technical instructions consistent with the new methods,

- Complete an Application Design Review for all process areas which will implement the new methods so as to assure all issues in the above areas have been adequately addressed.

Because of the accuracy benefits associated with the improved methods, the new versions of TGBLA and PANACEA will be implemented in the design and licensing process immediately following the successful closure of the Application Design Review. It is anticipated that this will occur in the fall of this year, 1996.

Considering the staff review of these methods during the August 1995 inspection, **we request prompt concurrence** that, with no further submittal, implementation of these methods are in the best interests of the safe core designs for GE fueled BWRs. We believe that the discussion in your inspection report (Reference 1) represents endorsement of these improved methods and **we will proceed according to our implementation plan unless we hear otherwise.**

Please note that the information contained in the enclosed attachment is of the type which GE maintains in confidence and withholds from public disclosure. It has been handled and classified as proprietary by GE as indicated in the attached affidavit. We hereby request that it be withheld from public disclosure in accordance with provisions of 10 CFR 2.790.

Respectfully yours,

Ralph J. Reda

Ralph J. Reda
Manager, Fuels and Facility Licensing

cc: J. S. Armijo (GE)
W. J. Sependa (GE)
R. C. Stirn (GE)
E. D. Kendrick (NRC)
L. E. Phillips (NRC)

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