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Theodore R. Quay, Director
Standardization Project Directorate
Divison of Reactor Program Management
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Subject: Response to NRC Staff Review of GE's Licensing Topical Report (LTR) NEDE-32176P, "TRACG Model Description" Rev. 1.

Reference: (1) Letter to Theodore R. Quay (NRC) from James E. Quinn (GE), dated February 12, 1996, "Transmittal of GE Proprietary Licensing Topical Report NEDE-32176P, 'TRACG Model Description', Revision 1, dated February 1996"

(2) Letter from Theodore R. Quay (NRC) to James E. Quinn (GE), dated July 5, 1996, "Staff Review of General Electric's (GE's) Licensing Topical Report (LT) NEDE-32176P, 'TRACG Model Description,' Revision 1, Related to Reactor System Area"

(3) Letter from Theodore R. Quay (NRC) to James E. Quinn (GE) dated July 31, 1996, "Staff Review of General Electric's Licensing Topical Report (LTR), NEDE-32176P, 'TRACG Model Description', Revision 1, Related to Containment Area"

(4) Letter to Theodore R. Quay (NRC) from James E. Quinn (GE), dated August 28, 1995, "SBWR - Test and Analysis Program Description, NEDO-32391P, Revision C (Proprietary)"

(5) Letter from Theodore R. Quay (NRC) to James E. Quinn (GE) dated July 11, 1996, "Staff Evaluation of General Electric's (GE's) Test and Analysis Program Description, NEDC-32391, Revision C"

On January 31, 1996, GE submitted Reference (1), Revision 1 of the TRACG Model Description for NRC review. This revision was intended to address the comments and

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questions that were provided as a result of the review of Rev. 0 submitted in 1993. The revision also sought to bring the document into alignment with the evolving NRC and ACRC code review methodology.

In the Reference (2) letter, the Staff concluded that in the Reactor Systems area "...the revised LTR is acceptable for more detailed review at a future date" and that "GE adequately addressed the open issues identified by the staff from the review of Revision O of the LTR. However, the staff identified a few exceptions as discussed in the enclosed report".

In the Reference (3) letter, the Staff concluded that in the Containment Area "in order to accept TRACG containment models, the code will have to go through extensive comparative studies using both experimental data and other containment models." GE agrees with regard to experimental data comparisons This was the purpose of the extensive experimental program conducted in support of the SBWR and the ongoing TRACG Qualification efforts described in the TAPD Revision C document (Reference 4) which was accepted by the NRC in Reference 5. Comparisons have been made both for the short term containment response (PSTF tests) and for the longer term response (GIRAFFE and PANDA tests). These comparisons have not been discussed with NRC, but will be fully documented in the TRACG Qualification Supplement for SBWR, now in preparation. The PANDA tests have demonstrated convincingly that the SBWR containment is robust. The LOCA transient is mild, and there is a large margin to the design pressure. Furthermore, TRACG predictions of the PANDA tests are excellent. In addition:

- GE does not see any merit in comparison with other codes. The basic equations in TRACG are similar to those for subdivided volumes in accepted containment codes such as GOTHIC. We do not know of any containment analysis code which would not be subject to the same reservations made in the Reference 3 letter with respect to TRACG. With regard to the more detailed comments in the Reference 3 Staff letter, GE acknowledges the importance of the drywell mixing, suppression pool stratification and PCC heat transfer phenomena in determining the long term containment pressure and temperature response. Of these, the drywell mixing will be treated in a bounding manner in TRACG. This has been conveyed to the Staff in earlier meetings, and a strategy for the bounding process has been outlined. GE is disappointed that despite several presentations on the suppression pool stratification model and the description in Section 7.11 of the report, the Staff has not yet accepted the proposed approach. It is evident that the empirical model in TRACG for pool stratification is conservative. We would expect furture discussions to lead to Staff acceptance. On PCC heat transfer, the Staff has concurred with the applicability of the models as demonstrated in the full scale PANTHERS comparisons.

- The discussion of the other models is somewhat academic, in that uncertainties in wall friction, flow regimes and interfacial shear in the large containment volumes have negligible impact on the long term response. Wall friction in the PCCs and

horizontal vents is well covered by the experimental data base. The wall heat transfer is a small fraction of the PCC heat transfer and is only important in the long term for scenarios with significant steam leakage from the drywell to the wetwell. The underwater condensation of mixed steam/noncondensible bubbles, and free surface heat and mass transfer are valid concerns which are addressed through comparisons with data and by bounding/sensitivity studies.

In summary, GE believes that its planned completion of TRACG Qualification LTR will fully address the concerns in Reference 2 & 3 and further, that there are no issues in Reference 2 & 3 that cannot be resolved through comparisons with available data and the use of bounding assumptions for steam/noncondensible mixing in the containment volumes.

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