UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENCLOSURE 1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO ACCEPTABILITY OF THE TOPICAL REPORT WCAP-14710(P) "1-D HEAT CONDUCTION MODEL FOR ANNULAR FUEL PELLETS" FOR INCORPORATION IN APPENDIX K LOCA MODELS WESTINGHOUSE ELECTRIC CORPORATION (TAC NO. M99884)

1 INTRODUCTION

In September 1996, the Westinghouse Electric Corporation (W) submitted WCAP-14710(P), "1-D Heat Conduction Model for Annular Fuel Pellets," (August 1992) for Nuclear Regulatory Commission (NRC) review and approval. WCAP-14710(P) describes a proposed model change to the 1-D heat conduction package used to analyze nuclear fuel rods in the W emergency core cooling system (ECCS) Appendix K evaluation models (EMs), which allows for the explicit modeling of annular pellets. Annular pellets are located in the ends of the fuel stack. W developed this fuel type as a means of incorporating more void volume for fission gas accumulation while remaining within the same overall height envelope. Approved versions of the EMs have not had the capability to explicitly model annular pellet geometry. Annular pellets have been modeled as solid pellets, and Westinghouse has implemented a self imposed linear power limit on pellets in the annular blanket regions to account for the inexact representation of the annular pellets. With incorporation of explicit annular pellet modeling into its Appendix K EMs, Westinghouse intends to remove the linear power restriction it had placed on LOCA analyses performed with the EMs.

2 STAFF EVALUATION

The staff reviewed WCAP-14710 to assure continued compliance of W Appendix K ECCS evaluation models with the guidance provided in 10 CFR 50.46 (a)(1)(i) and (ii). In WCAP-14710, W provided a discussion of the proposed model change to the 1-D heat conduction package made to accommodate annular pellets, heat conduction equations used for those pellets, and comparative analyses to show the effects of the explicit modeling of annular pellets.

In the explicit modeling of the annular pellets, the annular geometry is represented and the heat conduction equations are adapted to the geometry for those pellets only, without changing the representation of the heat conduction processes. The staff reviewed the modeling equations and confirmed that their validity was not changed. The staff also reviewed the modeling heat conduction assumptions, particularly the assumption of an adiabatic boundary at the inner annular surface, while referring to the comparative analyses, and concluded that, from a calculated peak cladding temperature standpoint, the assumptions retained conservatism.

According to the CRGR charter, the CRGR should review all staff approvals of topical reports. However, since the methodology described in WCAP-14710(P) does not represent a deviation from the staff position embodied in the requirements of 10 CFR 50.46 and 10 CFR Part 50 (Appendix K), and does not represent an increased burden on, or backfit to, industry, we believe that CRGR review is not necessary.

If you agree that a CRGR review is not necessary, please indicate your agreement by signing below. Otherwise, we shall proceed with preparation of an appropriate CRGR package.

Attachment:
As stated

Brian W. Sheron
Approved: CRGR review is not necessary.

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