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November 4, 1992
C311-92-2138

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Gentlemen:

Subject: Three Mile Island Nuclear Station, Unit No. 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
10 CFR 50.46(a)(3)(ii) Notification
ECCS Evaluation Model Changes

In accordance with the reporting requirements of 10 CFR 50.46(a)(3)(ii), "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors," attached is a summary of changes to the ECCS Evaluation Model for the period December, 1990 through December, 1991. A proposed schedule for providing a re-analysis is not required at this time; however, the analyses will be performed if any additional concerns or changes to the ECCS model arise in the future. This commitment is consistent with that given the NRC by the B&W Owner's Group (BWOG) Analysis Committee.

It should be noted that the ECCS LOCA Limits used in the revised B&W ECCS Evaluation Model were submitted to the NRC by GPUN's Technical Specification Change Request (TSCR) No. 208, dated August 9, 1991 (Letter No. C311-91-2070) for which an approved License Amendment has not yet been issued. However, TMI is operating administratively under the more conservative TSCR limits.

Sincerely,

T. G. Broughton
Vice President and Director, TMI-1

GMG/TGB/gma
Attachment

cc: Region I Administrator
TMI-1 Senior Project Manager
TMI Senior Resident Inspector

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10 CFR 50.46 NOTIFICATION
FOR THE PERIOD
DECEMBER, 1990 - DECEMBER, 1991

1.0 INTRODUCTION

In the period from December, 1990 through December, 1991 one (1) significant error was reported and no minor changes have been made to the B&W ECCS Evaluation Model. This report provides a summary of the evaluations that have been done, and the plant specific inputs which affect LOCA analyses are addressed.

2.0 SIGNIFICANT ERROR NOTIFICATION

Pursuant to 10 CFR 50.46(a)(3), the NRC was notified of the following "significant" error in an input to CRAFT2, one of the computer codes used in the B&W ECCS Evaluation Model:

Notification:

The continued acceptability of the current LOCA LHR limits for both the raised and lowered loop 177-FA plants, despite an error in the core crossflow model inputs to the CRAFT2 computer code.

Disposition:

The NRC was notified of the core crossflow error in the CRAFT2 input model in September, 1991 (Reference 1). The error resulted in the core crossflow paths being modeled incorrectly for all evaluations, except for the 6-foot elevation, in the analyses defining the current beginning-of-life (BOL) LHR limits for all 177-FA plants. A lowered-loop LOCA analysis performed at the 4-foot elevation with the corrected input resulted in a PCT that remained below the 2200F limit, but the change was greater than 50F, and thus required an NRC notification. A B&W evaluation of the error concluded that the previously accepted LHRs remain conservative despite the crossflow modeling error. This conclusion was based on the temperature decrease calculated with fuel data input from TACO3. As a result of this evaluation, LHRs were not changed.

The BWOOG has no immediate plan to provide re-analysis of the LOCA LHR limits correcting the input error. The peak cladding temperatures associated with the current LOCA LHR limits were shown to be conservative, accounting for the input error correction and TACO3, such that 10 CFR 50.46 and Appendix K requirements are met. Additionally, it is expected that the B&W 177-FA plants will be transitioning to the Mk-B9, or later, fuel design over the next few cycles. The analyses supporting the Mk-B9 fuel do not contain this input error.

Reference:

1. Letter to Dr. T. E. Murley, USNRC, from Mr. J. H. Taylor, B&W, "LOCA LHR Limits for 177-FA Lowered Loop and Raised Loop Operating Plants," JHT/91-142, dated September 3, 1991.

3.0 TMI-1 PLANT SPECIFIC LIMITS

3.1 6-foot LOCA LHR Limit (Reference 3.1)

The 6-ft LOCA LHR Limit was reduced from 16.6 Kw/ft (0 to 1000 MWd/mtU) and 18.0 kW/ft (after 1000 MWd/mtU) to 16.1 kW/ft to gain additional margin to 2200F for the Mk-Bz fuel, due to the metal-water reaction (References 3.2 and 3.3). To ensure that the estimated reduction was adequate, a set of LOCA analyses was performed using the modified FLECSSET code and fuel input from the TACO2 code. The results showed that for an LHR of 16.1 kW/ft at the 6-ft elevation, the PCT remained below the limit of 2200F.

3.2 LHR Increases at the 2-ft and 4-ft Elevations (Reference 3.4)

The BOL LOCA LHR limits at the 2-ft and 4-ft core elevations are 14.5 and 16.1 kW/ft, respectively. At a burnup corresponding to 1000 MWd/mtU, the 2-ft LHR limit is increased to 15.5 kW/ft and the 4-ft LHR limit is increased to 16.6 kW/ft. The increased LHR limits were extrapolated from the BOL limits. A set of time in life LOCA analyses were performed to verify these LHR increases. The analyses used the approved ECCS fuel input code, TACO3, and the Mk-B8 fuel design.

The LOCA analyses verified that the current LHR increases at the 2-ft and 4-ft elevations are acceptable from 1000 MWd/mtU to a burnup corresponding to a pin pressure of 2200psia. Beyond this time in life, the LHR is reduced to maintain the pin pressure below the RCS pressure, the current TACO3 SER internal pin pressure restriction.

3.3 4-ft LOCA LHR Limit (Reference 3.5)

The 4-ft LOCA LHR limit of 16.1 kW/ft was re-evaluated using the revised fuel pin performance code, TACO3. The previous, generic 4-ft analysis at 16.1 kW/ft, using TACO2 fuel data, resulted in a PCT of 2160F. To allow for continued justification of plant parameter variations, the approved TACO3 fuel performance code was used to re-evaluate the 4-ft case. The analyses resulted in a PCT below the limit of 2200F, thus confirming the 4-ft LHR limit of 16.1 kW/ft. This analysis was later revised because of the discovery of a core crossflow modelling error in the CRAFT2 inputs, as discussed in the generic portion of this letter.

References:

- 3.1 B&W Document 32-1177157-01, "FLECSSET Impact on BZ Fuel."
- 3.2 B&W Document 51-1174782-00, "Mk-BZ ECCS LOCA Limits."
- 3.3 B&W Document 51-1202151-00, "TMI-1 Cycle 9 ECCS Reload."
- 3.4 B&W Document 32-1200400-00, "2- and 4-ft Time in life Study."
- 3.5 B&W Document 86-1201110-00, "LOCA with TACO3 4-ft 16.1 kW/ft."