AmerGen Energy Company, LLC
200 Exelon Way
Suite 345
Kennett Square, PA 19348

www.exeloncorp.com

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10 CFR 50.90

June 11, 2003
5928-03-20101

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Response To Request For Additional Information – Technical Specification Change Request No. 316, Cycle 15 Core Reload Design (TAC NO. MB7270)

Three Mile Island, Unit 1 (TMI Unit 1)
Facility Operating License No. DPR-50
NRC Docket No. 50-289

This letter provides additional information in response to NRC request for additional information dated May 21, 2003, regarding TMI Unit 1 Technical Specification Change Request No. 316, submitted to NRC for review on January 16, 2003. The additional information is provided in Enclosure 1.

No new regulatory commitments are established by this submittal. If any additional information is needed, please contact David J. Distel (610) 765-5517.

I declare under penalty of perjury that the foregoing is true and correct.

Very truly yours,

6-11-03
Executed On

Ron J. DeGregorio
Vice President Operations Support
Mid Atlantic Regional Operating Group
AmerGen Energy Company, LLC

Enclosure: Response to Request for Additional Information

cc: H. J. Miller, USNRC Administrator, Region I
T. G. Colburn, USNRC Senior Project Manager, TMI Unit 1
C. W. Smith, USNRC Senior Resident Inspector, TMI Unit 1
File No. 02070

A001

ENCLOSURE

TMI UNIT 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
TECHNICAL SPECIFICATION CHANGE REQUEST No. 316
CYCLE 15 CORE RELOAD DESIGN

1. **NRC Question**

As discussed in the NRC staff's letter dated March 24, 1993, that transmitted the Safety Evaluation for Topical Report BAW-10187P-A to Framatome ANP, the topical report is acceptable for referencing in license amendment applications to the extent specified, and under the limitations delineated in the report, and in the associated safety evaluation. Page 4 of Enclosure 1 of your submittal states that the restrictions specified in the approved topical report have been addressed in the core reload design analysis for TMI-1.

Please provide the information needed to justify your plant-specific application of this methodology by identifying any TMI-1 features or conditions outside the range of the generic assessment. Refer to Table 3-4 of BAW-10187P-A that specifies the range of applicability.

Additionally, the hot pin statistical design limit of 1.313 is acceptable with the following limitations. Please provide justification for your plant-specific application of this methodology.

a. The component uncertainties and their distributions are to be reviewed on a plant-specific basis to determine their applicability.

b. The "bounding" assembly-wise power distribution assumed in the core-wide SCD calculation should be shown to bound the expected operating power distributions on a cycle-specific basis.

c. All core state variables that were not included in the statistical design must continue to be input to thermal-hydraulic computer codes at their most adverse allowable level rather than at their nominal value.

d. The response surface model should be validated and revised (as necessary) when applied to new fuel assembly designs and extended operating conditions, and with new computer codes and DNB correlations. The approved codes are LYNXT, LYNX1, and LYNX2, and the approved correlation is the BWC DNB correlation.

Response

For each reload cycle design, AmerGen formally provides a detailed list of Cycle Design Inputs and Requirements (CDIR) to Framatome ANP. As part of the reload design process, Framatome verifies the applicability of the Statistical Design Limit (SDL) basis by assuring the cycle-specific state parameters and uncertainty parameters (i.e., Tables 3-4 and 3-6 of BAW-10187P-A for TMI Unit 1) are bounded by the parameters used in the development of the Statistical Core Design (SCD) Response Surface Model (RSM)

and the SDL calculation. AmerGen confirms consistency between the CDIR and Framatome's reload licensing calculations during a design review of Framatome's reload licensing documentation, prior to final release of the cycle Reload Report.

In the event that state parameters and/or uncertainty parameters for a reload are outside the range of values considered in the development of the RSM and calculation of the SDL, the RSM must be validated and revised, as necessary. For the TMI Unit 1 specific application of SCD, the state parameters in Table 3-4 of BAW-10187P-A needed to be extended to cover two conditions:

1. Two RC pump Operation.

   TMI Unit 1 is permitted to operate with two reactor coolant pumps (one RC pump in each loop). Therefore DNB-based safety limits are necessary for two pump operation. As a result the minimum RCS flow rate was extended down to 41% of 375,000 gpm and the rated power was extended down to 54% of 2568 MWt to account for 2-pump operation.

2. Increased Hot Pin Radial Peaking.

   The maximum hot pin radial peaking factor was extended from 1.9 to 2.1 to allow the use of SCD methodology for DNB predictions at statepoint conditions supporting slightly higher radial peaks.

Calculations performed to extend the parameter ranges for these two conditions have validated the application of the Response Surface Model (RSM) and subsequent use of the Statistical Design Limit (SDL) of 1.313.

The application of the SCD methodology for TMI Unit 1 is acceptable with the following requirements stated in the SER for BAW-10187P-A. The justification for the plant-specific application of the methodology is provided below.

a. The component uncertainties and their distributions are to be reviewed on a plant-specific basis to determine their applicability.

   The review of the TMI Unit 1 specific uncertainties has been performed. The plant-specific uncertainties have been compared to the uncertainty allowances, shown in Table 3-6 of BAW-10187P-A, used in the SDL determination. These uncertainties are verified to be bounding and applicable for each reload cycle design. This verification is documented in a reload design calculation supporting the reload report.

b. The "bounding" assembly-wise power distribution assumed in the core-wide SDL calculation should be shown to bound the expected operating power distributions on a cycle-specific basis.

This requirement, as stated in NRC SER dated March 24, 1993 for use of BAW-10187P-A, is associated with the core-wide SDL calculation rather than SCD as documented in the May 21, 2003 Request for Additional Information. Compliance with this requirement assures a proper basis is in place to conclude whether the hot pin SDL (95% protection) continues to bound the core-wide SDL (99.9% protection) for a given fuel cycle design. As long as the hot pin SDL, which is independent of cycle designs, remains bounding, no change is required to the limiting SDL as determined by the analysis-of-record. Examination of cycle-specific core power distributions, including TMI Unit 1 Cycle 15, has concluded the core-wide SDL is bounded by the hot pin SDL.

c. All core state variables that were not included in the statistical design must continue to be input to thermal-hydraulic computer codes at their most adverse allowable level rather than at their nominal value.

   All core state variables not included in the statistical design were input at their most adverse allowable levels in the LYNXT model for DNB predictions supporting the TMI Unit 1 application. An example of the deterministic treatment of this class of variables is the core inlet flow mal-distribution factor application for the limiting hot bundle which is discussed in some detail in Section 6.2.5 of Framatome ANP's safety criteria and methodology Topical Report BAW-10179P-A.

d. The response surface model should be validated and revised (as necessary) when applied to new fuel assembly designs and extended operating conditions, and with new computer codes and DNB correlations. The approved codes are LYNXT, LYNX1, and LYNX2, and the approved correlation is the BWC DNB correlation.

   As noted above, the Response Surface Model (RSM) has been validated for two extended operating conditions for application to TMI Unit 1. The validation concluded that no revision to the RSM was required. The approved LYNXT code and the approved BWC CHF correlation were used for the TMI Unit 1 application. The Mark-B fuel design, for which the RSM has been previously validated, is the only fuel design currently in use at TMI Unit 1.