July 5, 1996

Mr. James Knubel, Vice President
and Director, TMI-1
GPU Nuclear Corporation
Post Office Box 480
Middletown, PA 17057-0191

SUBJECT: THREE MILE ISLAND NUCLEAR STATION - REQUEST FOR ADDITIONAL INFORMATION RELATED TO THERMO-LAG ASSOCIATED AMPACITY DERATING ISSUES, TAC NO. M85615

Dear Mr. Knubel:

By letter dated March 29, 1995, GPU Nuclear Corporation submitted a response to the NRC Request for Additional Information (RAI) related to Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers," for Three Mile Island, Unit 1. The staff, with assistance of its contractor, Sandia National Laboratories, has completed the preliminary review of your response and has identified several open issues and concerns requiring clarification. The enclosure gives details of this RAI. We request that you furnish your responses promptly.

Sincerely,

(Original Signed By)

Jan A. Norris, Senior Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure: RAI

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

THREE MILE ISLAND, UNIT 1

FIRE BARRIER AMPACITY DERATING ISSUES

(TAC NO. M85615)

1) The TMI documentation regarding the Thermo-Lag fire barrier issue is not well organized. It consists of attachments that do not seem to support one another and contains incomplete references which makes the logic of the study difficult to follow. The licensee should resubmit a more coherent package of information that documents all aspects of the analysis, identifies how the various documents are used to support the overall assessment, and includes the cited references required to support its analysis.

2) The licensee's package included a "TSI Derating Study Test Plan." It is not clear that the tests described have been or will be performed. Regarding the tests plan, provide answers to the following questions:

   - Have the tests called for in this plan been performed?
   - If not, will they be performed in the future, and if so, when will the test results be made available for review?
   - If the tests have been performed, provide documentation of the results and describe how the test results have been factored into the TMI ampacity assessment.

3) The Cycle 6 cable sizing criterion does not indicate the basis of ampacity values included in each table. It appears that the licensee did not use the ICEA P-46-426 tables for ampacity values. The licensee should document the source of its base ampacity values including any corrections to the base ampacities due to temperature, cable diameter variation, and number of conductors, etc.

4) The base cable ampacities used by the licensee are not consistent with either NEC or ICEA P-46-426 ampacity tables. The ampacity values should be reconciled or discrepancies between the licensee-cited values and those values documented in nationally recognized standards should be explained.

5) It appears that the licensee used ICEA P-54-440 to determine cable tray ampacity. These calculations lack the documentation of ICEA tables from which the values are derived, method for calculating cable depth or fill, and corrections due to temperature, depth of fill and cable diameter, etc., to the base values.

ENCLOSURE

6) The licensee needs to provide sufficient information regarding the physical and electrical characteristics including manufacturer, number of conductors, cable configuration (e.g., single conductor, three conductor, triplexed, shielded, insulated and jacketed cable, etc.), cable outside diameter, voltage rating, conductor size, etc., of the Thermo-Lag protected cables used at TMI.

7) The documentation of the cable tray 590 temperature measurement experiment is considered inadequate. Test documentation should include the description of the test procedure, documentation of experimental methods and instrumentation, and at least a minimal demonstration of quality control over the experiments. This information should be provided if this, or other in-plant experiments, are to be credited.

8) The licensee has assumed an ampacity derating factor of 28.04 percent for a 1-hour Thermo-Lag cable tray fire barrier. This value does not reconcile with other Thermo-Lag ampacity derating test results using IEEE Standard Procedure P848, "Procedure for the Determination of the Ampacity Derating of Fire Protected Cables." The licensee should reconsider its analysis using more reasonable estimates of the ampacity derating impact of a Thermo-Lag fire barrier system or explain the basis for variation in parameters. (For example, Texas Utilities found a value of 32 percent for a nominal 1-hour Thermo-Lag 330-1 cable tray barrier system.)

9) The licensee did not describe the fire barrier system for trays 551/553. A description of the fire barrier system for these trays should be provided.

10) The licensee's analysis appears to incorrectly interpret the cable tray multiple conductor derating correction to refer to a count of cables rather than conductors in the case of multi-conductor cables (see note 3 of TMI Cycle 6 Tables X and XI). This appears in direct conflict with the guidance of the NEC Handbook which quite clearly indicates that the count should be based on the actual number of power cable conductors. The licensee should reconsider its analyses using the actual count of power cable conductors as the basis for multiple conductor derating.

11) The licensee needs to provide a definitive technical basis to support the assessment of cable ampacity acceptability for those cables which are overloaded over the equipment life cycle. The licensee should indicate what measures will be taken to monitor for signs of accelerated age-related degradation.

12) The constant KVA loads will draw 11 percent more current at 90 percent of rated voltage available at its terminals. Additionally, some loads may operate at overload or at a service factor of 15 percent. Accordingly, the full load current (FLA) could be as high as 125 percent of FLA at nominal voltage. The licensee needs to address this aspect of system operation in its analysis.

13) The maximum load current of transformer (1000/1333 KVA) is based on breaker setting of 185 amperes. Breaker setting has a tolerance of ± 10 percent. As a result the maximum current seen by the cable shall be 203.5 amps (185 + 10 percent). Provide justification why 185 amperes shall be selected instead of 203.5 amperes.

14) The licensee should consider either the load amperes flowing through cables based on breaker setting with a positive 10 percent tolerance (i.e., 110 percent of breaker setting) or the actual amperage of the load in its analysis.

15) Circuits MA9 and MB9 for SR-P-3A and SR-P-3B are both on tray 756. If both A and B pumps are on the same tray, how has the separation criteria been met. Circuits MB13, ME11, and ME10 share both trays 751 and 756. The licensee should provide a discussion on how the analysis is consistent with the cable separation criteria as described in FSAR Section 8.2.2.12.