January 24, 2000

Mr. John B. Cotton
Vice President, TMI Unit 1
AmerGen Energy Company, LLC
P.O. Box 480
Middletown, PA 17057

SUBJECT: TMI-1 - REQUEST FOR ADDITIONAL INFORMATION (TAC NO. MA6312)

Dear Mr. Cotton:

The Nuclear Regulatory Commission (NRC) staff has reviewed your application dated August 20, 1999 (Technical Specification Change Request No. 283), which requested a change to the calibration frequency from refueling to annual for the degraded grid undervoltage relay setpoint and a change to the Technical Specification Bases to reflect that the degraded voltage relay setpoint tolerance is being changed from an "as left" to an "as found" reading.   The staff has determined it will need the additional information identified in the enclosure in order to complete its review. In order for the staff to support your requested review completion schedule, please provide the requested information within 30 days of receipt of this letter. The information in the enclosure and this request and the scheduled response date have been previously discussed and agreed upon with Mr. W. Heysek of AmerGen, and a copy of this letter is being faxed to Mr. Heysek.

If you have any questions, please contact me at (301) 415-1402.

Sincerely,

/RA/

Timothy G. Colburn, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure: Request for Additional Information

cc w/encl: See next page

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Request for Additional Information
Three Mile Island Nuclear Generating Station, Unit 1
Technical Specification Change Request (TSCR) No. 283
Degraded Grid Undervoltage Relay Setpoint Calibration Frequency
and Degraded Voltage Relay Tolerance Revision

1. On page 2 of Enclosure 1 to your August 20, 1999, letter, you state that 3760 V was retained as a basis for calculations, as it proved to be a reasonable compromise between the critical voltage and reset voltage constraints. However, the minimum dropout voltage (3727 V) obtained when that value is used in your calculations results in the need to rely on manual operator action to maintain adequate voltages. In addition, the discussion on page 5 of Enclosure 1 indicates that the 3727V reflects a switchyard voltage of 225.63 kV value that you state is considerably below the minimum voltage criteria of 232 kV cited in TMI-1 SDD-T1-000. In contrast, your old calculation (TDR 995 Revision 1) used a higher switchyard voltage of 229.45 kV that apparently was thought to provide acceptable margin. On that basis, why wasn't a higher setpoint chosen that reflects the originally used higher switchyard voltage of 229.45 kV? This would potentially result in less reliance on operator action. Is the minimum switchyard voltage value of 232 kV quoted in your submittal the current minimum switchyard voltage that you are experiencing? It appears that the discussion of minimum switchyard voltage should be dealing with the maximum pickup value (3806 V) of the relay rather than the minimum dropout value. It is the maximum pickup that determines worst case margin to grid separation vulnerability. Does the use of the maximum pickup value make 229.45 kV an unsuitable switchyard voltage for analysis purposes? What is the switchyard voltage relative to the maximum pickup value of 3806 V? Please provide calculation C-1101-700-E510-010 for our review.

2. With regard to compensatory operator action, the second paragraph on page 5 of Enclosure 1 to your submittal states that TDR 995, Revision 1 (the analysis which was the basis for TSCR No. 203) justified AH-E-29B (Diesel Generator (DG) South Supply Fan) on the basis of compensatory operator action. Further, on the same page, however, it is stated that reliance on operator action in lieu of automatic protection was not explicitly identified in TSCR No. 203. Please clarify whether the reliance on manual operator action is in fact a new requirement under the current proposed amendment (TSCR No. 283) relative to degraded voltage protection. Describe what specific compensatory actions are available to the operator to improve voltage. Have you quantified the voltage improvement each of these would provide? What is the improvement?

3. Your submittal indicates that one of the reasons the nuclear safety-related (NSR) loads that do not receive desired minimum voltage will tolerate the condition is that compensatory measures could be taken within a reasonable period of time. With regard to the Battery Chargers, your submittal states that during the period of low voltage, DC system loads will be supplied by the batteries that have sufficient capacity to supply station loads for at least 2 hours under worst-case conditions. What is the voltage deficit to the battery chargers during this period? Do the battery chargers have low

voltage protection to shut themselves down and protect themselves from the low voltage condition, or might they be damaged by the low voltage? Have the batteries been sized for such a scenario involving unavailability of the chargers? For example, if the batteries are discharging for some period of time following a LOCA, will they have sufficient capacity to then trip and close the necessary circuit breakers if the operators need to transfer the safety loads to the DGs? In most sizing calculations inrush loads are generally taken at the beginning of the load profile, rather than following some period of initial discharge. The DC motor-operated fuel pumps for the DGs might also be operating on the battery if the AC motor fails due to low voltage.

4. With regard to the AC motor-driven DG Fuel Pumps DF-P-1A/C, your submittal states that operation of these motors will be intermittent when the diesel is unloaded as expected in the short term following a LOCA. What is the voltage deficit to these motors during this period? In operating intermittently, do these motors start and stop as demanded, or do they run continuously but are only intermittently loaded as fuel supply dictates? If they start and stop as demanded, have you evaluated the effect of the multiple starts on the motors (with the attendant inrush currents) under the less-than-desired minimum voltages? Provide the results of your evaluation.

5. With regard to the Make-up Pump Gear Oil Pumps MU-P-4A/B/C your submittal states that these pumps provide backup capability for the shaft driven MU-P-5 pumps, and their operation is therefore not required for the MU pumps and the high pressure injection (HPI) system to perform their emergency core cooling system (ECCS) function. What is the voltage deficit to these pumps? Is their backup function limited to providing backup to the shaft driven pumps in case the shaft driven pumps fail; or do they also have another function, such as circulating oil prior to the shaft driven pumps attaining full speed? If they have another function discuss why this function is not necessary for reliable operation of the MU pumps and the HPI system to perform their ECCS function?

6. Your submittal indicates that the minimum dropout setpoint of 3727 V was used to determine the minimum steady state voltage at the terminals of the nuclear safety-related (NSR) equipment. The acceptance criteria for operation of the NSR equipment was based on steady state operation of the equipment. Did you determine whether the safety equipment would start satisfactorily under the initial transient voltage conditions associated with an accident, utilizing the appropriate degraded voltage setpoint? With regard to the safety equipment you identified as not receiving adequate steady state voltage under worst-case conditions, have you determined whether it would start properly under these conditions?

7. You indicated in your submittal that you have alarms set at approximately 92 percent of 460 V, sensed at the unit substation buses. You stated that TMI-1 has continued to use these alarms to alert operators of low voltage conditions. Are these alarms set sufficiently high to alert operators to the potentially low voltage conditions you have identified for the near-term post LOCA?

8. What indications are available to the operator to make low voltage operability calls on the offsite system during plant operation? If an event occurs that results in tripping of the plant, the loss of voltage support to the switchyard in combination with the increased loading of the safety loads will likely result in lower safety bus voltages than is typically

seen during power operation. The alarms on the 480 V unit substations will not necessarily alert the operators to such a condition prior to the trip. Do your operators have the ability to determine when switchyard and plant conditions during operation would result in insufficient post-trip event voltages? This is especially important at TMI because the technical specifications allow operation with one auxiliary transformer out of service for a period of 30 days. To what degree does the TMI-1 generator provide voltage support to the switchyard?

9. As a follow-up to the preceding question, the TMI-1 Technical Specifications require that a DG be run continuously during the period when an auxiliary transformer is inoperable. Is the running DG tied to offsite power during this period? If so, will a plant trip result in an overcurrent condition on the DG? This could be the case when the TMI-1 generator is providing voltage support to the switchyard and its separation from the yard results in a reduction of safety bus voltage.