

August 10, 2005

Mr. Christopher M. Crane  
President and Chief Executive Officer  
AmerGen Energy Company, LLC  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND NUCLEAR STATION, UNIT 1 - ISSUANCE OF  
AMENDMENT RE: EXTENSION OF REACTOR TRIP SYSTEM AND REACTOR  
TRIP DEVICE FUNCTIONAL TEST INTERVALS (TAC NO. MC4903)

Dear Mr. Crane:

The Commission has issued the enclosed Amendment No. 255 to Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit 1, in response to your application dated October 20, 2004.

The amendment revises Table 4.1-1, "Instrument Surveillance Requirements," of the Technical Specifications and associated Bases to extend the functional testing surveillance interval from monthly to a semi-annual interval for reactor trip system instrumentation channels, and from the current monthly to quarterly for the reactor trip devices.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

**\RA\**

Peter S. Tam, Senior Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosures: 1. Amendment No. 255 to DPR-50  
2. Safety Evaluation

cc w/encls: See next page

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**DISTRIBUTION:**

PUBLIC PDI-1 R/F RLaufer PTam MO'Brien  
OGC ACRS GHill(2) TBoyce AHowe IAhmed  
RBellamy, RI DLPM DPR

Accession Number: **ML052010179**

\*SE provided by memo of 7/8/05. No substantive changes made

OFFICE	PD1-1/PM	PD1-1/LA	EEIB/SC	IROB/SC	OGC	PDI-1/SC
NAME	PTam	MO'Brien	AHowe*	TBoyce	KKannler	TColburn for RLaufer
DATE	7/29/05	7/29/05	7/8/05	8/2/05	8/9/05	8/9/05

**OFFICIAL RECORD COPY**

\*Safety evaluation transmitted by memo of 7/8/05.

AMERGEN ENERGY COMPANY, LLC

DOCKET NO. 50-219

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 255  
License No. DPR-50

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by AmerGen Energy Company, LLC, et al., (the licensee), dated October 20, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-16 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A, as revised through Amendment No. 255, are hereby incorporated in the license. The AmerGen Energy Company, LLC shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

**\RA by T. Colburn\**

Richard J. Laufer, Chief, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical  
Specifications

Date of Issuance: August 10, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 255

FACILITY OPERATING LICENSE NO. DPR-50

DOCKET NO. 50-289

Replace the following pages of Appendix A, Technical Specifications, with the attached revised pages as indicated. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

4-2a

4-2b

4-3

4-4

4-7

Insert

4-2a

4-2b

4-3

4-4

4-7

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 255 TO FACILITY OPERATING LICENSE NO. DPR-50  
AMERGEN ENERGY COMPANY, LLC  
THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1)  
DOCKET NO. 50-289

## 1.0 INTRODUCTION

By application dated October 20, 2004 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML042950497), AmerGen Energy Company, LLC (the licensee) requested changes to the Technical Specifications (TSs) for TMI-1. The licensee proposed an extension of surveillance test interval (STI) from the current monthly to a semi-annual interval for reactor trip system (RTS) instrumentation channels, and from the current monthly to quarterly for the reactor trip devices consisting of control rod drive trip breakers, regulating rod power silicon control rectifiers (SCRs), and reactor trip modules.

The proposed amendment is based on Babcock and Wilcox Owners Group (B&WOG) Topical Report BAW-10167A, Supplement 1, "Justification for Increasing the Reactor Trip System On-Line Test Interval," for extending the STI of the RTS instrumentation channels, and BAW-10167A, Supplement 3, for extending STI of the RTS reactor trip devices. Both topical reports were generically approved by the Nuclear Regulatory Commission (NRC) staff for B&W power plants. B&W Nuclear Service Company published these reports, including their respective NRC staff's safety evaluation, in August 1992 and February 1998, respectively. The NRC staff's review of the licensee's application for amendment follows.

## 2.0 REGULATORY EVALUATION

The RTS in a nuclear power plant monitors parameters related to safe operation of the plant and initiates reactor trip to protect the reactor coolant system and the reactor core. As described in the TMI-1 Final Safety Analysis Report, Updated Version (UFSAR), Section 7.1, the TMI-1 RTS includes instrumentation channels, reactor trip modules, and control rod drive trip breakers and regulating rod power SCRs. Four redundant protection channels, each containing process instrumentation trip contacts to form an instrument string and terminating on a trip relay within the reactor trip module, provide two-out-of-four coincidence logic to trip the control rod drive trip breakers and regulating rod power SCRs.

The NRC's regulation at 10 CFR 50.36(c)(3) provides that surveillance requirements (SRs) be included in the TSs. SRs are defined as requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

The current functional test requirement for the RTS instrumentation channels and trip devices is on a monthly basis as specified in the TMI-1 TSs Table 4.1-1. The basis for any safety-related component or system STI is to ensure that the probability of an undetected failure existing within the component or system is small and to reduce the potential for spurious trips which may unnecessarily challenge the plant operators and safety systems. Testing of any RTS component causes a "half trip" of the control rod drives and have potentially resulted in spurious reactor trips. By increasing the test intervals, the risk of spurious trips can be reduced. Also, as shown in the B&W topical reports, the test interval extension is not a significant contributor to RTS unavailability or the risk of core damage. The NRC staff's evaluation will address whether the licensee's proposed changes are consistent with the safety evaluations on BAW-10167A, Supplements 1 and 3, and B&W Standard Technical Specifications (STS, NUREG-1430).

### 3.0 TECHNICAL EVALUATION

The licensee proposed the following changes to TSs Table 4.1-1:

- (1) Extend the STI of the instrument strings from monthly to a semi-annual interval.
- (2) Extend the STI of the reactor trip devices from monthly to a quarterly interval.

The NRC staff reviewed the proposed changes and the justification provided by the licensee for those changes to ensure that the TMI-1 RTS design is representative of the RTS model analyzed in the B&W topical reports and follow the guidance included in the safety evaluation of those topical reports.

#### 3.1 Extending the STI of Instrument Strings

The TMI-1 instrument string consists of eight primary trip channels (power range, reactor coolant (RC) temperature, RC high pressure, RC low pressure, pump flux comparator, flux-RC flow comparator, RC pressure-temperature comparator, reactor building high pressure) and two anticipatory trip channels (loss of feedwater reactor trip and turbine trip/reactor trip).

Per the NRC staff's safety evaluation (SE) on Topical Report BAW-10167A, Supplement 1, the modeling of the RTS for reliability and risk evaluation for the proposed change included both generic B&W RTSs, the "Oconee group" which represents TMI-1 design, and the "Davis Besse Group." These two groups of RTS differ in using SCRs in tripping the safety and/or regulating rods. The SE stated that, although reactor trip breaker (RTB) failures were the dominant effect, the effect of increased RTS instrument string STI on the anticipated-transient-without-scam (ATWS)-induced risk continued to be small and, therefore, acceptable. The SE requested each licensee who references this topical report to confirm that the licensee has reviewed the drift information including as-found and as-left values for each instrument channel involved, and has determined that drift occurring in that channel over the period of the extended surveillance test interval will not cause the setpoint value to exceed the allowable value (AV). In addition, each licensee should maintain onsite records showing the actual setpoint and AV calculations with supporting data that are available for future NRC staff audits. This data should consist of monthly information taken over an extended period of time (approximately 2-3 years), and the setpoint methodology used to derive the safety margins.

The licensee evaluated 3-year drift information including as-found and as-left values for each reactor protection system instrument channel in an instrument string for TMI-1, consistent with the scope of the test interval relief addressed in BAW-10167A, Supplement 1. Based on this evaluation, the licensee established that drift occurring over the proposed semi-annual surveillance test interval will not cause the setpoint value to exceed the allowable values for the instrument channels in an instrument string. Thus, the licensee's surveillance data confirmed that the reactor protection system instrument strings are capable of operating with a semi-annual surveillance test interval without drifting outside of the limits established for a one-month drift. As such, the licensee's proposed test STI extension can be implemented without requiring revision to the existing TS requirement. Therefore, the NRC staff did not review the licensee's setpoint methodology for this amendment request. The licensee stated that the records showing the actual setpoint calculations and supporting data for TMI-1 are available onsite. The licensee further stated that as-found and as-left values will continue to be recorded and reviewed for consistency with the assumptions of the STI extension analysis and to verify that the test results meet acceptance criteria. The licensee further stated that out-of-tolerance results will be evaluated to determine if they meet the requirements outlined in BAW-10167A, Supplement 1.

Based on the above evaluation, the NRC staff finds the licensee's justification for extending the TMI-1 RTS instrument string STI from a 1-month to a 6-month interval sufficient. The proposed STI extension is, therefore, acceptable.

### 3.2 Extending the STI of Reactor Trip Devices

TMI-1 reactor trip devices are comprised of protection channel coincidence logic (called "reactor trip module" in BAW-10167A, Supplement 3), control rod drive trip breaker, and regulating rod power SCRs.

As stated in the NRC SE, the reliability models and data used in BAW-10167A, Supplement 3, for examining the sensitivity of the RTS reliability to reactor trip devices STI are representative of both the Oconee and Davis Besse RTS design groups. The TMI-1 RTS was not included in the reliability model evaluated in BAW-10167A, Supplement 3, because TMI-1 was not represented by the B&WOG on this issue. The topical report justified extending reactor trip devices STI from the current 1-month to a 6-month interval; however, the NRC staff approved a 3-month STI instead of a 6-month interval. The SE stated that the availability of only 5 years of data on RTB failure, since implementation of Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Event," is not sufficient to offset the uncertainties associated with the actual potential RTB failure modes. The SE documented B&WOG's commitment to monitor performance of reactor trip devices and agreement to implement more frequent testing if performance criteria were exceeded.

Although TMI-1 was not represented in the reliability analyses in BAW-10167A, Supplement 3, the TMI-1 reactor trip devices are within the scope of the Oconee RTS design group. The licensee has subsequently performed this analysis for the TMI-1 system using methodology and reliability models described in BAW-10167A, Supplement 3. The analysis results of the incremental change in RTS unavailability (failure/demand) and the net incremental risk is found

to be essentially the same as reported for the Oconee RTS design group in BAW-10167A, Supplement 3, and the STI extension is found to be an insignificant contributor to system unavailability or core damage risk. The licensee evaluated the recent 10 years worth of relevant plant-specific RTB failure-to-trip data to establish RTS unavailability at TMI-1. The licensee reported that only one RTB failure-to-trip incident was identified. In this failure, only the undervoltage (UV) trip device failed during monthly testing of the RTB while the redundant shunt trip device (temporarily bypassed to perform UV device test) was operable to trip the RTB. This demand-related failure rate is consistent with the expected frequency of one UV trip device failure in 11 years assumed in BAW-10167A, Supplement 3. The licensee stated that the failure experience from TMI-1 since publication of the topical report does not contradict any of the assumptions or conclusions of BAW-10167A, Supplement 3, or the NRC's associated SE.

Based on the above evaluation, the NRC staff finds the licensee's justification for extending the TMI-1 reactor trip devices STI from monthly to quarterly sufficient. The licensee's proposed extension is, therefore, acceptable.

### 3.3 Proposed TS Bases Changes

The licensee also proposed to revise the associated TS Bases (contained on Page 4-2a and 4-2b of the TSs) associated with the above TS changes. The NRC staff reviewed the proposed changes and found the proposed changes to the TS Bases consistent with the proposed TS changes.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment. The State official had no comments.

### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (69 FR 68181). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: I. Ahmed

Date: August 10, 2005

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