October 22, 2009

MEMORANDUM TO: Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Peter Bamford, Project Manager ***/ra/***
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: THREE MILE ISLAND, UNIT NO. 1 - ELECTRONIC TRANSMISSION, DRAFT REQUEST FOR ADDITIONAL INFORMATION REGARDING PROPOSED TECHNICAL SPECIFICATION CHANGES TO REFLECT CONTROL ROD DRIVE CONTROL SYSTEM REPLACEMENT

The attached draft request for additional information (RAI) was transmitted by electronic transmission on October 21, 2009 to Mr. Frank Mascitelli, at Exelon Generation Company, LLC (Exelon, the licensee). This draft RAI was transmitted to facilitate the technical review being conducted by the Nuclear Regulatory Commission (NRC) staff and to support a conference call with Exelon in order to clarify the licensee's amendment request regarding technical specification changes to reflect the planned replacement of the Control Rod Drive Control System. The draft RAI is related to the licensee's submittal dated September 29, 2008, and supplements dated May 6, 2009, June 23, 2009, August 21, 2009, September 17, 2009, and October 15, 2009. The draft questions were sent to ensure that they were understandable, the regulatory basis was clear, and to determine if the information was previously docketed. Additionally, review of the draft RAI would allow Exelon to evaluate and agree upon a schedule to respond to the RAI. This memorandum and the attachment do not represent an NRC staff position.

Docket Nos. 50-289

Enclosure: As stated

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DATE	10/22/2006	10/21/2009

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REQUEST FOR ADDITIONAL INFORMATION

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

CONTROL ROD DRIVE CONTROL SYSTEM REPLACEMENT AND

AXIAL POWER SHAPING ROD REMOVAL

DOCKET NO. 50-289

By letter dated September 29, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082800174, AmerGen Energy Company, LLC, the licensee[1], submitted a license amendment request (LAR) for Three Mile Island Nuclear Station, Unit 1 (TMI-1). The LAR proposes to modify Technical Specifications (TSs) related to the Control Rod Drive Control System (CRDCS), Reactor Trip Breakers (RTBs) and Axial Power Shaping Rods (ASPRs). These proposed changes reflect a planned CRDCS upgrade to a digitally based system that will result in the replacement of the TMI-1 reactor trip breakers and elimination of the APSRs. On May 6, 2009 (ADAMS Accession No. ML091260765), and June 23, 2009 (ADAMS Accession No. ML091750846), the licensee provided supplemental information. Included in the May 6, 2009 submittal was information that the RTBs contain microcontrollers. On August 21, 2009 (ADAMS Accession No. ML092400175), and October 15, 2009 (ADAMS Accession No. ML092890470), the licensee provided supplemental information in response to requests for additional information concerning the microcontrollers. In order for the U.S Nuclear Regulatory Commission (NRC) staff to complete its review of the LAR, a response to the following request for additional information is requested.

The purpose of these questions is to clarify that the commercial dedication process was implemented in accordance with Electric Power Research Institute (EPRI) TR-106439.

1a. Nuclear Logistics Incorporated (NLI) Report VVR-042181-1 is titled as a Verification and Validation (V&V) report. However, for the Masterpact NT breaker that is being used by TMI-1, the NLI effort was a commercial grade dedication. Does this report constitute a commercial grade dedication report/effort, or is there a separate commercial grade dedication report? Please provide the portions of the commercial grade dedication package that are not contained in NLI Report VVR-042181-1.

[1] The operating license for TMI-1 has been transferred from AmerGen Energy Company, LLC to Exelon Generation Company, LLC as of January 8, 2009.

1b. It appears that the NLI report was originally written for the micrologic trip unit (not used in the TMI-1 application). Revision 7, dated April 22, 2009, added data on the undervoltage and shunt trip devices (referred to as coils in the report). Consequently, this report includes information on equipment that is not included in the TMI-1 application, which makes the review confusing. Please provide a marked up version of the NLI report that only shows the TMI-1 related information.

2. During the October 20, 2009 meeting it was stated that NLI considered the microcontroller coils to be dedicated per EPRI TR-106439, Example 6.2 but some additional Example 6.3 activities were performed. However, it is not clear from the NLI report which, if any, activities associated with Example 6.3 were performed. Provide confirmation of which Example 6.3 activities were performed on the microcontroller coils.

3a. Sections 7.1 - 7.1.7 of the NLI report discuss audits of the Schneider/Square D. These audits appear to have been for the micrologic trip units only. Did these audits also include the microcontroller coils? If so what were the results and where is this information documented?

3b. It appears from the NLI report that the only NLI activities directly related to the microcontroller coils (Sections 7.1.8, 7.2.1, 7.2.2, and 7.3.1) were documentation reviews, qualification testing, dedication testing, and operating history reviews. Were there other dedication activities for the microcontroller coils as stipulated in Section 6.2 of EPRI TR-106439? Please identify where this is documented.

4. Attachments A thru E to the NLI report deal with (A) Configuration and NLI audit, (B) Validation plan with test data, (C) Failure Mode and Effects Analysis (FMEA), (D) V&V plan, and (E) Validation test plan for the micrologic trip units without mention of the microcontroller coils. Are any of these attachments applicable to the microcontroller coils? If not, please indicate where in the NLI report this information is located with respect to the microcontroller coils.

5. How was the EPRI TR-106439 Table 6-2c failure modes and failure management critical characteristic met? Explain the process for reviewing the software architecture to identify important internal failure modes? Where are the results documented?

6. During the October 20, 2009 meeting the NLI representative indicated that the software includes interrupts. However, for the coils, Section 6.3 of the NLI report states, “The components use simple microcontroller architecture. It is deterministic with all commands executed sequentially in every cycle without interrupts.” Also the October 15, 2009 letter stated, “The firmware is deterministic with all commands executed sequentially in every cycle without interrupt.” Which statement is accurate?

7. Based on the NLI report, it is not clear how each of the critical characteristic of EPRI TR-106439 Example 6.2 in Tables 6-2a thru 6-2c have been met. Table 6.1 of the NLI report includes critical characteristics of the microcontroller coils on pages 67 and 68. However, these appear to be hardware characteristic and do not include all of the Example 6.2 critical characteristics. Where in the NLI report

are each of the Example 6.2 critical characteristics indentified and results discussed?

8. Section 3.2 of the NLI report states that, “The lifecycle model presented in [Institute of Electrical and Electronics Engineers] IEEE-1012 was used to identify the relevant lifecycle steps.” This gives the impression that IEEE-1012 was used. However, this section also states, “As such, the explicit documentation requirements in IEEE-1012 are not met.” If the provisions of IEEE-1012 are not met how was the software able to be acceptable for safety related applications?

9. The October 15, 2009 response to Question 6.a states, “It was determined that Schneider/Square D controls the life cycle steps for the hardware and software.” What criteria were used to determine how Schneider/Square D controls the life cycle steps?