

October 23, 2009

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

FROM: G. Edward Miller, 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 23, 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, and September 17, 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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NAME	GEMiller	DSkeen (GWilson for)
DATE	10/23/09	10/23/09

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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 licensee¹, 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), the licensee provided supplemental information in response to a request for additional information concerning the microcontrollers.

Part of the September 29, 2008 license amendment request (LAR) includes technical specification changes to facilitate the replacement of the existing control rod drive system with a digital control rod drive control system (DCRDCS) under Section 50.59 of Title 10 of *The Code of Federal Regulations*. The LAR did not contain a discussion of software common cause failure of the DCRDCS.

In its April 6, 2009 Request for Additional Information (RAI) the NRC staff asked a question concerning the use of the term failure in the LAR statement, "The DCRDCS does not perform a nuclear safety-related function and failure of the control system will not prevent the RPS [Reactor Protection System] from tripping the reactor." In the RAI the NRC staff asked, "In this statement, does the term "failure" imply a complete loss of functionality, or are there other failure modes that do not involve a complete loss of functionality (e.g., ones where unintended operations are spontaneously initiated due to programmatic error) that could adversely impact the reactor protection system."

Exelon's May 6, 2009 response included, "The term failure includes incorrect operation and partial failure as well as a complete loss of functionality of the DCRDCS control system. No failure modes of the control system can prevent the RPS function due to the independence of the two systems. The DCRDCS input to the RTB trip circuit is isolated from the RPS input by qualified devices and the RTBs are upstream of the CRD Control System such that no failure of the CRD controls can prevent a reactor trip when demanded by RPS."

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.

The NRC staff understands the May 6, 2009 answer, but the response does not address the consequences of a software common cause failure of the DCRDCS. Please address the following:

1. Describe the consequences of the worst case software common cause failure of the DCRDCS.
2. Can the worst case software common cause failure of the DCRDCS lead to reactivity events which have not been analyzed in the plant safety analysis (i.e., such that the protection system maintains the plant within its design basis in conjunction with a software common cause failure)?