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10 CFR 50.90

TMI-09-073
June 23, 2009

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Three Mile Island Nuclear Station, Unit 1
Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Three Mile Island Unit 1 - Supplement to Technical Specification Change Request (TSCR) No. 342: Control Rod Drive Control System Upgrade and Elimination of the Axial Power Shaping Rods

References:

(1) AmerGen Letter 5928-08-20132 - Three Mile Island Nuclear Station, Unit 1, "Technical Specification Change Request No. 342: Control Rod Drive Control System Upgrade and Elimination of the Axial Power Shaping Rods," dated September 29, 2008.

(2) Letter from P. Bamford (U.S. Nuclear Regulatory Commission) to C. Pardee (Exelon Generation Company, LLC), "Three Mile Island Nuclear Station, Unit 1 - Request for Additional Information Regarding Control Rod Drive Control System Replacement License Amendment (TAC NO. MD9762)," dated April 6, 2009.

(3) Exelon Letter TMI-09-057 - "Three Mile Island Unit 1 Response to Request for Additional Information Related to Technical Specification Change Request No. 342: Control Rod Drive Control System Upgrade and Elimination of the Axial Power Shaping Rods," dated May 6, 2009.

By letter dated September 29, 2008 (Reference 1), AmerGen Energy Company, LLC (now Exelon Generation Company, LLC (Exelon)) requested a change to the Technical Specifications to accommodate the proposed changes resulting from the Digital Control Rod Drive Control System (DCRDCS) Upgrade Project and the elimination of the Axial Power Shaping Rods.

During the U.S. Nuclear Regulatory Commission (NRC) staff review of the Reference 1 submittal, the NRC had determined that additional information was needed to complete its review. The NRC staff requested the additional information on April 6, 2009 (Reference 2).

Exelon's response to the NRC questions was provided on May 6, 2009 (Reference 3).

Subsequent to the response to the Request for Additional Information (RAI) (Reference 3), an inconsistency was identified with the design during training and subsequent testing. This inconsistency is being addressed in the design itself. However, as a result of this issue, a challenge review was initiated to reconfirm that the TSCR (Reference 1) and the response to the RAI (Reference 3) appropriately reflect the design.

The challenge review team consisted of members of the original TSCR team and three additional reviewers who had familiarity with the design but did not participate significantly during the development of the initial TSCR (Reference 1). The additional reviewers consisted of a senior corporate Instrument & Controls (I&C) engineer who specializes in digital control and has approximately 40 years experience in I&C design; a TMI station senior reactor engineer with approximately 25 years experience; and a Maintenance I&C supervisor with approximately 30 years experience. The challenge review team performed an additional validation of the technical inputs provided in References 1 and 3. Also, Nuclear Logistics Incorporated (NLI), the Reactor Trip Breaker supplier, and AREVA, the control system vendor, performed an additional review of References 1 and 3. The results are summarized in the attachment to this letter.

In conclusion, Exelon has determined that the information provided in this supplement does not change the proposed Technical Specification marked-up pages (Reference 1, Attachment 2) and does not impact the conclusions of the No Significant Hazards Consideration as stated in Reference 1.

There are no regulatory commitments contained in this letter.

A copy of this letter and its attachment are being provided to the designated State official and the township and county officials in which the facility is located.

Should you have any questions concerning this letter, please contact Frank J. Mascitelli at (610) 765-5512.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 23rd day of June, 2009.

Respectfully,

Pamela B. Cowan
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Technical Specification Change Request No. 342 - Summary of Identified Issues

cc: S. J. Collins, Administrator, USNRC Region I
D. M. Kern, USNRC Senior Resident Inspector, TMI Unit 1
P. J. Bamford, USNRC Project Manager, TMI Unit 1
D. Allard, Director, Bureau of Radiation Protection-PA Department of Environmental Resources
Chairman, Board of County Commissioners of Dauphin County
Chairman, Board of Supervisors of Londonderry Township

Attachment

Technical Specification Change Request No. 342 - Summary of Identified Issues

Attachment
Three Mile Island (TMI) Unit 1
Technical Specification Change Request No. 342
Summary of Identified Issues

The following issues were identified by Exelon involving information provided in the Reference 3 Request for Additional Information (RAI) Response:

1. Technical Specification Change Request (TSCR) No. 342, RAI Response Attachment, page 8, fourth and fifth paragraphs state: "Downloading the recompiled software trips the reactor since the DCRDCS processors stop running the control algorithm when a download is in progress. Changing the DCRDCS rod patching without detection while the reactor is on line is not possible since downloading the software to the DCRDCS processors causes the control rods to be de-energized resulting in a Reactor Trip."

   The system will be designed so that the reactor will trip before a revised patch takes effect. The following statement should be used instead of the statement made in the RAI response referenced above: "The reactor will trip prior to a revised patch taking effect. In order for a revised patch to take effect, the processor must be restarted which will trip the reactor by de-energizing the Single Rod Power Supplies (SRPSs)."

2. TSCR No. 342, RAI Response Attachment, page 4, third paragraph states: "The Square D breaker utilizes Mobil 28 grease as the lubricant."

   Mobil 28 grease is used on the circuit breaker primary disconnects and does not affect timing.

   Mobil Mobilith SHC-100 is used in the Square D Masterpact circuit breaker mechanism. The Square D Masterpact breakers were environmentally tested with Mobilith SHC-100 in the operating mechanism. Pre- and post- aging breaker testing demonstrated proper performance of the breaker. The RAI response conclusions remain valid.

The following issues were identified by Exelon involving information provided in the Reference 1 TSCR No. 342:

3. Electronic Trips

   a. TSCR No. 342, Attachment 1, page 9, third paragraph states that: "DCRDCS will actuate RTB shunt trip coils on DC undervoltage....".

      DCRDCS does not actuate the Reactor Trip Breaker (RTB) shunt trip coils on DC undervoltage, rather it actuates the electronic trip of the

associated SRPS. The DCRDCS monitors DC voltage on the output of both power modules for each rod. If voltage is low on both power modules, the DCRDCS trips both power modules for the affected rod causing the rod to drop into the core. A single rod drop event is analyzed as part of the current licensing basis.

b. Additionally, in this area, TSCR No. 342, Attachment 1, page 10, second paragraph states: "In addition a redundant trip feature was added to DCRDCS to actuate the Electronic Trips if a power supply voltage is outside allowed limits."

   The submittal could be interpreted as if this equipment protection trip is redundant to the Diverse Scram System (DSS) trip. This is not the case, and therefore, the above sentence should be deleted. The equipment protection trip is described in section 3.a above.

4. TSCR No. 342, Attachment 1, page 9, third paragraph states: "The DCRDCS hardware that is utilized to detect a power supply fault condition is triple-modular-redundant, and therefore, no single failure will result in a false reactor trip."

   Although the Triplex hardware is triple modular redundant, the control system devices external to the Triplex, such as voltage to current (E/I) converters are redundant. The conclusion remains valid: no single failure will result in a false reactor trip.

5. TSCR No. 342, Attachment 1, page 9, fifth paragraph states: "Asymmetric rod indication is indicated by a change in bar color."

   The original proposed design was modified slightly to improve human factors. The design was modified to provide asymmetric rod indication in a box associated with the rod position bar.

6. TSCR No. 342, Attachment 1, page 12, lists the following statement under Conclusions:

   - "The new design is simpler and more reliable than the existing design, and utilizes a smaller number of components."

   This statement should be replaced with the following: "The new RTB design is simpler and more reliable than the existing design, and utilizes a smaller number of components."

7. TSCR No. 342 Axial Power Shaping Rod (APSR) section states in multiple places that APSRs have not been used for imbalance control since 1994.

   The APSRs were used during a 50% downpower maneuver in 1998 (Cycle 12) with the intent to control imbalance (the maneuver did not require the APSRs for this purpose). The APSR movement was only approximately 2% with no significant effect on imbalance.

8. TSCR No. 342, Attachment 1, page 23, Reference 6 states: "BAW-1018A Rev 1."

   This contains a typographical error and should read: "BAW-10180-A Rev 1."

Note that the aforementioned issues have been documented in the corrective action system.

References:

(1) AmerGen Letter 5928-08-20132 - Three Mile Island Nuclear Station, Unit 1, "Technical Specification Change Request No. 342: Control Rod Drive Control System Upgrade and Elimination of the Axial Power Shaping Rods," dated September 29, 2008.

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(3) Exelon Letter TMI-09-057 – "Three Mile Island Unit 1 Response to Request for Additional Information Related to Technical Specification Change Request No. 342: Control Rod Drive Control System Upgrade and Elimination of the Axial Power Shaping Rods," dated May 6, 2009.