



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 16, 2012

Mr. Michael J. Pacilio  
President and Chief Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND, UNIT 1 – NRC STAFF OBSERVATIONS REGARDING  
TENDON SURVEILLANCE REPORT (TAC NO. ME4022)

Dear Mr. Pacilio:

By letter dated April 13, 2011 (Agencywide Documents Access and Management System Accession No. ML11105A163), Exelon Generation Company, LLC, submitted Topical Report Number 204, "2010 Augmented Reactor Building (IWL) In-Service Inspection," for Three Mile Island Nuclear Station, Unit 1 (TMI-1), pursuant to Technical Specification 4.4.2.1.6. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the report and has two comments, detailed in the enclosure. These comments were discussed with your staff in a teleconference on February 9, 2012. The NRC requests that you place these comments into your corrective action program (CAP) for disposition, and that you verbally inform the NRC Project Manager for TMI-1 of the associated CAP tracking number, once it has been obtained. After the CAP tracking number has been communicated to the NRC Project Manager, TAC No. ME4022 will be closed.

Please contact me at 301-415-2833, if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Peter Bamford".

Peter Bamford, Project Manager  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure:  
As stated

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NRC STAFF OBSERVATIONS REGARDING  
THREE MILE ISLAND NUCLEAR STATION, UNIT 1  
REACTOR BUILDING TENDON SURVEILLANCE REPORT  
DOCKET NO. 50-289

By letter dated April 13, 2011 (Agencywide Documents Access and Management System Accession No. ML11105A163), Exelon Generation Company, LLC (the licensee), submitted Topical Report Number 204, "2010 Augmented Reactor Building (IWL) In-Service Inspection," for Three Mile Island Nuclear Station, Unit 1 (TMI-1), pursuant to Technical Specification 4.4.2.1.6. The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the report and has two comments, detailed below. The NRC requests that you place these comments into your corrective action program (CAP) for disposition, and that you verbally inform the NRC Project Manager for TMI-1 of the associated CAP tracking number, once it has been obtained.

- 1.) The NRC staff does not agree with the last sentence in the third paragraph of Section 3.1, "Tendon Anchorage Forces," of the report which states: "Because this is the first surveillance of the [steam generator replacement] SGR tendons and a single data set is not sufficient to perform force projection, no such projections are made in this report." The staff observes that the augmented inspection surveillance (at 1-year following the repair/replacement activity) provides the second data set for tendon forces for the sampled tendons from the population affected by the repair/replacement. The first set would be the lock-off forces in the sampled tendons at the time of tensioning at completion of the repair/replacement project. The difference in tendon forces between these two points in time indicates the loss of pre-stress forces in the sampled tendons after 1 year. The code requires in IWL-3221.1(c) that the forces from these two data sets for tendons affected by the repair/replacement be projected to the next scheduled surveillance and shown to be above the minimum design pre-stress force. The staff observes, based on a post-repair/replacement lock-off value of 70 percent of Guaranteed Ultimate Tensile Strength, and its own evaluation of the lift-off data, that this requirement would be met for the next surveillance around 2014/2015 at TMI-1.
  
- 2.) The NRC staff does not agree with the position described in Section 3.1.2.1, "Group Mean Forces and Projected Group Mean Force Calculation for SGR Tendons," of the inspection report since, in the staff's view, the position documented therein is not consistent with the code requirements in IWL-2521.2 and Table IWL-2521-2 (Item L2.10 "Tendon") with regard to average measured pre-stress forces and trending of measured pre-stress forces for the population of tendons affected by repair/replacement activities. Section 3.1.2.1 of the report relates to Item L2.10 tendons sampled based on IWL-2521.2 from the population of tendons affected by repair/replacement. These tendons are subject to examination requirements for tendon force and elongation measurements in

Enclosure

IWL-2522 and the acceptance criteria of IWL-3221.1, "Tendon Force and Elongation." As such, the tendons so sampled for each type must meet all the acceptance criteria for lift-off forces and elongation in IWL-3221.1, including an average of measured tendon forces and trending of tendon forces. In the NRC staff's view, it is not the intent of the code provision to make predetermined conclusions such as "the present tendon forces in these original tendons are appreciably lower than those of the SGR tendons" or mixing and analyzing data obtained from the population of affected tendons and the population of unaffected tendons. The code requires these two populations of tendons to be treated as separate populations following the repair/replacement activity, and each population should be sampled, and separately meet, all the test requirements and acceptance criteria of Subsection IWL.

Based on the NRC staff experience with the development of ASME Section XI, Subsection IWL, the background and intent of the code provision in IWL-2521.2, applicable to tendons affected by repair/replacement activities, is as follows. Repair/replacement activities (such as creation and restoration of SGR construction opening) result in a group of tendons being de-tensioned and re-tensioned, and/or removed, replaced and tensioned. Further, the creation and restoration of the construction opening results in a permanent redistribution of dead load and pre-stress force in the area of opening, which results in a higher pre-stress demand in the restored area of the opening. The repair/replacement activity would thus result in a post-tensioned containment (as is the case with TMI-1) with two (or more) populations of tendons for each tendon type: (i) tendons not affected by the repair/replacement (i.e., original unaffected tendons), and (ii) tendons affected by repair replacement activity. These two populations of tendons behave differently and therefore, samples from one population are not representative of the other. Therefore, specifically, with regard to lift-off force and elongation measurements required by Table IWL-2500-1 (for original non-affected tendons) and Table IWL-2521-2 (for affected tendons), in future tendon surveillances following the repair/replacement, the code requires that each tendon type be sampled and tested separately for each of these populations, and each of these samples separately meet the acceptance criteria in IWL-3221.1. This includes meeting criteria for the average of measured tendon force, as well as individual tendon force, and trending of the previously measured tendon forces to the next surveillance. Similarly, though not at issue in this report, other examinations required by Table IWL-2500-1 (for original non-affected tendons) and Table IWL-2521-2 (for affected tendons) should meet the applicable acceptance criteria in IWL-3221.

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/RA/

Peter Bamford, Project Manager  
Plant Licensing Branch I-2  
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