December 4, 2012

MEMORANDUM TO: Meena Khanna, 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 RELIEF REQUEST RR-12-02, RELIEF REQUEST CONCERNING FULL STRUCTURAL WELD OVERLAY OF DISSIMILAR METAL WELDS ON THE LOWER COLD LEG LETDOWN NOZZLE AND SAFE END (TAC NO. ME9818)

The attached draft request for additional information (RAI) was transmitted by electronic transmission on December 3, 2012, to Mr. Thomas Loomis, 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 (if needed) with Exelon in order to clarify the licensee's relief request regarding the weld overlay of the dissimilar metal welds on the lower cold leg letdown nozzle and safe end. The draft RAI is related to the licensee's submittal dated October 18, 2012. 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 No. 50-289

Enclosure: As stated

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DATE	12/4/12	12/03/2012

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DRAFT

REQUEST FOR ADDITIONAL INFORMATION

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

RELIEF REQUEST CONCERNING FULL STRUCTURAL WELD OVERLAY OF DISSIMILAR METAL WELDS ON THE LOWER COLD LEG LETDOWN NOZZLE AND SAFE END

RELIEF REQUEST RR-12-02

DOCKET NO. 50-289

By letter dated October 18, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12292A584), Exelon Generation Company, LLC (Exelon, the licensee) requested relief from the requirements of the 2004 edition, no addenda, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code for Three Mile Island Nuclear Station, Unit 1 (TMI-1). TMI-1 is requesting relief to install a full structural weld overlay (FSWOL) on the lower cold leg letdown nozzle dissimilar metal welds and Alloy 600 safe-end. The U.S. Nuclear Regulatory Commission (NRC) staff has been reviewing the submittal and has determined that additional information is needed to complete its review.

1. Section 3.0 of the relief request lists ASME Code Case N-740-2 as an applicable code requirement. Various sections of the relief request stated that the proposed alternative is based on the code case. The NRC has not approved Code Case N-740-2. The NRC could not approve a relief request that is based on a code case that the NRC has not approved. However, the NRC has approved weld overlay designs from licensees that have included provisions of Code Case N-740-2 in their relief request. Therefore, as part of the technical basis for the relief request, please include or identify the relevant portions of ASME Code Case N-740-2 that are applicable to the requested relief.

2. Section 5.0 of the relief request states that after the full structural weld overlay is installed, ultrasonic (UT) examination coverage may achieve less than 98% of required volume because of the intrados of the elbow, but it is still expected to be greater than 90%. The NRC staff requests the following:

   (a) provide a figure with dimensions of the examination volume

   (b) provide a diagram showing the required examination volume for the acceptance examinations with dimensions of the examination volume and show the area(s) that will not be examined within the required examination volume.

   Further, it is the NRC staff's expectation that, at a minimum, 100% of the Alloy 82/182 dissimilar metal weld, i.e. the susceptible material within the required examination volume, be covered by UT after the weld overlay installation, if the coverage of the required examination volume cannot achieve 100%. Figure 1 shows that the Alloy 82/182 dissimilar metal weld joining the safe end and the elbow will not receive 100% examination coverage. Therefore,

(c) Justify how the structural integrity of the Alloy 82/182 dissimilar metal weld joining the safe end and the elbow can be verified in the future.

Page 4, second paragraph, of the relief request states that "…[t]his coverage will not interrogate 100% of the susceptible material volume in one of the four directions in the intrados region shown in Figure 1. The combined coverage for all four examination directions is expected to be approximately 98% because of the inherent scan limitation of the elbow…"

(d) Discuss the four examination directions. Discuss the direction that could not achieve 100% examination coverage. Provide the detailed calculation to show the maximum UT examination coverage.

3. Section 5.0 of the relief request stated that examination of the completed FSWOL will be performed according to ASME Code Cases N-740-2 and N-770-1, which is conditioned by 10 CFR 50.55a(g)(6)(ii)(F). Section 5.0 further stated that subsequent ultrasonic examinations will be performed as required by Code Case N-770-1. The NRC staff noted that code case N-770-1 contains provisions for various weld configurations and degradation. For regulatory clarity, please identify all the specific provisions in N-770-1 that are applicable to the proposed weld overlay installation, including at a minimum, the relevant inspection items, footnotes, subsections, and figures.

4. Section 5.0 of the relief request discusses the installation of one layer of sulfur mitigation layer to prevent hot cracking on the stainless steel piping. Discuss whether the delta ferrite number of this mitigation layer satisfies the delta ferrite requirements of paragraph(e) in Code Case N-504-4. Discuss the weld material (specification) used for the mitigation layer.

5. Provide the wall thickness of the letdown pipe and the thickness of the weld overlay.

6. Submit the design analyses of the weld overlay or discuss in detail how the design analyses are performed, including assumptions, references (i.e., industry standards or codes), and the results.

7. On page 5 of the relief request the licensee stated that it will calculate crack growth assuming an existing detected flaw size or assumed flaw size (75% through wall in both axial and circumferential direction), whichever is greater. Because the licensee does not plan to ultrasonically examine the 2 dissimilar metal welds on the letdown line prior to installing the weld overlay, confirm that the crack growth calculation will be performed assuming a 75% through wall flaw in both axial and circumferential direction.
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