



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

August 27, 2013

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

SUBJECT: THREE MILE ISLAND NUCLEAR STATION, UNIT 1 - END-OF-INTERVAL
RELIEF REQUEST RR-12-01, PRESSURIZER NOZZLE-TO-HEAD WELD
EXAMINATIONS (TAC NO. ME9788)

Dear Mr. Pacilio:

By letter dated October 5, 2012, supplemented by letter dated March 18, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12283A252 and ML13078A329, respectively), Exelon Generation Company, LLC (Exelon, the licensee) submitted a relief request for U.S. Nuclear Regulatory Commission (NRC) approval. In the relief request, Exelon identifies the limited examination of three pressurizer relief nozzle welds at Three Mile Island Nuclear Station, Unit 1 (TMI-1) for the third inservice inspection interval, which ended on April 19, 2012. According to the licensee, the coverage for each of the welds in question was approximately 40 percent, as compared to a specification of 90 percent, in accordance with American Society of Mechanical Engineers (ASME) Code Case N-460, "Alternative Examination Requirements for Class 1 and Class 2 Welds, Section XI, Division 1." This request was submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 50.55a(g)(5)(iii) on the basis that conducting the exams as required by the ASME Boiler and Pressure Vessel Code (ASME Code) would be impractical.

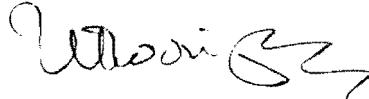
The NRC staff has completed its review of the relief request as discussed in the enclosed safety evaluation. The NRC staff review concludes that the ASME Code examination coverage requirements are impractical for the subject welds, and imposition of the ASME Code requirements would create a burden on the licensee. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Further, the NRC staff concludes that the examinations performed, as described in the submittals, provide reasonable assurance of the structural integrity and leak tightness of the subject welds. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), the NRC staff grants relief for the subject examinations of the items contained in relief request RR-12-01, as requested, at TMI-1 for the third 10-year ISI interval, that ended on April 19, 2012. No alternative requirements beyond those specified in the relief request are being imposed by the NRC staff.

M. Pacilio

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If you have any questions, please contact the TMI-1 Project Manager, Mr. Peter J. Bamford, at 301-415-2833.

Sincerely,

A handwritten signature in black ink, appearing to read "Veronica Rodriguez", with a stylized flourish at the end.

Veronica Rodriguez, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure:
Safety Evaluation

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELIEF REQUEST ASSOCIATED WITH THE THIRD INSERVICE INSPECTION INTERVAL
PRESSURIZER NOZZLE-TO-HEAD WELD EXAMINATIONS, REQUEST NO. RR-12-01
EXELON GENERATION COMPANY, LLC
THREE MILE ISLAND NUCLEAR STATION, UNIT 1
DOCKET NO. 50-289

1.0 INTRODUCTION

By letter dated October 5, 2012, supplemented by letter dated March 18, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12283A252 and ML13078A329, respectively), Exelon Generation Company, LLC (the licensee) submitted a relief request for Three Mile Island Nuclear Station, Unit 1 (TMI-1) associated with the third inservice inspection (ISI) interval. The request, RR-12-01, concerns requirements for examination of certain pressurizer relief nozzle welds. This request was submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Paragraph 50.55a(g)(5)(iii). The U.S. Nuclear Regulatory Commission (NRC, or Commission) staff reviewed and evaluated RR-12-01 pursuant to the provisions of 10 CFR 50.55a(g)(6)(i).

2.0 REGULATORY EVALUATION

The ISI of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3 components is to be performed in accordance with the applicable edition and addenda of ASME Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements set forth in the ASME Code, Section XI to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b), 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI code of record for the third 10-year ISI inspection interval at TMI-1 is the 1995 Edition, 1996 Addenda, of the ASME Code, Section XI. The third 10-year ISI interval began on April 20, 2001, and ended on April 19, 2012, including the one year extension allowed by paragraph IWA-2430(d)(1) of the ASME Code, Section XI, for these examinations.

Enclosure

TMI-1 has invoked ASME Section XI, Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," for the third interval ISI program. Code Case N-460 states, in part, that when the entire examination volume or area cannot be examined, a reduction in examination coverage may be accepted provided the reduction in coverage for that weld is less than 10 percent. NRC Information Notice 98-42, "Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirement," termed the reduction in coverage of less than 10 percent to be "essentially 100 percent." Information Notice 98-42 states, in part, that the NRC has adopted and further refined the definition of "essentially 100 percent" to mean "greater than 90 percent," which has been applied to examination of welds or other areas required by ASME Section XI.

3.0 TECHNICAL EVALUATION

3.1 Relief Request RR-12-01

3.1.1 ASME Components for Which Relief is Requested and Applicable Code Requirement

As specified in ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item Number B3.110, ASME Code Class 1, pressurizer relief nozzle-to-vessel weld (referred to as the subject weld in the remainder of the safety evaluation), essentially 100 percent volumetric examination of the subject welds is required. For this relief request, the component identification and percent coverage for the three ASME Class 1 nozzle-to-vessel welds are as follows:

Component Identification	Percent Coverage Attained
RCT0002PR003N	40.5
RCT0002PR004N	40.6
RCT0002PR005N	39.4

3.1.2 Licensee's Proposed Alternative Examination and Basis

The licensee requested relief pursuant to 10 CFR 50.55a(g)(5)(iii), for the components listed above, on the basis that the required examination coverage of "essentially 100 percent" is impractical due to the nozzle configurations and adjacent physical obstructions on the pressurizer upper head. As an alternative, the licensee performed the ASME Code-required examinations to the extent practical. The three welds were examined during the last period of the third inservice inspection interval in accordance with the ASME Code, Section V, Article 4 requirements. The three subject welds were credited for volumetric examination, even though the overall volumetric examination coverage was less than "essentially 100 percent" (i.e., less than 90 percent).

The licensee's proposed alternative and basis for use is quoted below: (as stated)

Examination coverage for the nozzle inner radius (Table IWB-2500-1, Category D-B, Item Number B3.120) was greater than 90%. This examination would detect surface connected inside surface flaws. The areas of limited examination were mainly in the region of the outside surface weld radius between the nozzle and head. A supplemental VT-1 [visual] examination of this region was performed to supplement the limited examination in this region and no degradation was observed. Surface connected service induced degradation in this most highly unexamined region would be detected by the VT-1 examination method. A

supplemental 35 degree angle beam examination was performed to increase coverage in other locations. The UT [ultrasonic] examinations were performed to the maximum extent practical using the best available technology of the time.

In order to satisfy compliance with the requirements of 10 CFR 50.55a and the ASME Code, the licensee determined that a relief request should be submitted for these limited examinations.

3.1.3 NRC Staff Evaluation

The ASME Code requires essentially 100 percent volumetric examination of the subject welds; however, due to the design of the nozzles, there were geometric limitations to the scanning area. To comply with the ASME Code, the subject would have required a re-design and modification to increase the coverage to 90 percent or better. Imposition of this requirement would have created a burden on the licensee.

Ultrasonic examination scanning (UT) was performed on the subject welds to obtain the highest examination volume practical. The examination volume coverage is shown above. This was confirmed by the NRC staff's review of figures and drawings provided by the licensee. Therefore, the NRC staff concludes that "essentially 100 percent" examination coverage is impractical. The licensee did achieve greater than 90 percent coverage for a volumetric examination of the pressurizer nozzle inner radius in the region near the subject weld. The staff would expect the B3.120 exam to detect any surface-connected inner-diameter (ID) flaws in the subject welds if they were present. The supplemental VT-1 examination of the outside surface weld radius between each nozzle and the head was performed and no degradation was observed; therefore, the staff concludes that there was no surface-connected degradation outside of the weld. The additional 35 degree angle beam examination did increase the volumetric coverage.

The relief request did not include any statement regarding past inspection results, including preservice. The NRC staff was concerned that there could be a weld repair done during fabrication. If the repair used a Nickel-based alloy filler metal, the joint could be susceptible to primary water stress-corrosion cracking (PWSCC). Therefore, the staff requested the licensee describe the results of all past inspections, including preservice, as well as any repairs that have been done to the subject pressurizer relief nozzle-to-vessel welds.

By letter dated March 18, 2013, the licensee provided a summary of all previous inspection results for the three subject welds. No repairs were done after final heat treatment and no Nickel-based alloys were used for any repair. The staff has reviewed the RAI response and is satisfied that PWSCC is not an issue for this relief request.

Finally, the NRC staff notes that a similar relief request (ADAMS Accession No. ML102510245) has been granted for North Anna Power Station, Unit 2. In this case, the volumetric exam could not be performed due to interference from the surrounding components and NRC staff determined that the licensee's proposed alternative provided reasonable assurance of the integrity of the subject welds.

In summary, the licensee has acceptably demonstrated that the essentially 100 percent ASME Code-required examination requirement is impractical. Further, the NRC staff concludes that the examinations performed, as described in the application, provide reasonable assurance of the structural integrity and leak tightness of the subject welds. Therefore, the NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will

not endanger life or property or the common defense and security and is otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and concludes that ASME Code examination coverage requirements are impractical for the subject welds, and imposition of the ASME Code requirements would create a burden on the licensee. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Further, the NRC staff concludes that the examinations performed, as described in the application, provide reasonable assurance of the structural integrity and leak tightness of the subject welds. Therefore, the NRC staff grants relief for the subject examinations of the items contained in relief request RR-12-01, as requested, at TMI-1 for the third 10-year ISI interval, which ended on April 19, 2012. All other ASME Code, Section XI requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: P. Purtscher, NRR

Date: August 27, 2013

M. Pacilio

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If you have any questions, please contact the TMI-1 Project Manager, Mr. Peter J. Bamford, at 301-415-2833.

Sincerely,

/ra/

Veronica Rodriguez, Acting Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure:
Safety Evaluation

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