NRR-PMDAPEm Resource

From: Wiebe, Joel
Sent: Tuesday, April 30, 2013 1:10 PM
To: Tom Loomis
Subject: Preliminary RAI for Proposed Alternative to Use Code Case N-786

Tom,

Preliminary RAIs are provided to ensure that the questions are clear and understandable. Let me know if you need a conference call to discuss them. A response is requested within 60 days.

By letter dated February 27, 2013 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML13059A498), Exelon Generation Company (the licensee) requested relief from the requirements of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, IWA-4000, for Braidwood Station Units 1 and 2, Byron Station Units 1 and 2, Clinton Power Station Unit 1, Dresden Nuclear Power Station Units 2 and 3, LaSalle County Stations Units 1 and 2, Limerick Generating Station Units 1 and 2, Oyster Creek Nuclear Generating Station, Peach Bottom Atomic Power Station Units 2 and 3, Quad Cities Nuclear Power Station Units 1 and 2, and Three Mile Island Nuclear Station Unit 1.

The licensee proposed to use ASME Code Case N-786, "Alternative Requirements for Sleeve Reinforcement of Class 2 and 3 Moderate-Energy Carbon Steel Piping Section XI, Division 1," to repair degraded Class 2 and 3 moderate-energy piping as documented in "10 CFR 50.55a Relief Request Revision 0". To complete its review, the Nuclear Regulatory Commission (NRC) staff requests the following additional information.

1. Section 1 of the relief request states that the affected components are Class 2 and 3 moderate energy carbon steel piping systems. (1) Confirm that the relief request is not applicable to pumps, valves, flanges and flange joints, socket welds (weldolets), expansion joints, heat exchangers, tubing, and threaded connections that are associated with the subject piping systems. (2) The identified affected components do not appear to be limited by size. Identify the smallest piping diameter and thinnest pipe wall for which the relief request is applicable and discuss the potential problems with welding of the sleeve on the small bore piping.

2. Piping containing radioactive fluid: (1) Discuss whether any Class 2 and 3 carbon steel piping covered under the relief request contains radioactive fluid (e.g., tritium) as part of its design functions. If yes, please identify these piping systems and the plant(s). (2) The relief request specifies that the monitoring frequency for the full structural Type B sleeve is every fourth refueling outage. Provide the technical basis for the monitoring frequency of every fourth refueling outage. Discuss whether this monitoring frequency is adequate for the buried piping systems that carry radioactive fluid and are repaired with the full-structural Type B sleeve. (3) If radioactive fluid leaks from the sleeve-repaired piping, discuss how the leakage can be detected and how soon the plant personnel would identify the leakage.

3. Three types of sleeve designs were proposed to repair the affected components--Type A, partial-structural Type B, and full-structural Type B. Page 2, 2nd to the last paragraph alluded to a situation where the Type B sleeve design would be used, however, without specifics. Explain the process for selecting the type of sleeve to be used, including the extent of degradation, wall thickness, and operating conditions (e.g., temperature and pressure).

4. The proposed alternative was submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii), which permits alternative to the ASME Code requirements if compliance with the specified ASME requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. However, the licensee has not provided sufficient evidence

to support its argument regarding hardship, unusual difficulty and the compensating increase in the level of quality and safety. Discuss fully the regulatory basis of the relief request in terms of hardship or unusual difficulty and the lack of a compensating increase in the level of quality and safety associated with the required ASME Code repair.

5. Page 3, 4th paragraph of the relief request states that "…A baseline thickness examination will be performed for completed full-structural Type B reinforcing sleeves, attachment welds, and surrounding areas, followed by thickness monitoring during the first two refueling outages after installation and at least every fourth refueling outage thereafter…". (1) Discuss whether a baseline thickness examination will be performed for the completed Type A and partial structural Type B sleeves. If not, provide justification. (2) Sections 6 and 8 of Code Case N-786 reference the Construction Code and ASME Code, Section III for volumetric examinations. However, the code case is not clear regarding to which ASME Code requirements the volumetric and thickness examinations will be qualified. Reference the ASME Code sections and subarticles for which the volumetric and thickness examinations of the subject pipes are qualified. (3) Discuss the acceptance criteria for in-service thickness monitoring of the installed full-structural Type B sleeve. That is, after placing in service, under what condition would the full-structural Type B sleeve be considered degraded and be required to be removed?

6. Page 3, 7th paragraph, of the relief request states that "…When used on buried piping, the area of full-structural Type B reinforcing sleeves will need to be physically accessible for the examinations required by the Code Case, which could necessitate installation of removable barriers at the repair location in lieu of backfilling the pipe at that location.…" (1) Discuss how the exposed pipe segment of a buried pipe will be supported at the excavation location after sleeve installation to minimize pipe sagging. (2) Discuss how soil erosion at the excavated location can be minimized so that the soil support for the non-repaired buried pipe segment in the vicinity of the repair will not be compromised.

7. Code Case N-786 allows the repair on piping systems that experience internal wall thinning from cavitation. The wall thinning rate for severe cavitation can be difficult to determine and predict. (1) Discuss whether cavitation will be mitigated after the sleeve is installed. If not, provide justification. (2) If cavitation cannot be mitigated after sleeve installation, discuss compensatory measures to ensure the structural integrity of the pipe at the repaired location. (3) If a full-structural Type B sleeve is installed on a pipe that experiences cavitation which cannot be mitigated, justify the adequacy of the proposed monitoring frequency of every fourth refueling outage or propose a shorter monitoring frequency that can be justified.

8. Paragraph 2(b) of Code Case N-786 states that "...The dimensions of the surrounding area to be evaluated shall be determined by the Owner, based on the type and rate of degradation present..." Provide guidance on how the surrounding area will be determined based on the type and rate of degradation to establish a consistent methodology across the fleet.

9. Paragraph 3.1(b)(1) of Code Case N-786 states that "…Full-structural reinforcement is designed to accommodate pressure plus axial and circumferential design loadings at the location for the design life of the repair…" Discuss how the design life of the repair is derived. Even though the reinforcement sleeve is installed, the original pipe metal is continuously being corroded and the corroded area will expand in the lateral direction. The sleeve may fail if the corroded area becomes larger than the size of the sleeve. In addition, the reinforcement sleeve may corrode over time also. Discuss the how the corrosion rate is calculated and provide the reference. Discuss how the corrosion of the pipe base metal and the sleeve is being considered in the design life.

10. Section 8(b) of the code case states that "…The owner shall prepare a plan for thickness monitoring of full-structural reinforcing sleeves and their attachment welds using ultrasonic or direct thickness measurements…The frequency and method of monitoring shall be determined based on an evaluation of the degradation mechanism. Monitoring activities shall be performed during the first two refueling outages after installation and at least every fourth refueling outage thereafter…" (1) Discuss the exact nondestructive examination that will be used to verify the thickness of the sleeve and the underneath

pipe base metal. (2) Clarify how the direct thickness measurements can be used on the reinforcing sleeve or pipe base metal. (3) Discuss whether the wall thickness of the pipe base metal in the vicinity of the sleeve will also be examined by ultrasonic testing to verify that the corroded pipe area underneath the sleeve has not expanded beyond the area that is covered by the sleeve. If this area will be examined, discuss the specific area of pipe wall where thickness readings will be taken. If this area will not be examined, provide justification. (4) Discuss how the fillet welds at the sleeve will be examined because ultrasonic testing will not be possible. (5) Explain how the evaluation of the degradation mechanism will provide the frequency and method of monitoring. For example, explain how the thickness monitoring frequency of every fourth refueling outage is derived. (6) Clarify the "monitoring activities" in the above Section 8(b) statement (is this an inspection activity or monitoring activity? Please explain any difference.). Describe the exact activities that will be performed during the first two refueling outages and every fourth refueling outage, thereafter.

Joel

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United States Nuclear Regulatory Commission
Protecting People and the Environment

Joel S. Wiebe
Senior Project Manager
Office of Nuclear Reactor Regulation

Mail Stop: O8 D-15 Work: 301-415-6606
11555 Rockville Pike Fax: 301-415-1885
Rockville, MD 20852-2738

Hearing Identifier: NRR_PMDA
Email Number: 702

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From: Wiebe, Joel

Created By: Joel.Wiebe@nrc.gov

Recipients:
"Tom Loomis" <thomas.loomis@exeloncorp.com>
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