

January 15, 2014

MEMORANDUM TO: Anthony J. Mendiola, Chief
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Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

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SUBJECT: SUMMARY OF NOVEMBER 19, 2013, PUBLIC MEETING TO
DISCUSS ON THE RESOLUTION OF PLANT-SPECIFIC ACTION
ITEMS RELATED TO MATERIALS RESEARCH PROGRAM-227-A
REACTOR INTERNALS AGING MANAGEMENT
PROGRAMS/INSPECTION PLANS

On November 19, 2013, staff from the U.S. Nuclear Regulatory Commission (NRC) held a meeting with representatives from the Electric Power Research Institute (EPRI) and industry. The purpose of the meeting was to discuss issues related to resolution of MRP [Materials Research Program]-227-A Applicant/Licensee Action Item (AI) 7 for plant-specific evaluation of cast austenitic stainless steel (CASS), provide an update of resolution of MRP-227-A Applicant/Licensee AI 1 on plant-specific applicability, and allow for discussion of some other similar requests for additional information (RAIs) to several applicants and licensees that have submitted reactor vessel internals aging management programs/inspection plans.

Industry presentations can be found in the Agencywide Documents Access and Management System (ADAMS) package for the meeting (ADAMS Accession No. ML13262A137). A copy of the notice and agenda can be found in ADAMS as Accession No. ML132691A037. A list of attendees is enclosed.

The NRC staff opened the meeting by stating that the discussions addressing the issues were essential in completing several ongoing plant-specific reviews. Further, the NRC staff mentioned its focus in the meeting was to discuss what needed to be done to address the AIs. Opening remarks from the industry emphasized the NRC staff perspective.

The first agenda item for the meeting covered CASS reactor internals management. After reviewing the issues related to recent utility-specific RAIs, the industry identified what it believed was a perceived disconnect in terminology. In particular the different meanings of failed and functionality assessment were discussed. A question asked by the NRC staff was why functionality assessment was conservatively covered by the "return to service" assessment. In response, the industry stated that return to service meant a plant was able to produce power and thus the condition was bounding.

Next in the presentation, the industry covered the screening of CASS pressurized water reactor (PWR) internals. Discussed at the end of the presentation was the ability of the industry to address the concerns generically. The industry preference was that the issues be resolved generically and then that generic resolution serve as the basis for closing plant-specific issues. During this discussion, the NRC staff noted that its focus and questions were on the currently-active, plant-specific reviews. The industry also presented a proposal for modification of the current NRC guidance for aging management of CASS. The industry's proposal would increase the screening threshold for irradiation embrittlement of CASS materials that screen out for thermal embrittlement based on ferrite content and chemical composition.

The initial NRC presentation provided the staff perspective on AI 7. Information in the briefing covered the background on AI 7 and the individual concerns that led to AI 7. After discussing the components in boiling water reactors and Westinghouse and Combustion Engineering PWRs to which AI 7 applied, the NRC staff discussed the Westinghouse lower support column body.

Further, the NRC staff provided three approaches that would be acceptable for AI 7 analyses. These were: 1) a screening approach; 2) a functionality approach; and 3) a flaw-tolerance approach. Specifics for each approach were provided. In closing the presentation, the two key messages from the NRC staff were that CASS embrittlement had to be addressed or facilities had to plan to inspect expansion CASS components as primary components.

Following the NRC staff presentation, the industry provided its perspective on AI 7. After providing some background information, the industry presented a proposed template for responding to AI 7. The template applied the screening, functionality, and flaw-tolerance approaches. During these discussions, the NRC staff asked about the presence of material with greater than 20 percent ferrite content.

Westinghouse representatives noted that material with greater than 20 percent ferrite content was found in an instrument clamp. The Westinghouse representatives went on to say that this clamp was an unusual situation which it is continuing to investigate. However, for structural components, the ferrite content was generally less than 20 percent.

Then the industry presented potential issues related to AI 7. During discussions on embrittlement of CASS, the industry noted that there was coordination with the BWR Vessel and Internals Project to develop a consensus on screening criteria. They expected consensus in the first quarter of calendar year 2014.

The next topic covered the strategy for response to AI 7 on Westinghouse lower-support columns. The key elements of the strategy are structural evaluation using finite element analysis, and a demonstration of the low likelihood of manufacturing or service induced flaws in the columns. The structural evaluation acceptance criteria will be based on safe shutdown and the evaluation will consider all design basis loadings. The low likelihood of flaws is based on a review of manufacturing inspection records, operating experience, and the high resistance to cracking of CASS due to mechanisms such as irradiation-assisted stress corrosion cracking (IASCC). In its presentation, the industry did note that the only function of the support column was a compression member. It transferred the load between plates. It further noted that there were no operational failures and that some international inspections have not shown failure.

During the presentation, the NRC staff asked how pictures shown of support columns had been obtained, if the columns are inaccessible for visual examination. The answer was that the opportunity was there to get pictures but that obtaining good coverage for visual examination would be extremely difficult, particularly for EVT-1 visual examination, which has more stringent requirements. In addition, the NRC staff requested verification of its understanding that Combustion Engineering (CE) lower support columns are accessible for visual examination since MRP-227-A includes the core support column welds as "Primary" components. The industry responded that the CE core support column welds are in the "Primary" inspection category, but the welds are accessible from above the core support plate, while the columns are not. Thus, the core support columns are not inspected.

Another question from the NRC staff was whether visual examination of the lower support columns could be performed when the core barrel is removed. The industry answered that it was difficult to visually examine the support columns due to the difficulty in dropping a camera through the holes in the lower core plate, which are roughly two inches in diameter.

Responding to the international information, the NRC staff asked if the industry could get from its international partners additional information on how inspections were done and how nondestructive examinations could be done. The industry agreed to see if it could get this information and later in the meeting reported that it would be able to do so.

Closing the presentation was an exchange about what the NRC staff would be expecting. The NRC staff reported that it had four plant-specific safety evaluations (SE) waiting for AI 7 closure. To complete these SEs, the NRC staff noted that the industry needed to provide the NRC information to support that there was no need to inspect the support columns.

To address the NRC points, the industry stated that Westinghouse and the PWR Owners Group would make a presentation to the PWR Owners Group executive committee in December and if the committee approved the proposed approach, a meeting in February would be where funding decisions would be made.

Additionally, Westinghouse stated that it wanted to show the NRC staff that conducting such an analysis was very complicated. One plant has started to address AI 7 but the industry would like to find a single solution that would be acceptable to the NRC staff. In this presentation, the industry was looking to get feedback from the NRC staff on what they were planning to do. The goal was to demonstrate that support column assemblies are redundant and failure of a small number would not impact safety.

The next subject covered in the meeting was AI 1. The NRC staff opened the discussion with a presentation on its perspective. Then a presentation on other RAIs was given by industry.

The meeting adjourned with an action item to schedule a follow-up meeting or telephone call on December 3, 2012, and another meeting in January 2014.

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**U.S. NUCLEAR REGULATORY COMMISSION (NRC) AND ELECTRIC POWER RESEARCH INSTITUTE MEETING ON THE RESOLUTION OF
PLANT-SPECIFIC ACTION ITEMS RELATED TO MRP-227-A REACTOR INTERNALS AGING MANAGEMENT PROGRAMS/INSPECTION PLANS
(CATEGORY 2 PUBLIC MEETING)**

November 19, 2013

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