March 28, 2016

MEMORANDUM TO: Kevin Hsueh, Chief
Licensing Processes Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

FROM: Joseph J. Holonich, Senior Project Manager ***/RA/***
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SUBJECT: SUMMARY OF FEBRUARY 4, 2016, MEETING WITH THE ELECTRIC POWER RESEARCH INSTITUTE ON "TOPICAL REPORT FOR PRIMARY WATER STRESS CORROSION CRACKING MITIGATION BY SURFACE STRESS IMPROVEMENT" (MRP-335, REVISION 3)

On February 4, 2016, a Category 2 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) staff, representatives from the Electric Power Research Institute (EPRI), and industry at NRC Headquarters, Three White Flint North, 11601 Landsdown Street, North Bethesda, Maryland. The purpose of the meeting was to hold a presubmission discussion between the NRC staff and EPRI regarding MRP-335, Revision 3, "Topical Report for Primary Water Stress Corrosion Cracking Mitigation by Surface Stress Improvement." Information related to the meeting can be found in the Agencywide Documents Access and Management System package Accession No. ML15344A379.

The NRC staff opened the meeting by stating that it was looking for EPRI to discuss the changes made in MRP-335, Revision 3, in response to the conditions in the NRC staff's draft safety evaluation (SE) for MRP-335, Revision 2. The NRC staff acknowledged receipt of a presubmission draft copy of MRP-335, Revision 3, but explained that it has not yet reviewed the document in detail. The NRC staff emphasized that the actual review would not begin until the document was formally submitted.

In its opening remarks, the industry reported that it would be describing the history of the changes in MRP-335, Revision 3. Industry further stated that it recognizes that the topical report is needed to support relief requests from the inspection frequencies contained in the NRC regulations and American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. It also noted that in the December 9, 2015, meeting, EPRI recognized the need for Revision 3 to address NRC staff's conditions in the draft SE and requested that the NRC staff review of MRP-335, Revision 2, be stopped.

In addition, industry said that five of the nine conditions in the draft SE had been completely adopted in MRP-335, Revision 3. For the remaining four conditions, the industry would show cases of how they were addressed. The industry requested that NRC staff raise any concerns during the meeting. This would allow EPRI to address the NRC staff's concerns in the formal MRP-335, Revision 3, submittal which the industry planned to submit by February 9, 2016.

During the industry's presentation, the NRC staff and industry discussed the use of deterministic versus probabilistic analyses. Industry indicated that a probabilistic approach was emphasized in earlier versions of the topical report to address the variability in key modeling parameters, and that the new deterministic matrix results in Revision 3 of the topical report are sufficient to justify the MRP inspection requirements. The NRC staff responded that it would review probabilistic analyses as schedule permits during its detailed review and determine if it would help to make a conclusion in the SE.

A second topic raised during the presentation was the concept of crack arrest with respect to peening. The industry stated that the purpose of peening was not to arrest crack growth. Rather, peening is to prevent crack initiation.

The third topic of discussion was the near surface stress (operating loads and residual stresses and potentially depth), which is required to prevent crack initiation in a peened component.

The NRC staff closed the meeting by identifying six items:

1) The NRC staff found that the December 9, 2015, meeting was beneficial in that all of the issues discussed appear to have been included in MRP-335, Revision 3. However, the NRC noted that a complete review of MRP-335, Revision 3, was required to determine whether all the issues had been successfully addressed.

2) The NRC staff noted that MRP-335, Revision 3, provided additional information on probabilistic analysis. The NRC staff observed that a complete review of the probabilistic analyses, as required for them to be the basis for a regulatory decision, would require a period of time which is significantly longer than the review schedule desired by industry. The NRC staff stated that it will use the probabilistic analysis to risk-inform its final conclusion.

3) The deterministic analyses appear to demonstrate that the potential for leakage of peened components, even with the proposed extension of inspection intervals, will be less than for un-peened components that are inspected following current regulations.

4) MRP-335, Revision 3, moves determination of uncertainty of residual stress measurements from MRP-335, Revision 3, to plant-specific relief requests. This will speed up the review of MRP-335, Revision 3, but may slow down the review of individual plant-specific relief requests.

5) The NRC staff noted that it would be helpful for the review if MRP-335, Revision 3, can include a clear statement and justification that it is not possible to achieve a stress state of 0 kilo pounds per square inch at operating conditions at either 1 millimeter depth or at the surface.

6) MRP-335, Revision 3, is based on the concept that peening will be 100 percent effective in preventing crack initiation. The NRC acknowledged that peening is highly effective in retarding the initiation of fatigue cracks. The NRC continues to review the concept of whether peening will be fully effective in eliminating initiation of primary water stress corrosion cracking cracks.

Next, the NRC staff provided its tentative review schedule for MRP-335, Revision 3. The schedule showed that a draft SE would be available 12 weeks from the formal submittal and a final SE would be available 14 weeks after that. The NRC staff emphasized three points on this schedule: (1) it would not officially start its review until the formal submittal had been made; (2) the review schedule assumed no requests for additional information; and (3) an evaluation by the Office of Management and Budget could be required under the Congressional Review Act. Any of those three caveats would affect the progress of the NRC review.

EPRI reported that some plants are beginning peening this spring. Industry noted that although the peening could be acceptable under Title 10 of the *Code of Federal Regulations*, Part 50, Section 59, it might not be completely aligned with MRP-335, Revision 3. Thus, industry questioned whether an individual plant could file a relief request with a plant-specific justification for a relief request. The NRC staff stated that such a plant-specific request could be made.

There were no actions identified at the meeting.

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