February 10, 2010

MEMORANDUM TO: Marissa G. Bailey, Acting Director
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Robert O. Hardies, Sr. Level Advisor ***/RA/***
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF JANUARY 19, 2016, PUBLIC MEETING TO DISCUSS REACTOR PRESSURE VESSEL ISSUES AND 10 CFR 50 APPENDIX, H RULEMAKING

On January 19, 2016, the U.S. Nuclear Regulatory Commission (NRC) staff hosted a Category 2 public meeting with representatives of industry and other stakeholders to exchange of information about reactor pressure vessel integrity issues and to discuss the staff's efforts associated with the rulemaking revision to Title 10 of the *Code of Federal Regulations,* Part 50 (10 CFR 50), Appendix H. A portion of the meeting related to the staff's recent evaluation of potential non-conservatisms in NRC Branch Technical Position (BTP) 5-3, "Fracture Toughness Requirements." Other topics included a summary of the staff's efforts to correct errors previously found in the Fracture Analysis of Vessels – Oak Ridge (FAVOR) computer code, and an industry presentation on the Pressurized Water Reactors Owner's Group (PWROG) efforts to address nozzle discontinuities in the extended beltline regions of pressurized water reactor (PWR)s. The NRC's Agencywide Documents Access and Management System (ADAMS) contains the meeting agenda (ADAMS Accession No. ML16021A006) and the list of attendees (Accession No. ML16021A003.)

The NRC staff made a status presentation (ADAMS Accession No. ML16021A007) of recent NRC evaluation activities performed regarding the potential non-conservatism of BTP 5-3. The objectives of the NRC's activities related to BTP 5-3 include evaluating the potential impact on safety and the potential need to revise the BTP. The staff provided a summary of their evaluation findings and their observations on each of the various technical positions of the BTP. The staff presented their proposed conceptual next steps which include: 1) finalizing the technical bases underlying the potential revision of BTP 5-3 considering any additional industry information, 2) performing a risk assessment, 3) revising the BTP (provided the risk assessment indicates a revision is necessary and would satisfy backfit provisions), 4) solicitation of public comments(if applicable), and 5) communicating the findings to all affected plants (if applicable).

The PWROG discussed an assessment of the margins associated with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Appendix G pressure-temperature (P-T) limits for PWR nozzles (ADAMS Accession No. ML16021A002). The assessment generically addresses 10 CFR 50 Appendix G requirements which the NRC recently clarified in Regulatory Issue Summary (RIS) 2014-11, "Information on Licensing Applications for Fracture Toughness Requirements for Ferritic Reactor Coolant Pressure

Boundary Components." This RIS clarifies that 10 CFR 50 Appendix G requires that P-T limits sufficiently address all ferritic materials of the reactor vessel, including the impact of structural discontinuities such as nozzles. The purpose of the industry's activity is to develop a basis for generically addressing reactor pressure vessel (RPV) inlet/outlet nozzles in P-T limit submittals and to justify the use of the reactor vessel shell region with the highest embrittlement and the RPV flange region as the limiting regions to be used for P-T limits using current methodologies that comply with 10 CFR 50, Appendix G. The PWROG's studies conclude that existing beltline and flange P-T limits bound all U.S. PWR inlet/outlet nozzle P-T limits derived using previous NRC-approved topical reports. The PWROG's intends to document their nozzle studies in a topical report scheduled for completion in the summer of 2016.

The NRC staff presented a summary of their efforts associated with the rulemaking activities to revise 10 CFR 50, Appendix H (ADAMS Accession No. ML16021A005). The objectives of the presentation included: 1) providing an overview of the rulemaking activities for 10 CFR 50, Appendix H, 2) discussing current staff considerations on updating the 10 CFR 50, Appendix H requirements, 3) discussing the rulemaking schedule, and 4) soliciting stakeholder feedback on some of the changes being contemplated. The staff provided a schedule but indicated the funding for this rulemaking had been suspended until fiscal year 2017. Therefore, NRC staff will suspend rulemaking activities until the fall of 2016. The NRC requested specific quantitative stakeholder feedback on the cost and resource impacts associated with the provisions being considered by the NRC.

Finally, the NRC's contractor at Oak Ridge National Laboratory (ORNL) presented results of recent NRC-funded activities associated with a pending new version of the FAVOR computer code to address software errors previously identified by the industry (ADAMS Accession No. ML16021A004). A release of FAVOR v16.1 that remedies the software errors is anticipated no earlier than the summer of 2016. A second presentation (ADAMS Accession No. ML16021A008) summarized the impact of using a stress-free temperature of 364°F to evaluate shallow surface-breaking flaws in FAVOR. Further efforts are underway to explore other fracture mechanics models and to assess the ability to adopt an appropriate model into the FAVOR code at a later date.

Action items captured during the meeting were as follows:

1. NRC will assess risk implications of potential revisions of BTP 5-2.
2. NRC and industry will assess the need for NRC formal review of the nozzle topical report.
3. Industry will provide feedback regarding burden increase or decrease associated with proposed changes to Appendix H.

The meeting ended at approximately 12:00 pm.

Boundary Components." This RIS clarifies that 10 CFR 50 Appendix G requires that P-T limits sufficiently address all ferritic materials of the reactor vessel, including the impact of structural discontinuities such as nozzles. The purpose of the industry's activity is to develop a basis for generically addressing reactor pressure vessel (RPV) inlet/outlet nozzles in P-T limit submittals and to justify the use of the reactor vessel shell region with the highest embrittlement and the RPV flange region as the limiting regions to be used for P-T limits using current methodologies that comply with 10 CFR 50, Appendix G. The PWROG's studies conclude that existing beltline and flange P-T limits bound all U.S. PWR inlet/outlet nozzle P-T limits derived using previous NRC-approved topical reports. The PWROG's intends to document their nozzle studies in a topical report scheduled for completion in the summer of 2016.

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ADAMS Accession No.: Package: ML16021A001 Summary: ML16039A091 Mtg. Notice: ML15300A125
ML06021A002 – PWROG Presentation ML16021A03 – RPV Attendance List ML16021A004 – Summary Rpt. On FAVOR
ML16021A005 – 10 CFR 50 Appendix H ML16021A006 – Agenda ML16021A007 – 1 BTP 5-3 Status Update
ML16021A008 - -2bFAVOR Status

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