



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

June 6, 2022

MEMORANDUM TO: Richard Chang, Chief
Licensing Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Lois M. James, Senior Project Manager */RA/*
Licensing Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MEETING FOR ELECTRIC POWER RESEARCH
INSTITUTE TO PRESENT ANTICIPATED ASME CODE
CASE N-729 VISUAL EXAM UPDATES TO THE U.S. NUCLEAR
REGULATORY COMMISSION (EPID L-2022-PPM-0000)

On May 11, 2022, the U.S. Nuclear Commission staff met with the Electric Power Research Institute (EPRI) for EPRI to provide an update to the NRC of changes to American Society of Mechanical Engineers (ASME) Code Case N-729 that has been submitted to the ASME Code Committee. The meeting summary is Enclosure 1 and the list of attendees is Enclosure 2.

If you have any questions or comments, please contact me via e-mail at Lois.James@nrc.gov.

Docket No. 99902021

Enclosures:

1. Meeting Summary
2. List of Attendees

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U.S. Nuclear Regulatory Commission Public Meeting Summary

Title: Meeting for Electric Power Research Institute (EPRI) to Present Anticipated American Society of Mechanical Engineers (ASME) Code Case N-729 Visual Exam Updates to the U.S. Nuclear Regulatory Commission (NRC)

Date of Meeting: May 11, 2022, 1:30 pm – 3:30 pm

Location: Webinar

Purpose of the Meeting: For EPRI to provide an update to the NRC of proposed changes to ASME Code Case N-729 that will be submitted to the ASME Code Committee.

General Details: The NRC staff held a public, observational meeting with EPRI for EPRI to provide an update to the NRC regarding proposed changes to ASME Code Case N-729 visual examination requirements that was discussed and will be submitted to the ASME Code Committee, Task Group on High Strength Nickel Alloys, for consideration. The meeting began at 1:30 pm and ended 3:25 pm. There were 26 NRC staff members, 3 EPRI members, 15 members of industry, and 3 members of the public or individuals who did not identify their affiliation. The meeting began with introductions of the NRC staff, EPRI staff, and industry staff.

Summary of Meeting: EPRI began the discussion by explaining the purpose of the meeting. Specifically, over the last several years, several licensees have submitted relief requests regarding visual examinations associated with concerns and indications on the upper head when using ASME Code Case N-729. In addition, the NRC staff issued Regulatory Issue Summary (RIS) 2018-06, "Clarification of the Requirements for Reactor Pressure Vessel Upper Head Bare Metal Visual Examinations," to clarify the requirements for bare metal visual examination, which can be either a visual examination of the bare metal of the upper head or a visual testing (VT)-2 examination under the insulation to meet the requirements, as conditioned by 10 CFR 50.55a(g)(6)(ii)(D), of notes 1 and 4 in Table 1 of ASME Code Case N-729-6.

EPRI considers the current Code Case requirements associated with visual examinations vague and proposes to update those requirements. Based on industry and NRC thoughts and experiences, EPRI began working to develop improvements to the visual examination language in ASME Code Case N-729 to implement a more structured process and reduce ambiguity.

EPRI began with a review of the existing visual examination acceptance criteria of ASME Code Case N-729 which includes the following concepts:

- Evaluation for source of relevant conditions
- Evaluation for degradation of low-alloy steel
- Supplemental exam or correction of the source
- Subsequent visual examinations of the previously obscured surfaces before return to service and at the next refueling outage (RFO)

EPRI is proposing to incorporate the following additional concepts not currently explicitly included within the Code Case:

- Explicit consideration of masking deposits from a source other than head penetration leakage (including a limit on number of masked penetrations depending on the head category)
- Explicit recognition that superficial discoloration and superficial deposits do not require evaluation
- Specification of the information to be collected in support of the evaluation, to the extent such information is relevant and can reasonably be obtained
- Establish an explicit standard of reasonable confidence that the relevant condition is not the result of head penetration leakage

EPRI also noted that:

- The concept of relevant conditions is reasonably reflected in the current language of the code case, but is not as tightly defined as it could be
- The concept of evaluation for degradation of low-alloy steel is there and is adequate
- The following concepts are there but would be modestly adjusted under this proposal
 - o Supplemental exam or correction of the source
 - o Subsequent visual examination (VE) of previously obscured surfaces before return to service and at the next RFO

The EPRI presentation next focused on a detailed discussion of their flowchart capturing the entirety of the proposed revised process for conducting the visual examination, evaluating any identified relevant conditions, and taking the necessary actions determined from that evaluation. EPRI characterized this revised process as providing for a more structured, methodical evaluation than currently required, and incorporating the new concepts previously noted.

Several new or revised definitions and their basis were also discussed including that of masking deposits, which is important to the evaluation. The proposed masking definition requires there be strong evidence that the deposit is coming from above, but also recognition that more than one source of leakage might be present and that the masked condition could compromise the visual examination.

EPRI explained that the proposed standard of "reasonable confidence" recognizes that absolute confidence in the determination whether evidence of nozzle leakage is present is not necessary. This conclusion is based on related requirements that maintain defense in depth and that extensive research and operating experience support a determination that the required repeat visual exam in the next refueling outage is sufficiently timely to avoid a consequential challenge to nuclear safety.

EPRI also proposed a requirement for personnel performing the evaluation of relevant conditions identified during visual examinations.

EPRI concluded by explaining that they plan to initiate a Code Action through ASME to seek Code Committee approval. Subsequent NRC consideration of the approved revised Code Case

would of course take time, but the updated Code Case and basis document would be available, and licensees could use the information.

The NRC staff asked questions and made comments including the following:

- Regarding the 15 indications, partially masked penetrations *may*... Can you further explain the word *may*?
 - o Licensees would have the option of counting fractions of masking indications. For example, if there are two penetrations that are 50 percent masked, this could count as one fully masked penetration rather than two. This would require additional analysis within the required evaluation, but is an option.
- Can you speak to “reasonable confidence” in the context of the detection and evaluation of relevant conditions?
 - o Dust or debris which is blown away would not count as a relevant condition. After blowing, remaining deposits that may be reactor coolant system leakage and meet the relevant condition definition would need to be evaluated under the Code Case. The “reasonable confidence” standard is obtained through the rigorous, detailed deposit evaluation process, which may include potential steps delineated in supporting documents such as MRP-60. Deposit removal should not be undertaken until a licensee has sufficiently assessed and characterized the material, including any necessary sampling, to support the subsequent evaluation. Power wash cleaning would be the last task accomplished.
- “Reasonable confidence” is a field decision that will need to be recorded and justified. There does not appear to be clear cut go/no-go decision point. Given this is a field decision, is there more information for regional inspectors to better understand?
 - o The “reasonable confidence” standard would primarily be applied during the well-documented evaluation process for dispositioning relevant conditions identified during the initial VE as opposed to being a true field decision. EPRI has also worked on a quantitative scoring rubric concept which might be applied to reduce the subjectivity in assessing each evaluation item. This scoring rubric may be included in the basis documents rather than being codified in the Code Case. This is part of the details that are still being developed.
- Can you discuss the terms “superficial” nature, “previously obscured,” and “masked” further?
 - o Superficial discoloration or superficial deposits are defined as areas of discoloration or deposits on the head upper surface with no visually discernible thickness. Based on operating experience from past inspections, superficial deposits or discoloration have not been associated with head penetration leakage. The proposed Code Case changes do not require further evaluation of the superficial deposits or discoloration but do require their documentation during the visual inspection.
 - o Regarding “previously obscured” and “masked,” EPRI explained that any relevant conditions need to be removed to allow inspection of the bare metal to see

corrosion and any degradation before returning to service. Masked locations are only a subset of potential relevant conditions that may obscure the head surface, so both terms are relevant in this discussion.

- Years ago, inspectors found that a licensee cleaned a deposit found on the reactor vessel head before conducting any analyses or evaluation. Would this be permitted under the revision being proposed.
 - o EPRI stated the intent is to build more structure and logical sequencing into the revised language beyond what is currently in the Code Case such that all appropriate information would be collected to support analysis and evaluation prior to cleaning to remove relevant conditions.

- There has been a lot of discussion in this meeting about applying the standard of “reasonable confidence” in the Code Case. Why reasonable confidence and not reasonable assurance? And what are the criteria? Why would you not update the language in the Code Case instead of providing more guidance in the basis document or MRP-60?
 - o EPRI stated that reasonable confidence is subjective and not easily reducible to a set of objective criteria. As proposed, whether a “reasonable confidence” conclusion can be reached is the focus of the evaluation. The evaluation must weigh the available evidence, develop a logical framework for assessing and understanding it, and present a defensible position as to why it does or does not reach a conclusion with “reasonable confidence”.
 - o Given this lack of simple objective criteria, direct incorporation into the Code Case appears impractical and EPRI judged it more appropriate to provide practical guidance and examples within EPRI Technical Report MRP-60, “Materials Reliability Program: Visual Examination for Leakage of PWR Reactor Vessel Upper Head Nozzles.” Also, there seems to be little difference between reasonable confidence and reasonable assurance as they are generally considered synonymous.

Public Participation Themes: No member of the public spoke on the webinar.

Attachments:

Meeting description and agenda – ADAMS Accession No. ML22117A034

EPRI slide presentation – ADAMS Accession No. ML22129A008

EPRI Markup of ASME Code Case N-729 - ADAMS Accession No. ML22129A007

U.S. Nuclear Regulatory Commission Public Meeting Attendees

Title: Meeting for Electric Power Research Institute to Present Anticipated American Society of Mechanical Engineers Code Case N-729 Visual Exam Updates to the U.S. Nuclear Regulatory Commission

Date of Meeting: May 11, 2022, 1:30 pm – 3:30 pm

NRC PARTICIPANTS

Name	Affiliation
Anchondo-Lopez, Isaac	U.S. Nuclear Regulatory Commission (NRC)
Michael Benson	NRC
John Bozga	NRC
Burton, Mat	NRC
Mat Burton	NRC
Jay Collins	NRC
Stephen Cumblidge	NRC
Robert Davis	NRC
Binoy Desai	NRC
Bart Fu	NRC
Emma Haywood	NRC
Allen Hiser	NRC
John Honcharik	NRC
Lois James	NRC
Varoujan Kalikian	NRC
Seung Min	NRC
Matthew Mitchell	NRC
Carol Moyer	NRC
Carol Nove	NRC
Cory Parker	NRC
Eric Reichelt	NRC
David Rudland	NRC
Atif Shaikh	NRC
John Tsao	NRC
Dan Widrevitz	NRC
On Yee	NRC

INDUSTRY PARTICIPANTS

Name	Affiliation
David Van Allen	Arizona Public Service Company
Donald Armbruster	Constellation Nuclear
Joseph Buchanan	Constellation Nuclear
Ramon Cruz	Constellation Nuclear

Name	Affiliation
Rebecca Rice	Constellation Nuclear
Glenn Chatterton	DC Cook
Markus Burkardt	Dominion Engineering, Inc. (Dominion)
Troy Meurer	Dominion
Glenn White	Dominion
Jim Cirilli	Electric Power Research Institute (EPRI)
Craig Harrington	EPRI
Chris Wax	EPRI
Mark Ferlisi	GSE TrueNorth
Kevin J Hacker	Services
Truong V Vo	Services
Dale Brown	Southern Nuclear
Corey Thomas	Southern Nuclear
Maria Luisa Garcia Heras	Tecnatom

PUBLIC PARTICIPANTS

Name	Affiliation
Austin Charles Keller	public
Rowland Walter Tedder Jr.	public
unannounced	public

SUBJECT: SUMMARY OF MEETING FOR ELECTRIC POWER RESEARCH INSTITUTE TO PRESENT ANTICIPATED ASME CODE CASE N-729 VISUAL EXAM UPDATES TO THE U.S. NUCLEAR REGULATORY COMMISSION (EPID L-2022-PPM-0000) DATED JUNE 6, 2022

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