

## U.S. Nuclear Regulatory Commission Public Meeting Summary

April 13, 2015

**Title:** The Performance-Based Emergency Core Cooling Systems Cladding Acceptance Criteria (Title 10 of The Code of Federal Regulations Section 50.46c) Proposed Rule

**Meeting Identifier:** 20150264

**Date of Meeting:** March 17-18, 2015

**Location:** NRC headquarters location in Rockville, Maryland

**Type of Meeting:** Category 3

**Purpose of the Meeting(s):** The purpose of the meeting was to discuss implementation and regulatory analysis comments received related to the 10 CFR 50.46c proposed rule (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12283A174.) The U.S. Nuclear Regulatory Commission (NRC) did not accept formal written comments during the meeting.

**General Details:** Day 1 of the meeting was attended by 57 individuals including industry representatives and NRC staff, 9 of whom participated through audio teleconferencing and webinar. Day 2 of the meeting was attended by 44 individuals, 5 of whom participated through audio teleconferencing and webinar.

**Summary of Presentations:** The meeting slides and handouts are available in the ADAMS package under Accession No. ML15071A272. In addition to the material presented in the slides, the major areas of discussion are summarized below.

### Public Participation Themes:

#### Introductory Remarks

- The meeting started with welcome, introductions, and meeting ground rules for the people in the room and those participating via phone.
- The NRC staff made a presentation providing an overview of the proposed rule, an update on the draft risk-informed regulatory guide, and potential changes to the proposed rule under staff consideration. These potential changes were discussed in order to aid the discussion on implementation of the proposed rule. These slides are in ADAMS at ML15071A216. Key points following this discussion include:
  - In response to questions, the staff provided the number for the draft risk-informed regulatory guide, DG-1322, and the length of the public comment period, 75 days.
  - A member of industry asked if the NRC could provide preliminary response to their comments related to moving Appendix K to regulatory guidance. There was

a considerable amount of additional discussion on this topic, and the industry noted that this could be a topic of an additional public meeting. The NRC noted that they would consider this as a topic for a future meeting.

- The NRC responded that the comment had not acknowledged any potential unintended consequences of this proposal or ways to manage such unanticipated consequences.
- The NRC questioned the motivation for this proposal, and a member of industry noted that the NRC's withdrawal of support for old loss-of-coolant accident (LOCA) methods is the driver.
- In addition, a member of the industry stated that Appendix K needed to be updated to allow the use of the Cathcart-Pawell (CP) correlation. Appendix K stipulates that the Baker-Just (BJ) correlation be used to calculate the amount of cladding oxidation and the heat associated with that exothermic reaction. The NRC staff responded that Appendix K did not need to be revised and that plants using Appendix K models should continue to use BJ for its defined purpose, but use CP to integrate time-at-temperature as required by 10 CFR 50.46c. No exemptions to Appendix K are needed for this application.
- A member of industry referenced Research Information Letter (RIL) 0202, "Revision of 10 CFR 50.46 and Appendix K," which can be found under ADAMS Accession No. ML021720690 as part of package ML021920159. Industry encouraged the NRC to review this RIL to understand past related efforts.

### Industry Presentations

- **Overview:** A representative from the Electric Power Research Institute (EPRI) Fuel Reliability Program, Thomas Eichenberg, provided a general overview of the industry comments submitted on the 50.46c proposed rule. This presentation is under ADAMS Accession No. ML15075A472, and the comments are under ADAMS Accession No. ML14237A149.
- **Owners Groups' Presentations:** A representative from the Pressurized Water Reactor Owners Group (PWROG), Kurt Flaig, and a representative from the Boiling Water Reactor Owners Group (BWROG), Michael Iannantuono, made presentations. The presentations are under ADAMS Accession Nos. ML15075A468 and ML15075A469, respectively. Main discussion topics included the following:
  - Several members of the industry were concerned with compliance. These concerns included the following:
    - Was the date of compliance based on when the license amendment request (LAR) was submitted or when the NRC has completed its review and approval?
    - Awaiting NRC review would extend the schedule and introduce uncertainty beyond industry control.
    - Industry recommended a 10 year implementation period to allow for NRC approvals.
    - How would reporting of changes and errors under 10 CFR 50.46(a)(3) be performed during the period while awaiting NRC approval?

- Industry would prefer NRC approval of compliance demonstration.
  - Are currently approved LOCA methods considered acceptable for 50.46c compliance demonstration? Do vendors need to submit revision to approved topical reports specifically for 50.46c?
  - Industry re-iterated that regulatory guidance is needed to address all of the uncertainties.
  - A member of the NRC asked if Owner's Group emergency core cooling system (ECCS) margin assessments would be updated and if there are plans to bin plants by level of effort required for compliance. A representative of the PWROG noted that the PWROG isn't a regulatory body and doesn't have the authority to force this, but has encouraged licensees to develop detailed compliance plans.
  - The NRC emphasized that in order to accept an alternative implementation plan (from the 3 track plan in the proposed rule, with the latest compliance date of 60 months) as proposed by industry, there would need to be specific details to provide confidence that the workload would be well managed. Also, there would need to be justification for a compliance deadline longer than 60 months. A member of industry noted that they would be working on providing these details.
  - A member of the NRC Office of General Counsel (OGC) addressed the definition of compliance by noting that there is no definition of compliance in the NRC's regulations or in the proposed rule. The OGC representative also indicated that the proposed rule does not contain a requirement for NRC staff review and approval. Thus, it is ultimately the licensee's regulatory responsibility to document its demonstration that it is in compliance.
  - A member of the NRC OGC addressed an industry inquiry about the staff's consideration of the industry's proposal to remove Appendix K from the regulations and instead treat it as guidance. The OGC representative indicated that there is no legal prohibition to such a course of action. However, the industry proposals did not appear to reflect a complete understanding of the consequences of removal. The OGC representative then briefly summarized the consequences in terms of process for changing Appendix K, predictability and regulatory stability for the applicant, NRC and other stakeholders, shifting of the burden of proof in NRC enforcement actions, and effects on adjudicatory hearings and the ability to invoke 10 CFR 2.335. Finally, the possible need for a limited renoticing of the 50.46c rulemaking to afford a comment opportunity on any proposed removal of Appendix K was mentioned by the OGC representative.
- **Fuel Vendors' Presentations:** Representatives from three fuel vendors provided presentations, which are under ADAMS Accession Nos.: Westinghouse, Thomas Rodack, ML15075A477; GEH Hitachi, Kurshad Muftuoglu, ML15075A234; AREVA, Lisa Gerken, ML15075A465. Main discussion topics included the following:
    - A member of the NRC asked how many of the 7 Westinghouse evaluation models would be updated and used in the future. A member of industry explained that it is complicated as some models would be retired and old evaluation models (EM) could be continually used for the plants with large margin. However, PWR plants that need re-analysis will rely on new full spectrum LOCA EM.
    - A member of the NRC staff asked if thermal conductivity degradation would be resolved with any plant using Appendix K models.

- There was discussion regarding the notion that (combined operating license) COL holders must comply either before first fuel load or 60 months, whichever is later. The NRC clarified that this was intended to distinguish between COL applicants that aren't building versus COL applicants that are building and that may be built before 60 months. There was a discussion that the staff may need to create two bins to distinguish these concepts.
- A member of the industry discussed confusion with a staff comment that Technical Specifications core operating limit report (COLR) methods would need to be updated to reflect any new EMs used for 50.46c compliance.
- **Fleet Schedule Assumptions:** Thomas Eichenberg of the EPRI Fuel Reliability Program provided a presentation on fleet schedule assumptions associated with implementation the proposed rule and accompanied this presentation with an illustrative Gantt chart. The presentation and Gantt chart are under ADAMS Accession Nos. ML15075A482 and ML15076A077, respectively. Main discussion topics included the following:
  - A member of the NRC staff asked whether vendors anticipate deviating from the regulatory guides (i.e., PQD and breakaway testing procedures and PQD analytical limits) and if NRC staff and industry should work more closely together to align on the regulatory guides if that would reduce the level of effort.
  - The NRC staff emphasized that in order to entertain an alternative implementation plan from what is stated in the proposed rule, there would need to be specific details and justifications. For instance, each plant would need to identify any unique situations on the horizon (e.g., EPU, cladding changes, vendor changes) and identify the LOCA EM used for 50.46c compliance in order to bin plants and manage the workload.
  - The NRC asked whether it was feasible to get this plant specific data in 4 months to support an alternative implementation plan in the development of the proposed final rule. A member of the industry stated that this was possible.
  - There was agreement that a detailed schedule is needed in order to meaningfully plan for resources for the future. In order to continue to discuss details of an alternative implementation plan, an action item was taken to consider public meeting webinars in the coming weeks/months.
- **Suggested Guidance:** On day 2 of the meeting, a representative from Southern Nuclear, Robert Florian, provided a presentation on suggested guidance for implementation 10 CFR 50.46c. This presentation is under ADAMS Accession No. ML15075A486. Main discussion points included the following:
  - The NRC noted that the staff is interested in the idea of an industry developed guidance document and LAR templates, and then a staff created review standard. The review standard would state that the NRC endorses the industry's guidance and provide guidance for staff reviewers to expedite these reviews.
    - This guidance would not necessarily need to be completed before the rule is finalized, but the earlier it can be completed the better.
  - A member of industry suggested a potential public workshop on this guidance in the August-September 2015 timeframe in order to target completion of the guidance by December.

- A separate subject of discussion was the change control process (i.e., paragraph m of 50.46c). A member of the NRC staff noted that there will be a regulatory issue summary (RIS) discussing reporting for the current 50.46 requirement (this is a separate initiative from the 50.46c proposed rule), and it may be beneficial to have a public meeting to discuss this RIS once its published for comment and 50.46c paragraph m.
- Another item of discussion was potential new language associated with long term cooling in 50.46c, which may be a subject of an additional public meeting. This public meeting would be to hear from stakeholders any potential unintended consequences of new rule language.

### Regulatory Analysis

In the afternoon on day 2 of the meeting, the NRC staff provided a presentation summarizing the regulatory analysis performed in association with the proposed rule. This presentation is under ADAMS Accession No. ML15071A211 and the regulatory analysis is under ADAMS Accession No. ML12283A188. Main discussion points included:

- The NRC staff noted that the analysis would be updated with any relevant information that became available. Given the status of the proposed rule (i.e., the public comment period is closed), the NRC is not requesting additional information but would consider it if volunteered by stakeholders.
- There was a question regarding whether the NRC's latest safety evaluation (i.e., in terms of margin) had been included in the regulatory analysis, and the answer was no.
- There was a question whether the 2009 ANPR vendor supplied comments on costs to implementation had been included. The NRC staff responded that they would look into this.
- There was a question whether costs associated with attending meetings or preparing public comments on the draft rule had been included in the analysis. The answer was no but that these costs could be added in the revision to the analysis.
- A member of the industry asked why they should expend effort to perfect the rule's costs estimates as it is an adequate protection rule and costs cannot be considered. The NRC noted that the regulatory analysis would help ensure that the adequate protection rule would be implemented in a cost effective manner.
- Given changes from the proposed rule stage to the final rule stage, the NRC will be updating the regulatory analysis. A member of NEI noted that the industry is prepared to create more accurate cost estimates. The NRC noted that the staff will review and consider any information that is volunteered by stakeholders, but is not able to specifically request information at this time given Office of Management and Budget (OMB) requirements. The NRC is open to holding more public meetings on the regulatory analysis if requested.

Future Public Meetings: Throughout the 2-day public meeting, meeting participants noted additional topics that may be subjects of future public meetings. **These plans are pre-decisional and subject to change**; however, a summary of these potential public meetings include the following:

Subject of public meeting	Rough timeframe	Notes
Meeting focused on DG-1261, DG-1262, DG-1263	April 29-30, 2015	This meeting will be held at Oak Ridge National Lab
1. Template/ details on Gantt chart 2. Long term cooling public workshop (potential)	May 2015	1. After April draft guide meeting. 2. Include draft rule language in meeting notice.
Guidance kickoff meeting/ comment resolution	Late September 2015	See "Suggested Guidance" section above
Implementation	October/ November 2015	Final discussion on implementation of 50.46c, as the rule is nearing completion
Change Reporting Guidance	Potentially Summer 2015—tentative	RIS on current 50.46 requirements anticipated to be published summer 2015. There was discussion of a public meeting to discuss the RIS and comments on paragraph m in 50.46c.

- The industry noted their continued interest in a public meeting on moving Appendix K to a regulatory guide. The NRC staff noted that they would discuss this internally and bring the item to management for discussion.
- There was discussion of potential bi-weekly public webinars to discuss the status of an alternative implementation plan.
- November/December- ACRS meetings (public)

#### Action Items/Next Steps:

- Work on scheduling potential additional public meetings

#### Attachments:

- Meeting agenda – ML14190A002
- NRC staff presentation – ADAMS Accession No. ML15071A216, ML15075A468
- Industry presentations – ADAMS Accession Nos. ML15075A468, ML15075A469, ML15075A465, ML15075A472, ML15075A482, ML15075A477, MLK15075A486, ML150476A077, ML15075A234

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DATE	4/9/2015	4/13/2015	4/13/2015	4/13/2015

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**List of 50.46c Public Meeting Attendees  
March 17, 2015**

<b>Name</b>	<b>Organization</b>
Thomas Rodack	Westinghouse
Beth A. Wetzel	TVA
Kathleen Parrish	APS
Steve Scammon	Energy Northwest
Mitch Nissley	Westinghouse
David A. Medek	Arizona Public Service
Dana M. Knee	Dominion
Paul Leonard	Enercon
Gregory Hill	AEP/Indiana Michigan
Ron Holloway	WCNOL
Michael Iannantuono	GE-Hitachi
Gregg Swindlehurst	GS Nuclear Consulting
Charles Albury	STP NOC
Kurshad Muftuoglu	GE Hitachi Nuclear Energy
Miguel Armenta	Energy Northwest
William Herwig	SCR&G
Ken Yueh	EPRI
Ryan Joyce	SNL
Jerald Holm	Areva
Tom Eichenberg	TVA
Andy Olson	Exelon
Korey Hosack	Westinghouse
Kurt F. Flaig	Dominion
Steve Smith	NRC
Gordon Cleifton	NEI
Lisa Gerken	AREVA
Darius Ahran	Xcel Energy
Shane Jurek	Xcel Energy
Alan Meginnis	AREVA
Jeremy Dean	NRC
Jennifer Whitman	NRC
Michelle Bales	NRC
CJ Fong	NRC
Ralph Landry	NRC
Robert Becton	NRC
Robert Taylor	NRC
Vic Cusumano	NRC
Kim Hawkins	NRC
Robert Florian	NRC
Harold Scott	NRC
Gary D. Miller	Dominion
Paul Clifford	NRC
Shanlai Lu	NRC
Geary Mizuno	NRC
Harold Scott	NRC



<b>Name</b>	<b>Organization</b>
Alysia Bone	NRC
Jessica Kratchman	NRC
John Alvis	Anatech
David Fink	Westinghouse
Dennis Frederick	First Energy
Mark Handrick	Duke Energy
Steve Laur	NRC
Stanley Levinson	AREVA
Ben Parks	NRC
Thomas Remick	Arizona Public Service
James Smith	Westinghouse

**List of 50.46c Public Meeting Attendees  
March 18, 2015**

<b>Name</b>	<b>Organization</b>
Michael Iannantuono	GE Hitachi, BWROG
Miguel Armenta	Energy Northwest
Beth Wetzel	TVA
Kurshad Muftuoglu	GE Hitachi Nuclear Energy
Thomas Rodack	Westinghouse
Ryan Joyce	Southern Nuclear
Lisa Gerken	AREVA
William Herwig	SCR&G
Gregory Hill	AEP/Indiana Michigan Power
Greg Broodbent	Entergy
Charles Albury	STPNOC
Gregg Swindlehurst	GS Nuclear Consulting
Ken Yueh	EPRI
David A. Medek	Arizona Public Service
Jessica Kratchman	NRC
Steven Hutchins	Exelon/NEI
Jerald holm	AREVA
Tom Eichenberg	TVA
Kathleen Parrish	APS
Dana Knee	Dominion
Gary D. Miller	Dominion
Robert Florian	Southern Nuclear
Steve Scammon	Energy Northwest
Kurt F. Flaig	Dominion
Alan Meginnis	AREVA
Korey Husack	Westinghouse
Gordon Cleffton	NEI
Jennifer Whitman	NRC
Jeremy Dean	NRC
Robert Taylor	NRC
Michelle Bales	NRC
Darius Ahrar	Xcel Energy
Shane Jurek	Xcel Energy
Jana Bergman	CW/ Scientech
Kim Hawkins	NRC
Harold Scott	NRC
Andy Olson	Exelon
Alysia Bone	NRC
Paul Clifford	NRC
David Fink	Westinghouse
Ken Frederick	First Energy Satellite corp
Mark Handrick	Duke Energy
Thomas Remick	Arizona Public Service
James Smith	Westinghouse