



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

February, 03, 2020

MEMORANDUM TO: Tara Inverso, Acting Deputy Director
Division of Fuel Management
Office of Nuclear Material Safety and Safeguards

FROM: Paul B. Kallan, Project Manager */RA/*
New Reactor Licensing Branch
Division of New and Renewed Licenses
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE JANUARY 22, 2020, CATEGORY 1 PUBLIC
WORKSHOP ON SPENT FUEL PERFORMANCE MARGINS

On January 22, 2020, the U.S. Nuclear Regulatory Commission (NRC) held a Category 1 public workshop with the Nuclear Energy Institute (NEI) and other industry representatives to discuss NEI's white paper on Spent Fuel Performance Margins (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19318D971). The goal of the workshop was to reach a common understanding of the details of each recommendation, the proposed regulatory products, and the path forward to engage on individual recommendations. Approximately 62 personnel attended, including 24 in person and 38 remotely via Skype. The remote participants included members of the public.

The public workshop notice dated January 9, 2020, in ADAMS at Accession No. ML20009C024. This meeting notice was also posted on the NRC public website. Enclosed is the meeting agenda (Enclosure 1), a list of participants (Enclosure 2), an overview of the meeting (Enclosure 3) and a table listing workshop outcomes and actions (Enclosure 4). NEI's presentation materials are available in ADAMS:

- Thermal Modeling and Phenomena Identification and Ranking Tables (PIRTs): ADAMS Accession No. ML20021A220
- Workshop on Spent Fuel Performance Margins: ADAMS Accession No. ML20021A221

In addition to the items discussed and listed in Enclosure 4, NEI stated that it intends to withdraw petition for rulemaking (PRM) 72-7, which was submitted by NEI on October 8, 2012 (ADAMS Accession No. ML12299A380).

Enclosures:

1. Meeting Agenda
2. List of Attendees
3. Meeting Overview
4. Table

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In terms of next steps, the NRC is planning four additional workshops to discuss the recommendations in more detail. During the meeting, the attendees discussed the following possibilities:

- Thermal Parameters (~ February 2020)
- Source Terms (~ March 2020)
- Dose Rates (~ April 2020)
- Graded Approach/Phenomena Identification and Ranking Tables (PIRTs) (~ May 2020)

The NRC may consolidate these meetings and/or shift the timeline for logistics purposes. In any event, these workshops will be posted to the NRC's public meeting website in advance of each meeting date.

SUBJECT: SUMMARY OF THE JANUARY 22, 2020, CATEGORY 1, AND PUBLIC
WORKSHOP ON SPENT FUEL PERFORMANCE MARGINS
DATE: FEBRUARY03, 2020.

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ADAMS Accession No.: ML20028F277**via email****NRR-106**

OFFICE	DNRL/NRLB: PM	NMSS/DFM: (a) DD	DNRL/NRLB: PM
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DATE	1/29/20	1/03/20	1/03/20

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U.S. NUCLEAR REGULATORY COMMISSION

CATEGORY 1 PUBLIC WORKSHOP ON SPENT FUEL PERFORMANCE MARGINS

PUBLIC MEETING AGENDA

January 22TH, 2020

<i>Time</i>	<i>Topic</i>	<i>Speaker</i>
9:00 AM	Introductions/Opening Remarks	NRC/NEI
9:30 AM	Industry Presentations	NEI
12:00 PM	Break for Lunch	
1:00 PM	Discussion on Recommendations	NRC/NEI
TBD	Break (as needed)	
3:30 PM	Opportunity for Public Comment	Members of the Public
3:50 PM	Closing Remarks	NRC/NEI
4:00 PM	Meeting Adjourn	

U.S. NUCLEAR REGULATORY COMMISSION

CATEGORY 1 PUBLIC WORKSHOP ON SPENT FUEL PERFORMANCE MARGINS

LIST OF ATTENDEES

January 22th, 2020

Name	Organization
Andrea Kock	U.S. Nuclear Regulatory Commission (NRC)
Jeremy Bowen	NRC
Tara Inverso	NRC
Yaira Diaz	NRC
Meraj Rahimi	NRC
Travis Tate	NRC
April Smith	NRC
Paul Kallan	NRC
Christine Lipa	NRC
Chris Bajwa	NRC
Joann Ireland	NRC
Jason Piotter	NRC
Alayna Pearson	NRC
Antonio Rigato	NRC
Caylee Kenny	NRC
Chi Min Chang	NRC
Daniel Doyle	NRC
David Tang	NRC
Donny Harrison	NRC
Ghani Zigh	NRC
Haile Lindsay	NRC
Jimmy Chang	NRC
Joe Browski	NRC
John Wise	NRC
Jorge Solis	NRC
Kenneth Armstrong	NRC
Norma Garcia	NRC
Rhex Edwards	NRC
Ricardo Torres	NRC
Timothy McCartin	NRC
Zhian Li	NRC
Rod McCullum	Nuclear Energy Institute (NEI)
Mark Richter	NEI
Kris Cummings	Curtis Wright
Jana Bergman	Curtis Wright
Aladar Csontos	Electric Power Research Institute (EPRI)
Hatice Akkurt	EPRI
Keith Waldrop	EPRI
Jeremy Renshaw	EPRI

Jack Desando	Exelon
Michael Callahan	GSI
Stefan Anton	Holtec International
Andrew Orrell	INL
George Carver	NAC International
Andy Jung	NWTRB
Brad Blome	Omaha Public Power District
Douglas Yates	TN Orano
Raheel Haroon	TN Orano
Glenn Mathues	TN Orano
Don Shaw	TN Orano
Andrea Jennetta	Platts
Glenn Schwartz	PSEG Nuclear
Paul Plante	The Yankee Companies
Robert Capstick	The Yankee Companies
Steven Baker	Transware
Zita Martin	TVA
Carlyn Greene	USC
Robert Quinn	Westinghouse
John Phabe	Westinghouse
Marty Murphy	XCEL
Marvin Lewis	Public

U.S. NUCLEAR REGULATORY COMMISSION

CATEGORY 1 PUBLIC WORKSHOP ON SPENT FUEL PERFORMANCE MARGINS

On January 22, 2020, the U.S. Nuclear Regulatory Commission (NRC) held a Category 1 public workshop with the Nuclear Energy Institute (NEI) and other industry representatives to discuss NEI's white paper on Spent Fuel Performance Margins (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19318D971). The goal of the workshop was to reach a common understanding of the details of each recommendation, the proposed regulatory products, and the path forward to engage on individual recommendations. Approximately 62 personnel attended, including 24 in person and 38 remotely via Skype. The remote participants included members of the public.

The staff participated in discussions with NEI on its plans for the recommendations listed in the white paper under Category 1, "Actions that industry can take within the confines of existing regulations and guidance," and Category 2, "Actions that NRC can take by tailoring their regulatory guidance as well as their review and inspection practices to recognize the existence of performance margin." The staff also discussed, at a high level, Category 3 recommendations, "Actions that will need industry and NRC to engage in a dialogue to develop improved regulatory tools and guidance."

In the morning session of the meeting, NEI stated that it intends to withdraw petition for rulemaking (PRM) 72-7, which was submitted by NEI on October 8, 2012 (ADAMS Accession No. ML12299A380).

NEI then discussed the Spent Fuel Margins Industry Category 1 Recommendations, or the actions for the industry. These are as follows:

- Licensees/COC holders to define and utilize more realistic source terms, supported by conservative modeling in the downstream calculations, in their applications to demonstrate the adequacy of dry storage system design (Recommendation III-1).
- In cases where conservative source term calculations demonstrate compliance with 72.104 and 72.106, licensees/COC holders should also apply a source term uncertainty (i.e. burnup uncertainty) in their applications (Recommendation III-2).
- Assess how thermal modelling is done and what can be simplified. Develop an industry consensus based on thermal modelling methodology and document this as a best practice guide (Recommendation IV-3).
- CoC holds should amend their CoCs to follow the precedent established through Regulatory Issue Resolution Protocol 1-16-01 wherein a graded approach was developed to apply risk insights which resulted in a pilot amendment (#16) to Standardized NUHOMs® Certificate of Compliance No. 1004 for Spent Fuel Storage Casks (Docket 72-1004) that achieved a 90% reduction in the amount of information requiring NRC approval in the Fuel Qualification Table and reduced the overall size of the CoC by 33%. NEI mentioned that the NRC would then have the action to review graded approach amendments as they are submitted (Recommendation VI-1).

Next NEI discussed the Spent Fuel Performance Margins Industry Category 2 Recommendations, or the actions for the NRC. These are as follows:

- NRC should develop an Acceptance Review Grading process that would assign varying levels of review to an application, from the time it is initially received, based on risk insights (Recommendation II-1).
- In the cases where applicants have applied conservative source terms, conservative modeling, and source term uncertainty (i.e. burnup uncertainty) in their applications NRC should conduct a much less detailed review (Recommendation III-3).
- In cases where applicants have applied the results of the PIRT described in Recommendation IV-1, NRC should revise its internal review guidance to limit the review to verification that the results of the PIRT have been appropriately applied instead of trying to independently repeat results (Recommendation IV-2).

The NEI discussed, at a high level, the Spent Fuel Performance Margins Category 3 Recommendations. The NRC and NEI determined that these recommendations should be discussed in more detail at a future workshop (likely in May 2020).

Following NEI's presentation, Westinghouse provided a quick update of the action items from the April 23rd, 2019 public meeting (A summary of that meeting is available in ADAMS at Accession No. ML19126A026.).

The next presentation was from the Electric Power Research Institute (EPRI), which discussed the benefits of Thermal Modeling and Phenomena Identification and Ranking Tables (PIRTs). EPRI discussed the benefits of improved thermal models that had occupational dose benefits, dry storage operational benefits and reactor operation/safety benefits. EPRI also discussed the PIRT process, which is a systematic way of gathering information from experts on a specific subject, and ranking the importance of the information, in order to meet some decision-making objective, thus determining what has the highest priority for research on that subject. An important part of the process is to also identify the uncertainty in the ranking, usually by scoring the knowledge base for the phenomenon. EPRI used examples of thermal/decay heat modeling and fuel/cladding performance. EPRI mentioned that the PIRT process significantly reduced concerns with high burn up (HBU) fuel/cladding performance.

The next four presentations were provided by Holtec, NAC, TN – Orano and TVA and consisted primarily of cost-benefit examples. TVA provided a licensee's perspective on the cost-benefit.

In the afternoon session of the meeting, NRC, NEI, and industry discussed the Category 1 and 2 recommendations. These discussions focused on desired outcomes of each recommendation, associated details, and who (i.e., NRC or industry) would lead each recommendation. This information was captured in a table during the workshop and can be found in Enclosure 4.

At the end of the meeting, the NRC staff provided an opportunity to the public to provide any comments or questions. There was one comment from the public that meeting attendees should identify themselves prior to speaking in the workshop because the conversation was difficult to follow. The attendees committed to properly identifying themselves in future workshops.

Outcomes and Actions from the January 22, 2020 Workshop on Spent Fuel Margins

Recommendation	What is needed/Regulatory Product	Details	Workshop Date	Lead
IV-3 (Category (Cat) 1): Best practices for thermal modeling methodology	Industry Best Practices Guide (followed by potential Nuclear Regulatory Commission (NRC) documentation indicating consistency with NUREG 2152 "Computational Fluid Dynamics Best Practice Guidelines for Dry Cask Applications")	Would clarify performance metrics and provide an integrated/aligned approach on what inputs are "relevant/important" and needed for reasonable assurance. Related to Category 3 Recommendation IV-1.	Late February 2020	Industry
III-1 (Cat 1): Define and utilize more realistic source terms	Industry to develop a "conservatisms roadmap" and develop guidance for end-users (licensees). Public workshop will give awareness to NRC and allow for NRC input on relative importance of conservatisms.	Would clarify how regulatory limits are implemented and conservatisms are accounted for.	March 2020 (near Regulatory Information Conference (RIC))	Industry
III-2 (Cat 1): Do not apply additional burnup uncertainty with conservative source term calculations	Using the "conservatisms roadmap" above, industry will describe the factors contributing to the margins and gain understanding of when applying additional burnup uncertainty may be unnecessary.	Would clarify how regulatory limits are implemented and conservatisms are accounted for.	March 2020 (near RIC)	Industry
III-3 (Cat 2): Conduct less detailed review when conservative methods used for source terms	NRC to determine whether less detailed reviews are warranted when conservatisms applied. Public communication of any changes to review process (e.g., letter, future revisions to guidance)	"Conservatisms roadmap" could inform industry's use of RG 3.54 "Spent Fuel Heat Generation in an Independent Spent Fuel Storage Installation".	March 2020 (near RIC)	Industry led workshop; NRC participation and determination of path forward for NRC reviews.

Outcomes and Actions from the January 22, 2020 Workshop on Spent Fuel Margins

Recommendation	What is needed/Regulatory Product	Details	Workshop Date	Lead
V-1 (Cat 3): Dose rates & V-2 (Cat 3): Modeling dose rate evaluations to consider operating experience loaded storage systems	NRC public documentation that new industry guidance is consistent with regulatory requirements (e.g., potential clarifications on how to implement NUREG 1536 "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility", NUREG 2215 "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities; OR revisions to NUREG 1536, 2215)	Industry may provide a product for NRC to review on potential resolution of dose rate recommendations.	April 2020	Industry
II-1: Develop Acceptance Review Grading Process	Publicly available document that would describe the criteria for grading reviews (e.g., varying scopes of review).	<p>NRC make the criteria and process public so that industry can anticipate scope of NRC review based on content of application.</p> <p>Nuclear Material Safety and Safeguards/Division of Fuel Management (NMSS/DFM) licensing process expectations memo will provide a starting point.</p>	May 2020	NRC

Outcomes and Actions from the January 22, 2020 Workshop on Spent Fuel Margins

Recommendation	What is needed/Regulatory Product	Details	Workshop Date	Lead
IV-2: Limit Phenomena Identification and Ranking (PIRT) reviews to verification that results applied properly	NRC will articulate how the application of the PIRT will be reviewed in the licensing process (e.g. incorporation into the Standard Review Plan (SRP))	Workshop to be conducted after PIRTs report issued (draft expected March 2020).	May 2020	NRC
Remaining Cat 3 Items	Prioritize the remaining Cat 3 recommendations and plan for next steps (similar to this table)		May 2020	NRC
VI-1 (Cat 2): Amend Certificate of Compliance (COC)s to follow graded approach	<p>TN COC 1004 Rulemaking ongoing (anticipated issuance 1Quarter 2020).</p> <p>NEI to close the Regulatory Issue Resolution Protocol associated with the graded approach.</p> <p>Vendors will evaluate the pilot for applicability. As appropriate, vendors will engage the NRC in pre-application meetings to submit similar license amendment requests to adopt the graded approach. The NRC will use precedence to review associated applications.</p>		To Be Determined (TBD) – if necessary pending ongoing activities	Industry led for future workshops, if necessary (including Recommendation VI-2)