

## **Risk-Informed, Performance-Based Principles and Policy Committee (RP3C) Virtual Meeting**

June 12, 2023

Marriott Indianapolis Downtown

### **Members Present:**

N. Prasad Kadambi (Chair), Kadambi Engineering Consultants  
Robert W. Youngblood III (Vice Chair), Idaho National Laboratory  
Kathy Murdoch (Secretary), American Nuclear Society  
\*Patricia Schroeder (Secretary), American Nuclear Society  
Todd Anselmi, Idaho National Laboratory  
\*James August, Individual  
\*Sam Bays, Idaho National Laboratory  
\*Robert Budnitz, Lawrence Berkeley National Laboratory (retired)  
\*Robert Burg, Engineering Planning and Management, Inc.  
Brandon Chisholm, Southern Company  
Matthew Darois, Radiation Safety & Control Services, Inc.  
Mihai Diaconeasa, North Carolina State University  
Donald Eggett, Eggett Consulting LLC  
John Fabian, American Nuclear Society  
\*George Flanagan, Individual  
\*Rani Lea Franovich, Nuclear ROSE Consulting, LLC  
\*Michelle French, WECTEC  
\*Kurt Harris, Flibe Energy, Inc.  
Gale Hauck, Oak Ridge National Laboratory  
\*Dennis Henneke, GE Hitachi  
\*Ralph Hill, Hill Engineering Solutions, LLC  
\*David Holcomb, Idaho National Laboratory  
\*F. Gregory Hudson, Metcalfe PLLC  
\*Mark Joseph, TechSource  
\*Ian Jung, U.S. Nuclear Regulatory Commission  
\*Gerry Kindred, Tennessee Valley Authority  
\*Svetlana Lawrence, Idaho National Laboratory  
\*D. Wayne Lewis, Westinghouse Government Services  
\*Mark Linn, Individual  
Jean-Francois (Jef) Lucchini, Los Alamos National Laboratory  
\*Charles (Chip) Martin, Longenecker and Associates  
\*James O'Brien, U.S. Department of Energy  
\*Hanh Phan, U.S. Nuclear Regulatory Commission  
Mehdi Reisi-Fard, U.S. Nuclear Regulatory Commission  
\*Alexandra Renner, Oklo, Inc.  
\*Thomas Roberts, POMO18 Consult, LLC  
\*Kashmir Singh, EDF Energy (UK)  
\*Andrew Smetana, Individual  
Andrew Sowder, Electric Power Research Institute  
\*John Stamatakis, Southwest Research Institute  
\*Eric Thornsby, Electric Power Research Institute  
Reshma Ughade, Purdue University  
\*Kent Welter, NuScale Power

*\*Participated remotely*

## 1. **Welcome, Roll Call & Introductions**

RP3C Chair Prasad Kadambi welcomed attendees both in person and those participating remotely.

## 2. **Approval of Meeting Agenda**

Prasad Kadambi reviewed the agenda. He referred members to the [embedded meeting presentation](#) which will be used throughout the meeting and referred to throughout.



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## **CATEGORY I:**      **ADDRESS STANDARDS BOARD'S OBJECTIVES**

## 3. **Discussion of RP3C Portions of SB SMART Matrix**

NOTE: The matrix filtered for RP3C actions is [embedded](#).



3A\_SMART\_MATRIX\_  
Update\_2-20-23.xlsx

The Standards Board (SB) uses a SMART Matrix to track actions to support the Standards Committee Strategic Plan. RP3C has a role to play in many of the SMART Matrix actions. Actions involving RP3C are listed below:

### A. SMART Matrix Components to be included:

See slides 3 – 6 of the meeting presentation for more details.

#### (1) Item 1A: Executive Advisory Committee (EAC)

The EAC has just been formally approved. Kadambi will hear more about the formation of the EAC and find out whether there is a role for RP3C at tomorrow's SB meeting.

#### (2) Item 1C: Consensus committees (CCs) to identify standards that working groups (WGs) should coordinate during development

RP3C's role is to harmonize how risk-informed, performance-based (RIPB) approaches are used within CCs and even with other standards development organizations (SDOs).

#### (3) Item 1F1: [RIPB Guidance Document](#) and training package

Kadambi sees training of working groups on the use of the Guidance Document as the most important role for RP3C at this time. He is working with the Large Light Water Reactor Consensus Committee (LLWRCC) and the Research and Advanced Reactor Consensus Committee (RARCC). Training is an activity in progress.

#### (4) Item 1F2: CC and WG chairs provide feedback during RP3C and SB meetings

Feedback during today's RP3C meeting and during tomorrow's SB meeting is expected.

#### (5) Item 1F3: Focused pilots with RARCC & LLWRCC on specific standards

Projects within RARCC and LLWRCC are being used as a start for firming up a process by which RP3C can be more effective in modernization of ANS standards.

### B. Revision of RP3C Bylaws

See slides 7 – 13 of the meeting presentation for more details.

Robert Youngblood addressed the need to update the RP3C Bylaws. He recognized that the procedures in the Bylaws call for a lot of formality. Youngblood agrees that formality is needed for committees approving standards, but RP3C is not charged to write standards. The right level of formality needs to be found to ensure productivity for RP3C and the Community of Practice (CoP). Kadambi added that whatever RP3C has done, it has been reported to the SB and approved if needed.

Donald Eggett stated that he has just been appointed a member of the ANS Bylaws and Rules Committee and may be able to offer his assistance on the RP3C Bylaws.

Budnitz sees RP3C's primary role as providing RIPB-related comments. He wouldn't want formality of these comments to require committee approval. This would be burdensome and stifle the benefit. Budnitz does, however, feel that formality is needed on development and approval of documents that will have wide use such as the Guidance Document.

Todd Anselmi explained his sentiments as a working group chair who received comments from RP3C. He feels that there is a lack of clarity on RP3C's role with working groups and requirements for working groups to address RP3C comments. Anselmi would recommend clarifying this role when revising RP3C's Bylaws.

ACTION ITEM 6/2023-01: RP3C members to provide comments to Robert Youngblood on the need to revise the RP3C Bylaws.  
DUE DATE: September 1, 2023

ACTION ITEM 6/2023-02: Pat Schroeder to provide Prasad Kadambi and Robert Youngblood the current RP3C roster.  
DUE DATE: July 1, 2023

#### **4. RP3C's RIPB Guidance Document Training**

See slides 14 – 19 of the meeting presentation for more details.

##### **A. Delivery of Training**

James O'Brien reported on the RIPB Guidance Document training program. Training material has been developed in two modules. Part 1 discusses general RIPB concepts and what incorporation of those concepts in a standard will look like. Part 2 discusses specific historical examples and naturally accommodates discussion of issues specific to that WG.

##### **B. Incorporation of Training Feedback**

Positive feedback has been received from training participants. Where applicable, feedback continues to be incorporated into the training presentations. There is a need to find a way to help the WG not only produce the standard but also to place it in context of where the standard fits—a systems engineering process.

##### **C. Preliminary Evaluation of Lessons Learned**

Prasad Kadambi explained that session participants say they find the training to be valuable, but it is unclear whether learnings are used. Several suggestions were made including training every few years at an ANS meeting, expanding the training sessions, developing a bulleted "checklist," and embedding a RP3C member on all working groups. All are considered good suggestions but would need additional individuals from RP3C to support these efforts. Gerry Kindred suggested that members from the Subcommittee on Risk Application may be able to help with staffing resources.

**5. Report on Community of Practice (CoP) Sessions**

See slide 20 of the meeting presentation for more details.

The CoP has held 34 sessions all of which are publicly available on the [RP3C website](#). Prasad Kadambi considers the CoP as part of the training sessions. He would like ANS to recognize presenters and participants and has asked John Fabian, ANS Publications Director, what options there may be. Fabian sees a few ways to recognize CoP participants through certificates and professional development hours. Presentations could be added to a digital website for referencing. Presentations added to Open Access would have a digital object identifier (DOI) number and would be citable.

**CATEGORY II:      EXPAND RIPB METHODS**

**6. Update on ANS Advanced Reactors Working Group (ARWG)**

See slides 21 – 27 of the meeting presentation for more details.

Rani Franovich updated RP3C members on the ARWG's accomplishments in 2022 – 2023 and challenges ahead. Accomplishments include establishment of a web portal and a SharePoint site for collaborative work. Comments were provided on the National Academies of Sciences, Engineering, and Medicine (NASEM) study on merits and viability of fuel cycles. The ARWG discussed the BreakThrough Institute's white paper on Part 53, updates on international harmonization, and how ANS can have a positive impact on realizing the benefits of the Nuclear Energy Innovation and Modernization Act (NEIMA). Challenges to be tackled in 2023 – 2024 include reaching a common understanding of RIPB terminology in the context of NEIMA, centrality of probabilistic risk assessment's (PRA's) role in risk-informing, reaching a common understanding of performance-based concepts and methods, and how to gain benefits from ANS's performance-based expertise. Franovich believes that there has been a PRA preference within the U.S. Nuclear Regulatory Commission (NRC) and industry wide. The ARWG is developing a paper to more clearly define what terms mean which may lead to a new ANS position statement.

Henneke agreed with about 95% of Franovich's summary and that they have done some good work over the last year. However, he expressed concern that ARWG leadership has presented slides in public that have not been approved by the ARWG similar to today and that past requests for approval of slides being presented at public meetings have not been honored. Franovich explained that she was not representing any views of the ARWG, she was merely referencing some CoPs and meetings with NRC staff that have taken place and are part of the record. Henneke disagreed stating that the slides give the impression that the report is from the ARWG, and not an opinion from Franovich. Franovich acknowledged the disagreement and suggested that this subject be discussed at the next ARWG meeting.

**7. Focus on RIPB Applications in Operating Reactors — Broadening Scope of RI Initiatives in INL's LWRSP to include PB Enhancements and Explore Potential for ANS Standards --Lawrence/Kadambi**  
See slides 28 – 34 of the meeting presentation for more details.<sup>1</sup>

Svetlana Lawrence introduced herself and explained her role in Idaho National Laboratory's Light Water Reactor Sustainability Program. The program focuses on RIPB methods for operating reactors. The goal is to enhance the safe, efficient, and economical performance of the U.S. nuclear fleet and extend their operating lifetimes. The program is also looking into cost saving opportunities.

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<sup>1</sup> At the request of Tom Roberts and with concurrence of Svetlana Lawrence, a clarification was made to slide 34, bullet 2, under RIM strategies to add "to leak rate of functionality loss."

When questioned, Lawrence stated that she is not certain whether there is the desire or willingness to expand the program to other areas such as emergency preparedness.

### **CATEGORY III**      **SUPPORT TO WORKING GROUP APPLICATION OF RIPB METHODS**

#### **8. SUBSTANTIVE DISCUSSION OF SPECIFIC STANDARDS**

- A. Status of ANS-3.5.1, *Nuclear Power Plant Simulators for Use in Simulation-Assisted Engineering and Non-Operator Training*, K. Singh/ N.P. Kadambi / M. French  
See slides 35 – 42 of the meeting presentation for more details.

Kashmir Singh provided some history and a status update of ANS-3.5.1. The draft has been provided to the Utility Simulator Users Group, the Pressurized Water Reactor Owner's Group, and the Boiling Water Reactor Owner's Group for comment. The draft is expected to be ready to start the approval process by the end of 2023.

- B. Status of ANS-53.1, *Nuclear Safety Criteria for the Design of High Temperature Gas-Cooled Reactor Plants*, J. August/ G. Hauck  
James August stated that the RIPB Guidance training session went well and exceeded expectations. A SharePoint site is being used. The working group meets every other week and is making progress.

- C. RP3C Input on ANS-GS-30.1, *Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs* (new standard)—M. Linn/ G. Hauck ([Link to RP3C Ballot](#))  
See slides 43 – 45 of the meeting presentation for more details.

Mark Linn addressed the project's history, addressing comments, and the path forward including the SB's direction to convert the standard to a guidance standard. A new ballot will be issued and will include the comment response packet. More discussion on the path forward is expected at tomorrow's SB meeting.

- D. Status of ANSI/ANS-30.3-2022, *Light-Water Reactor Risk-Informed Performance-Based Design* (new standard)—N.P. Kadambi/ M. French  
See slides 46-47 of the meeting presentation for more details.

Prasad Kadambi stated that the standard is under review at NRC for endorsement and a formal response to ANS is expected in the next few weeks.

- E. Status of ANS-30.2, *Categorization Classification of SSCs for New Nuclear Power Plants* (new standard)—M. Diaconeasa/ G. Hauck  
See slide 49 of the meeting presentation for more details.

Mihai Diaconeasa provided an update on ANS-30.2. He explained that much of the work was completed under the group's past chair, Kent Welter. Diaconeasa is pushing to get 80% of the draft completed by the end of the summer. When questioned, Diaconeasa confirmed that some ANS-30.2 Working Group members worked on NEI 18-04, "Risk-Informed Performance-Based Technology Guidance for Non-Light Water Reactors," and he believes the two documents will be harmonized.



- F. RP3C Input on ANS-20.2, *Nuclear Safety Design Criteria and Functional Performance Requirements for Liquid-Fuel Molten Salt-Reactor Nuclear Power Plants* (new standard)—D. Holcomb/ G. Hauck ([Link to RP3C Ballot](#))  
See slide 50 of the meeting presentation for more details.

David Holcomb reported that all but one negative on the RARCC ballot has been resolved. The draft has been restructured with some text moved to informative appendices. The draft should be ready for recirculation ballot very soon.

- G. Status of ANS-3.13, *Nuclear Facility Reliability Assurance Program (RAP) Development* (new standard)—J. August/ M. French  
A status update was unable to be provided due to time limitations.
- H. Status of ANS-60.1, *Civil Nuclear Export Control* (new standard)—M. Harding/ M. French  
See slide 51 of the meeting presentation for more details.

Kadambi is a member of the WG and reported that they have made significant progress. A physical meeting is scheduled for later this month in Washington D.C.

- I. Status of ANS-57.11, *Integrated Safety Assessments for Nonreactor Nuclear Facilities*—M. Kotzalas/ C. Martin ([Link to RP3C Ballot](#))  
See slide 52 of the meeting presentation for more details.

A status update was unable to be provided due to time limitations.

## 9. INVITE INPUT FROM STANDARDS ON RIPB SCHEDULE

The Schedule of RIPB Standards in Development [is embedded](#) here for reference.



9\_Proposed Schedule  
for ANS RIPB Standard

- RP3C interaction/input on the following PINS or standards on the RIPB Schedule (not discussed elsewhere):
  - ANS-2.3, Estimating Tornado, Hurricane, and Extreme Straight-Line Wind Characteristics at Nuclear Facility Sites
  - ANS-2.15, Criteria for Modeling Atmospheric Dispersion of Radiological Releases from Nuclear Facilities
  - ANS-2.18, Evaluating Radionuclide Transport in Surface Water for Nuclear Reactor and Nuclear Facility Sites
  - ANS-2.22, Environmental Radiological Monitoring at Operating Nuclear Facilities
  - ANS-2.26, Categorization of Nuclear Facility SSCs for Seismic Design
  - ANS-2.32, Remediation of Radioactive Contamination in the Subsurface at Nuclear Power Plants
  - ANS-2.34, Characterization and Probabilistic Analysis of Volcanic Hazards
  - ANS-2.36, Accident Analysis for Aircraft Crash into Reactor and Nonreactor Nuclear Facilities
  - ANS-GS-3.8, Guidance for Risk-Informing Emergency Preparedness Programs for Nuclear Facilities
  - ANS-3.11, Determining Meteorological Information at Nuclear Facilities
  - ANS-3.15, Risk-Informing Critical Digital Assets (CDAs) for Nuclear Power Plant Systems
  - ANS-15.22, Classification of Structures, Systems and Components for Research Reactors
  - ANS-19.13, Initial Fuel Loading and Startup Tests for FOAK Advanced Reactors
  - ANS-56.2, Containment Isolation Provisions for Fluid Systems After a LOCA
  - ANS-57.2, Design Requirements for LWR Spent Fuel Storage Facilities at NPPs
  - ANS-57.9, Design Criteria for an Independent Spent Fuel Storage Installation (Dry Storage Type)

**10. Changing Environment**

See slides 54 – 55 of the meeting presentation for more detail.

With limited time, Prasad Kadambi quickly reviewed international harmonization related to regulatory issues and consensus standards. The North American Advanced Reactor Roadmap developed by EPRI and NEI was recognized. Kadambi suggested that ANS-30.2, *Categorization Classification of SSCs for New Nuclear Power Plants*, and Section XI, Division 2 of the Boiler Pressure Vessel Code be put into pilot projects under the Roadmap.

**11. Review of Open Action Items**

There are no open action items carried from previous meetings.

**12. Other Business**

No other business discussed.

**13. Next Meeting**

RP3C is expected to schedule in-person meetings during the upcoming ANS meetings:

- ANS Winter Meeting in Washington, D.C., at the Washington Hilton from November 12-15, 2023
- ANS Annual Meeting in Las Vegas, Nevada, at the Mirage from June 9-12, 2024

**14. Adjournment**

The meeting was adjourned.

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**LIST OF EMBEDDED FILES:**

- 1) Meeting presentation
  - 2) RP3C Actions on SB SMART Matrix for RP3C
  - 3) Schedule of RIPB Standards in Development
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