

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

Washington Hilton, Washington D.C.

November 13, 2023

Members Present:

N. Prasad Kadambi (Chair), Kadambi Engineering Consultants
Robert W. Youngblood III (Vice Chair), Idaho National Laboratory
John Fabian (Secretary pro tem), American Nuclear Society
*Patricia Schroeder (Secretary), American Nuclear Society
Todd Anselmi, Idaho National Laboratory
*James August, Individual
*Robert Budnitz, Lawrence Berkeley National Laboratory (retired)
*Robert Burg, Engineering Planning and Management, Inc.
Brandon Chisholm, Southern Company
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
*Fred Grant, Simpson Gumpertz & Heger Inc.
*Kurt Harris, Fluor Energy, Inc.
*Dennis Henneke, GE Hitachi
*Ralph Hill, Hill Engineering Solutions, LLC
*David Holcomb, Idaho National Laboratory
*F. Gregory Hudson, Metcalfe PLLC
*Ian Jung, U.S. Nuclear Regulatory Commission
*Bryce Kelly, Idaho National Laboratory
*Gerry Kindred, Tennessee Valley Authority
*Svetlana Lawrence, Idaho National Laboratory
*Mark Linn, Individual
Jean-Francois (Jef) Lucchini, Los Alamos National Laboratory
Daniel Moneghan, Electric Power Research Institute
*James O'Brien, U.S. Department of Energy
*Hanh Phan, U.S. Nuclear Regulatory Commission
Andrew Smetana, Individual
Andrew Sowder, Electric Power Research Institute
*John Stamatakos, Southwest Research Institute
*Eric Thornsbury, Electric Power Research Institute
*Kent Welter, NuScale Power

**Participated remotely*

Guests Present

Temí Adeyeye, NuScale Power
Jason Andrus, Idaho National Laboratory
C. Rick Grantom, C.R. Grantom P.E. & Associates, LLC
Donald Spelman, Individual
Andrew Whittaker, University at Buffalo, SUNY

1. Welcome, Roll Call & Introductions

RP3C Chair Prasad Kadambi welcomed all. Brief introductions were made. Members were directed to the combined meeting presentation that would be used throughout the meeting by all presenters. See the embedded file.



RP3C Slides for
11-13-2023_FINAL(2).f

2. Approval of Meeting Agenda

With no objections, the agenda was approved.

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.



3_SMART_MATRIX_
Update_2-20-23.xlsx

Prasad Kadambi explained the purpose of the SMART Matrix which is to keep track of actions to fulfill the Standards Committee Strategic Plan. Several activities have been assigned to the RP3C. RP3C takes the SMART Matrix as direction from the Standards Board on RP3C activities. RP3C will look to contribute to any risk-informed and/or performance-based (RIPB) activities of the soon-to-be formed Executive Advisory Committee under the Standards Board. The Guidance Document (GD) is the principal product developed by the RP3C over the last 10 years. The GD has been available for trial use for the last three years or so. One of the SMART Matrix activities is a pilot with standards in the Large Light Water Reactor Consensus Committee (LLWRCC) and the Research and Advanced Reactor Consensus Committee (RARCC). Kadambi would like more feedback from working groups on the use of the GD. See slides 5-6 of the combined meeting presentation for more details.

A. SMART Matrix Components to be included:

- (1) Item 1A: Executive Advisory Committee
- (2) Item 1C: CCs to identify standards that WGs should coordinate during development
- (3) Item 1F1: RIPB Guidance Document and training package
- (4) Item 1F2: CC and WG Chairs provide feedback during RP3C and SB meetings
- (5) Item 1F3: Focused pilots with RARCC & LLWRCC on specific standards

B. Revision of RP3C Bylaws

The RP3C Bylaws were developed 10 years ago and are in need of an update to reflect the way RP3C works. Robert Youngblood presented the issues. He suggested that the RP3C Bylaws be updated and then followed. Youngblood added that the Standards Board has been informed of all RP3C activities through regular reporting. The scope in the Bylaws (see slide 8 of the meeting presentation) was reviewed. Members agreed that RP3C's role is advisory to working groups. Andrew Smetana added that he believes there would be pushback from working groups if RP3C's suggestions were forced upon them.

Youngblood shared his rewrite of the RP3C's scope provided below:

The American Nuclear Society Standards Board (SB) has established the *Risk Informed and Performance Based Principles Policy Committee (RPBPPC¹)* as a committee that reports directly to the SB and operates in accordance with the Rules and Procedures of the American Nuclear Society Standards Committee (SC) and this document.

RIPB concepts can beneficially be applied in standards that address the design, construction, operation, evaluation and analysis, decontamination and decommissioning, waste management, and environmental restoration for nuclear facilities. The purpose of the RP3C is to promote appropriate application of RIPB concepts in Standards that are under development or being revised. To this end, the RP3C will:

- Maintain and periodically revise the “Guidance Document” explaining and illustrating the concepts of RIPB as they apply in Standards;
- Engage with Working Groups as requested in order to convey the essentials of the Guidance Document to Working Group members;
- Review and comment on Working Group drafts as requested;
- Work to socialize RIPB concepts through (e.g.) “Community of Practice” presentations.

The role of the RP3C is advisory in nature; RP3C is not authorized to develop consensus standards or other similar products. Working Groups retain all responsibility for the draft standards that they submit to the CCs.

Kadambi provided history on the formation of the RP3C. The RP3C was formed when Donald Spellman and Steven Stamm were chair and vice chair, respectively, of the Standards Board. They pulled the Bylaws together from other procedural documents. Kadambi just wanted to get the committee going and didn’t object.

The sense of the committee was that the rewrite of the RP3C scope showed promise. Some members questioned the need for formal bylaws or whether a performance-based mission statement would be acceptable. With no objection, the following recommendation from slide 10 of the meeting presentation was accepted:

- Completely redraft the “Scope” section in the Bylaws. Spell out our relationship to the WGs, the CCs, and the SB.
- Call out the GD as a maintained RP3C document.
- Design the voting / balloting / etc. formalities to support those functions.
- Once the job is better defined, the rest of the modification task will largely be implied, other than the need to discuss and agree on certain details of the “formality” requirements.

With the recommendation accepted, a small committee to include Robert Youngblood (lead), Prasad Kadambi, Todd Anselmi, and Rani Franovich was formed to work on a revision of the RP3C Bylaws.

ACTION 11/2023-01: Robert Youngblood (lead), Prasad Kadambi, Todd Anselmi, and Rani Franovich to work on a revision of the Bylaws to

- Completely redraft the “Scope” section in the Bylaws. Spell out our relationship to the WGs, the CCs, and the SB.
- Call out the GD as a maintained RP3C document.
- Design the voting / balloting / etc. formalities to support those functions.
- Once the job is better defined, the rest of the modification task will largely be implied, other than the need to discuss and agree on certain details of the “formality” requirements.

DUE DATE: June 1, 2024

¹ Shortly after formation “RPBPPC” was changed to “RP3C.”

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

A. Delivery of Training

James O'Brien provided background on the training that has been offered on the GD. Part 1 provides a general overview. Part 2 is on the application on the GD. He recognized some challenges getting working groups to use the GD and incorporate RIPB methods. See slide 12 for more details.

B. Incorporation of Training Feedback

The GD training slide deck has gone through cycles of review and comment internal to RP3C before being presented to live audiences. Questions have emerged from the trainings. RP3C and consensus committees need to collaborate actively to respond to feedback from trainees. Liaison roles with other standards development organizations, when it makes sense, is recommended. See slides 13-14 for more details.

C. Preliminary Evaluation of Lessons Learned

Examples on risk insights, level of rigor, and formality of requirements management and evaluation of lessons learned were provided (see slide 15). Todd Anselmi explained that the Standards Board will discuss the use of requirement tables in ANS standards to add clarity of requirements. Kadambi added that he asked Andrew Whittaker, a professor at the University at Buffalo, SUNY, to help with the training program. See slides 15-17 for more details.

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

There have been 39 CoP presentations, many from developers. Recordings from all are posted to the [RP3C CoP webpage](#). Prasad Kadambi has been working with John Fabian, ANS Director of Publications, for recognition of the CoPs. ANS is now giving Professional Engineers 1 hour credit for presenting or participating in a CoP. Fabian shared two options for referencing CoPs. An article can be prepared after each CoP and added to Nuclear Newswire with a link to the CoP recording. The webpage can then be cited as a reference. The other option is to include CoPs in ANS's new Nuclear Science and Technology (NST) Open Research platform. Presenters can submit their presentation to NST Open Research which can link back to the YouTube Video. The NST Open Research platform would provide a permanent digital object identifier (doi). Members liked both options, and especially the NST Open Research posting, to broaden the reach of the CoP. If an article is published in Newswire, a notice would be included in Nuclear Smart Brief and a notice could be included in the weekly Newswire recap. See slide 19 for more details about the CoP.

ACTION ITEM 11/2023-02: John Fabian to work with Prasad Kadambi to create a collection of files from RP3C on the NST Open Research Platform.
DUE DATE: June 1, 2024

CATEGORY II: EXPAND RIPB METHODS

6. **Discussion of NPK's Presentation to U.S. Nuclear Regulatory Commission's (NRC's) Standards Forum**

[Link to 2023 NRC Standards Forum Webpage with presentations and meeting summary](#)

- NRC Request for ANS Presentations
NRC asked for several ANS presentations to be presented at the NRC Standards Forum on September 13, 2023. Prasad Kadambi made a presentation on "Development of RIPB Standards." The slides were reviewed by RP3C, and comments were incorporated before the presentation.

Andrew Sowder made a presentation on ANS standards. David Grabaskas made a presentation on behalf of the ASME/ANS Joint Committee on Nuclear Risk Management. Kadambi's slides from the NRC Standards Forum are included in the meeting presentation. Members were interested in OMB Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities," mentioned in Kadambi's presentation. Circular A-119 authorizes agencies to use voluntary consensus standards instead of agency requirements. The Circular is available at <https://www.whitehouse.gov/wp-content/uploads/2017/11/Circular-119-1.pdf>. See slides 20-26 for Kadambi's presentation at the NRC Standards Forum.

7. **Advanced Reactor Codes and Standards Collaborative (ARCSC) and ANS-ASME Collaboration --**
The ARCSC was addressed under #10, Changing Environments.

8. **Report on INL RISA Stakeholder Engagement Meetings November 7-8, 2023**

Svetlana Lawrence made a presentation at the Risk Informed Plant Health and Asset Management (RISA) Stakeholder engagement meeting held November 7-8, 2023. This is an annual meeting to present all of their work in the last year to the public and engage feedback. Lawrence suggested that members use the link to [INL's site](#) to view presentations. Lawrence is a member of the Large Light Water Reactor Consensus Committee. Prasad Kadambi has requested that Lawrence bring these new approaches for light water reactors to the LLWRCC to develop new standards.

Rani Franovich attended an NRC Commission briefing a couple of weeks ago on the business lines, operating reactors, and advanced reactors. They're just now starting to think of risk informing license renewals.

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

8. **SUBSTANTIVE DISCUSSION OF SPECIFIC STANDARDS**

A. NRC's Risk Forum and Status of ANSI/ANS-30.3-2022, *Light-Water Reactor Risk-Informed Performance-Based Design* (current standard)—Kent Welter / Michelle French

Prasad Kadambi was asked to make a presentation at the NRC Risk Forum held September 12, 2023. He worked with ANSI-30.3 Working Group Chair Kent Welter to prepare the slides. Kadambi's slides from the NRC Risk Forum are available in the meeting presentation as slides 30-38.

Welter provided a status update on NRC's review and preliminary comments on ANSI/ANS-30.3-2022. NRC provided two high-level comments and six technical comments. NRC commented that they are used to seeing more prescriptive standards with more requirements. Other comments were about referencing existing guidance and clarifications. The ANSI-30.3 Working Group has drafted responses which are being reviewed by the working group. The goal is to send responses back to NRC by the end of the year and request a public meeting. See slide 39 for more details.

Kadambi received a message from Sunil Weerakkody, NRC, earlier in the day. Several staff members have been assigned to review ANSI/ANS-30.3-2022. NRC is awaiting ANS's response to their initial feedback. Once they receive ANS's response, NRC will begin the next steps.

Fred Grant questioned whether ANS standards get into risk informing external events. Both James August and Robert Budnitz provided responses. In general, ANS standards refer users to JCNRM standards. August added that ANSI/ANS-53.1-2011 (R2021), *Nuclear Safety Criteria for the Design of High Temperature Gas-Cooled Reactor Plants*, is being revised. A lot has changed since ANS-53.1 was issued in 2011. The revision may add an appendix to discuss supporting standards. The basic process in the standard will remain the same, but it's going to be entirely revised compared to the existing standard. And it will be much more RIPB.

Budnitz informed members that the U.S. Department of Energy has sponsored a project with Argonne National Laboratory. They have developed a very interesting document that is about halfway done. The authors are David Grabaskas and Ben Chen. They are trying to think through how to provide clear guidance on external events to the designer in the context of the License Modernization Project and the F-C curve. The document is [ANL/NSE-21/56, “Regulatory Treatment of Low Frequency External Events under a Risk-Informed Performance-Based Licensing Pathway.”](#)

Dennis Henneke just came back from an IAEA meeting. They were working on a couple of documents with regard to risk informed deterministic safety analysis as well as any other area of external hazards. Henneke suggested that ANSI/ANS-30.3-2022 could be refined and that a JCNRM representative could help the working group.

- B. RP3C Input on ANS-GS-30.1, *Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs* (new guidance standard)—M. Linn / M. French (new standard) ([Link to RP3C Ballot](#))

ANS-GS-30.1 was issued to the Advanced Initiatives Subcommittee, to RP3C, and to the JCNRM Subcommittee on Risk Application (SCoRA) for review. All ballots closed in September 2023. Mark Linn provided a status update. No comments were received from the subcommittee. Sixty-six comments were received from RP3C and SCoRA through the non-developing consensus committee (NDCC) review. Linn expects the working group to have a draft ready for RARCC review in February 2024. See slides 40-41 for more details.

Henneke has drafted a letter from JCNRM with a request for the Standards Board to discontinue work on ANS-GS-30.1. The letter is being processed within JCNRM.

- C. Status of ANS-53.1, *Nuclear Safety Criteria for the Design of High Temperature Gas-Cooled Reactor Plants* (revision of current standard)—J. August/ G. Hauck
An update on ANS-53.1 was covered in 8A.

- D. Status of ANS-30.2, *Categorization Classification of SSCs for New Nuclear Power Plants* (new standard)—M. Diaconeasa/ G. Hauck

Mihai Diaconeasa reported that two sections of ANS-30.2 have been drafted; four sections are in works. The working group has found inconsistencies in definitions. ANS-30.2 will be technology neutral and RIPB. It will also be consistent with NEI 18-04, “Risk-Informed Performance-Based Technology Guidance for Non-Light Water Reactors.” The working group still needs to determine classification and categorization.

- E. 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](#))

David Holcomb stated that the recirculation ballot closed with two negatives. One is a maintained negative from Amir Afzali. The second is a negative from Jason Andrus that has been upgraded. The working group has worked with Andrus on clarification of molten-salt reactors (MSR) and liquid MSR in the standard. Andrus is not completely satisfied but wants the standard to move forward. All other comments have been satisfactorily addressed. Afzali has elected not to appeal. The next step is for RARCC Chair Gale Hauck to declare consensus and seek Standards Board certification. The standard has already been provided to the ANS editor to start the publication process.

- F. Status of ANS-3.13, *Nuclear Facility Reliability Assurance Program (RAP) Development* (new standard)—J. August/ M. French

August reported that ANS-3.13 is making excellent progress. They have an outline and could have a draft completed by the end of year for the working group to review.

- G. Status of ANS-60.1, *Civil Nuclear Export Control* (new standard)—M. Harding/ M. French
Margaret Harding was not able to join the RP3C meeting but provided a report. See slide 45 for her update.
- H. Status of ANS-57.11, *Integrated Safety Assessments for Nonreactor Nuclear Facilities*—M. Kotzalas/ M. Joeseeph ([Link to RP3C Ballot](#))
Todd Anselmi is not aware of a status change on ANS-57.11.

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

- Clarification of Relationship Between RP3C and Advanced Reactor Working Group (ARWG)
Prasad Kadambi stated that he previously believed that the RP3C and ARWG were closely related. Recent feedback from SB leadership indicated that the link to the Standards Board was not any greater than to any other ANS committee. The ARWG and RP3C are considered separate entities.
- Report on Survey Conducted by Advanced Reactor Codes and Standards Collaborative (ARCSC)
The ARCSC will hold a workshop on November 30, 2023, at the Electric Power Research Institute offices in D.C. with a remote option. The workshop will provide high-level feedback from the recent industry survey. The registration link to participate in the workshop remotely has been issued.

11. Review of Open Action Items

The following two action items have been completed:

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

12. Other Business

No other business was discussed.

13. Next Meeting

The RP3C is expected to meet on Monday afternoon of the upcoming ANS meetings:

- 2024 ANS Annual Meeting in Las Vegas, NV, at the Mandalay Bay from June 16-19, 2024
- 2024 ANS Winter Meeting in Orlando, FL, at the Renaissance at SeaWorld, November 17-21, 2024

14. Adjournment

Prasad Kadambi thanked everyone for their contribution before adjourning the meeting.