American Nuclear Society

MINUTES

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

November 14, 2022
Phoenix, Arizona

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.
*Stefani Buster, Duke University
Donald Eggett, Eggett Consulting LLC
*George Flanagan, Individual
*Rani Lea Franovich, The Breakthrough Institute
*Kurt Harris, Flibe Energy, Inc.
*Robert Hayes, North Carolina State University
*Ralph Hill, Hill Engineering Solutions, LLC
*Gerry Kindred, Tennessee Valley Authority
*Marsha Kinley, Duke Energy Corporation
Margaret Kotzalas, U.S. Department of Energy
*Svetlana Lawrence, Idaho National Laboratory
*Stuart Lewis, Independent Consultant
*Mark Linn, Individual
Gary Locklear, Kinectrics, Inc.
Jean-Francois (Jef) Lucchini, Los Alamos National Laboratory
*Stewart Magruder, AdSTM
Charles (Chip) Martin, Longenecker and Associates
Steven Nesbit, LMNT Consulting
*James O'Brien, U.S. Department of Energy
*Hanh Phan, U.S. Nuclear Regulatory Commission
*William Reckley, U.S. Nuclear Regulatory Commission
*Steve Weinbeck, Savannah River National Laboratory
*Kent Welter, NuScale Power

**Participated remotely*

1. Welcome, Roll Call & Introductions
RP3C Chair Prasad Kadambi welcomed all.

2. Approval of Meeting Agenda

2_RP3C Meeting_11-14-2022

Prasad Kadambi reviewed the agenda. He referred members to the embedded meeting presentation which will be used throughout the meeting and referred to throughout.

CATEGORY I: ADDRESS STANDARDS BOARD'S OBJECTIVES

3. Discussion of RP3C Portions of SB SMART Matrix

A. SMART Matrix Components and Teamwork Needed to Accomplish Them (see embedded file filtered for RP3C actions also see slides 3-6 of the meeting presentation)

3A-SMART_MATRIX_
Issued_5-27-22 (RP3

The SMART Matrix reflects the goals of the ANS Standards Committee Strategic Plan. There are two main actions for RP3C:

- Developing and delivering training on the Risk-Informed, Performance-Based (RIPB) Guidance Document (GD), including incorporating feedback from trainees
- Publicizing RP3C accomplishments on modernization within and outside ANS

The GD was approved and formally issued for trial use in March of this year. A training session was held September 29, 2022, after one was held about two years ago. Feedback was received from both and is being considered. Training of ANS working groups is the most important assignment to RP3C. For example, representing RP3C, Kadambi convinced ANS-60.1 Working Group Chair Margaret Harding to develop proposed new standard ANS-60.1, *Civilian Nuclear Export Control*, as a performance-based standard. This example is one that applies to the Large Light Water Reactor Consensus Committee. Kadambi provided three other examples of consensus committees (CCs) where variances of conservatism and prescription from one CC to another need to be considered at the Standards Board (SB) level. See slide 5 of the meeting presentation for more details.

Kadambi is trying to publicize RP3C and RIPB approaches through the Advanced Reactor Working Group (ARWG) and panel sessions at ANS meetings. He would like to see the SB help to publicize the need for modernization of ANS standards. Kadambi recommends that a line item on CC chair reports to the SB address modernization successes on their standards. They should also bring to RP3C's attention specific difficulties that they may be having with modernization.

B. Revision of RP3C Bylaws
(Link to Bylaws on RP3C's public webpage)
Kadambi recognized that the RP3C Bylaws from 2013 no longer reflect current practices and could benefit from an update. The Bylaws need to reflect RP3C's successes. When the Bylaws were originally set up, working group chairs were added as *ex officio* members to RP3C's roster. We need to take account and make sure that the capabilities of the people in RP3C are recognized by the working groups to further their work. RP3C needs to be seen as a resource and not a hurdle to be overcome.

Robert Youngblood agreed that the Bylaws need to change. He recognized that RP3C should be considered a resource and that the Bylaws don't conceive of the committee's work. The Bylaws don't capture the ways that RP3C tries to help. We need to begin reconciling the Bylaws with a useful and practical concept of RP3C's function.

Robert Budnitz questioned whether a revision of the Bylaws was really necessary. Considering limited volunteer resources, he doesn't see the need to revise the procedures. He sees the Bylaws as being useless. On the other hand, he sees the real work of RP3C as important. James August

agreed with Budnitz's sentiments. Kadambi explained that he has been questioned by one member about RP3C's practices versus the Bylaws. Kadambi feels it would be appropriate to take up the concern about the Bylaws with the SB at their meeting tomorrow. See slides 7 and 9 for more details on this topic.

ACTION ITEM 11/2022-01: Prasad Kadambi to elevate concerns about the RP3C Bylaws being obsolete to the Standards Board.
DUE DATE: November 15, 2022

4. RP3C's RIPB Guidance Document Training

As noted earlier, the GD was issued for trial use in April 2022 and training has been initiated. James O'Brien reported that two training sessions have been presented. The most recent was held on September 29, 2022. O'Brien feels these were demos to make sure they are hitting the mark. Both training activities were received well. O'Brien has just finished drafting Part 2 of the training which provides case studies. He is targeting the Part 2 training for December 2022. Part 1 and Part 2 training sessions will also be held in 2023. O'Brien reviewed questions that emerged from the training sessions. See slides 10 – 13 for more details.

5. Report on Community of Practice (CoP) Sessions

RP3C engages with those in the nuclear community active with RIPB concepts and methods to share their knowledge and experience. The RP3C website holds 29 CoP presentations and recordings from a wide variety of practitioners. Prasad Kadambi has noticed a downward trend on the number of live attendees but an increase in viewings of recordings. See slide 14 for more details.

CATEGORY II: EXPAND RIPB METHODS

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

Rani Franovich introduced herself. She is the Senior Policy Advisor, Nuclear Energy Innovation, with The Breakthrough Institute (BTI) and vice chair of the ARWG. The ARWG was established in 2021 within the Operations and Power Division to tap and strategically focus the valuable influences ANS can exert in promoting advanced rector technologies and leveraging representatives from all ANS Professional Divisions including the Standards Committee.

ANS provided comments (ML21063A107) on Part 53 in February 2021. At ARWG's recommendation, ANS cosigned two comment letters with the BTI—1) April 27, 2022, comment letter (ML22122A218) proposing improvements to a limited-scope Part 73 rulemaking for new reactor licensing and 2) June 15, 2022, comment letter requesting workshops and open collaboration on Part 53 (ML22172A195). When questioned, Franovich responded that ANS received a general response back from NRC but not responses to individual comments. Presently, the commenting process has been informal. See slides 15-20 of the meeting presentation for more details.

7. RIPB Applications in Operating Reactors

Svetlana Lawrence, who works for Idaho National Laboratory on the Light Water Reactor Sustainability Program, provided an update on the program. The goal is to enhance the safe, efficient, and economical performance of our nation's nuclear fleet and extend the operating lifetimes of this reliable source of electricity. See slides 21 – 29 of the meeting presentation for more details.

CATEGORY III SUPPORT TO WORKING GROUP APPLICATION OF RIPB METHODS

8. SUBSTANTIVE DISCUSSION OF SPECIFIC STANDARDS

A. RP3C Input on ANS-30.1, *Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs* (new standard)—M. Linn/G. Flanagan (Link to RP3C Ballot)
Mark Linn explained that ANS-30.1 has been converted to a guidance standard at the request of the SB. The document remains a top-tier, technology inclusive guidance standard in the advanced reactor framework. Linn submitted a revised draft to ANS on October 26, 2022. Pat Schroeder had a few administrative comments that are currently being addressed before the draft goes back out for approval. See slides 29-30 of the meeting presentation for more details.

B. Status of ANS-30.3, *Light-Water Reactor Risk-Informed Performance-Based Design* (new standard)—K. Welter/M. French
Kent Welter reported on ANS-30.3. ANS-30.3 provides requirements for the incorporation of RIPB principles and methods into the design of new commercial light water reactors (LWRs) and establishes a minimum set of requirements for designers to follow to appropriately combine deterministic, probabilistic, and performance-based methods during design development. The application was intended for LWRs under Parts 50 and 52, but the guidance can be applied to other reactors. The standard was approved and published in July 2022 and the SB requested NRC endorsement in August 2022. The request points out that ANS-30.3 complies with mandates of the Nuclear Energy Innovation Modernization Act (NEIMA). Kadambi noted that he contacted the branch chief at NRC and was told that a task group was set up to review ANS-30.3. The task group doesn't have a schedule at this time. Welter added that NuScale is referencing ANS-30.3 on licensing submittals, and he is aware of others using it as well. Welter expects that the standard will get good use and may need to consider a revision in five years. See slides 31-32 of the meeting presentation for more details.

C. Status of ANS-30.2, *Categorization Classification of SSCs for New Nuclear Power Plants* (new standard)—K. Welter/G. Flanagan
Welter stated that ANS-30.2 is technology agnostic. Bi-weekly meetings have been held for the last year. The working group is large with a small group of writers. Struggles with the scope and content of the standard remain. Welter will be stepping down as working group chair in January and is actively soliciting a new chair. Kadambi recognized Welter's significant contribution as working group chair and how difficult it will be to fill his shoes. Working group members have been asked to consider the position or other candidates to take over the chair role. See slide 33 of the meeting presentation for more details.

D. 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 (Link to RP3C Ballot)
Kadambi explained that RP3C has had interactions on ANS-20.2 and continues to work with the working group to incorporate RIPB ideas. Stu Magruder has stepped in as the RP3C liaison on ANS-20.2. There are two standards within the Research and Advanced Reactors Consensus Committee that aspire to incorporate RIPB principles but with significant differences. ANSI/ANS-53.1-2011 (R2021), *Nuclear Safety Design Process for Modular Helium-Cooled Reactor Plants*, takes one approach while ANS-20.2 takes another. Kadambi is trying to bridge the gap. Magruder added that he believes ANS-20.2 will be a useful document when approved. The scope was originally not intended to be a RIPB standard. Magruder is trying to inject RIPB modernization which he feels will improve the standard. See slide 34 of the meeting presentation for more details.

E. ANS-60.1, *Civil Nuclear Export Control* (new standard)—M. Harding/M. French

Kadambi reported for ANS-60.1. He said that there is a lot of interest in the standard internationally. The working group has grown and includes several lawyers. They are focusing on the requirements that need to be covered. A face-to-face meeting is planned in Washington D.C. next month. See slide 35 for more information and the embedded file.

8E_ANS-60.1_RP3C Virtual Meeting_6-13-

F. ANS-57.11, *Integrated Safety Assessments for Nonreactor Nuclear Facilities*—M. Kotzalas/C. Martin (Link to RP3C Ballot)
Margaret Kotzalas reported that much progress was made on the draft of ANS-57.11 at the June 2022 meeting. This Wednesday's meeting will go over assignments and look at the clean draft. Formatting is needed, but she believes that the draft is in good shape. Because the draft was essentially rewritten, it will start back at subcommittee balloting. RP3C, the Subcommittee on Risk Assessment, and non-developing CCs will also be provided the revised draft for review and comment. See slide 36 for more details.

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 Standar

- Brief updates were provided on the following three projects:
  - ANS-2.36, *Accident Analysis for Aircraft Crash into Reactor and Nonreactor Nuclear Facilities*
    STATUS: The working group is very active.
  - ANS 3.13, *Nuclear Facility Reliability Assurance Program (RAP) Development*
    STATUS: The draft outline is being filled in. The working group is following the GD. Good progress is being made.
  - ANS-53.1, *Nuclear Safety Criteria for the* Design of High Temperature Gas-Cooled Reactor Plants
    STATUS: The working group has had a slow start. They are using the GD.
- 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-3.5.1, *Nuclear Power Plant Simulators for Use in Simulation-Assisted Engineering and Non-Operator Training*
  - 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-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

Prasad Kadambi recognized that ASME has embarked on an impressive effort to modernize their standards. ASME Boiler Pressure Vessel Code, Section III, Div. 5, has just been endorsed in an NRC Regulatory Guide. Kadambi believes that the effort to modernize and harmonize standards will come together and that ANS can help lead this effort. Don Eggett feels that harmonization will fall out of the NEI/EPRI North American Advanced Reactor Codes & Standards Workshop to be held on December 1, 2022.

11. Review of Open Action Items

RP3C has one open action item as noted below:

> ACTION ITEM 6/2022-01: Rani Franovich and Prasad Kadambi to carry Amir Afzali's, Dennis Henneke's, and Robert Budnitz's message to the ARWG that the letter is inappropriate and inaccurate and that advanced reactor designers need to be included in the makeup of the group.

The message was carried back to the ARWG.

12. Other Business—All

Time did not permit other business to be discussed.

13. Next RP3C Meeting—Kadambi

Upcoming ANS meetings:

- ANS Annual Meeting in Indianapolis, Indiana, at the Marriott Indianapolis Downtown from June 11-14, 2023
- ANS Winter Meeting in Washington, D.C., at the Washington Hilton from November 5-8, 2023

RP3C meetings are anticipated during the upcoming ANS annual and winter meetings in 2023.

14. Adjournment

The meeting was adjourned.

LIST OF EMBEDDED FILES:

1) Meeting Presentation
2) RP3C Actions on SB SMART Matrix for RP3C
3) ANS-60.1 Presentation/Report
4) Schedule of RIPB Standards in Development
