American Nuclear Society

MINUTES

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

Hyatt Regency San Francisco, San Francisco, CA
June 12, 2017

Members Present:
N. Prasad Kadambi, RP3C Chair, Individual
Edward Wallace, Vice-Chair, GNBC Associates, Inc.
John Fabian, (Secretary Pro Tem), American Nuclear Society
*Patricia Schroeder (Secretary), American Nuclear Society
Amir Afzali, Southern Company
*James August, Southern Company
Robert Budnitz, Lawrence Berkeley National Laboratory
Donald Eggett, Individual
George Flanagan, Oak Ridge National Laboratory
Alan Levin, U.S. Department of Energy
*Mark Linn, Oak Ridge National Laboratory
James O'Brien, U.S. Department of Energy
Andrew Smetana, Savannah River National Laboratory
*Robert Youngblood, Idaho National Laboratory

Guests:
Jeff Mitman, U.S. Nuclear Regulatory Commission
Kent Welter, NuScale Power
*Steven Stamm, Individual

**participated by phone*

Members Absent:
Wayne Andrews Jr., Individual
Edward Blandford, University of New Mexico
Richard Browder, Duke Energy
Robert Eble, AREVA Inc.
Kamal El Sheikh, The Cameron Group, Inc.
Yan Gao, Westinghouse Electric Company, LLC.
Gerry Kindred, Tennessee Valley Authority
Stanley Levinson, Individual
Thomas Marenchin, U.S. Nuclear Regulatory Commission
Ronald Markovich, Contingency Management Consulting
Carl Mazzola, Chicago Bridge & Iron Federal Services
William Reckley, U.S. Nuclear Regulatory Commission
William Reuland, Individual

1. Welcome, Roll Call & Introductions

RP3C Chair Prasad Kadambi welcomed all to the meeting. The committee's reporting structure and its membership were reviewed. Introductions were made.

2. Approval of Meeting Agenda

Prasad Kadambi reviewed the items planned for discussion at the meeting. Two files will be used throughout the meeting as reference. Attachment 1 has backup information to several agenda items. Additionally, a meeting presentation was prepared and is available as Attachment 2. Both files are referenced throughout the minutes for additional details. The agenda was approved as presented.

3. Status of Interaction with Standards Board (See 3.A & 3.B of Attachment 1 and Slides 3-7 of Attachment 2 for more detail.)

A. Outcome of Standards Board Meeting on November 8, 2016

Prasad Kadambi informed members that the Standards Board assigned him and James O'Brien an action item to develop a path forward to complete the RP3C Operating Plan for ANS standards committees to be consistent with the current RP3C Bylaws. A draft RP3C Operating Plan has been prepared and was provided to members as part of the meeting materials. The draft plan is available for reference as Attachment 3 to these minutes.

B. Strategic Plans for ANS and the Standards Committee

Kadambi reiterated the need for ANS standards for the future of ANS. He believes that the Licensing Modernization Program will benefit ANS Strategic Plan goals. Excerpts from the ANS Strategic Plan and the ANS Standards Committee Strategic Plan relevant to standards and the RP3C were reviewed. Both excerpts are provided in Attachment 1, see 3.A and 3.B.

C. ANS Executive Committee Comments Relevant to RP3C

Two comments from the ANS Executive Committee review of the Standards Committee Strategic Plan pertinent to the RP3C were discussed. The first comment reflects the sentiment that too much emphasis is placed on performance-based methods and not enough on risk-informed methods. The second comment recommends the implementation of risk-informed, performance-based (RIPB) regulation endorsed by ANS Position Statement #46, Risk-Informed and Performance-Based Regulations for Nuclear Power Plants. ANS Executive Committee comments can be found in Attachment 1, 3.C.

JCNRM Chair Robert Budnitz explained that there are some standards that can be made performance based and others that can be risk informed--a few that can be both. He believes that more of our standards are amenable to performance-based methods so the statement is true. Amir Afazli expressed his concern that there are missed opportunities to incorporate risk-informed methods. A suggestion was made to review the list of all standards and identify those that could potentially be risk informed. The scope of each standard and project would need to be reviewed to make this assessment. Some consensus committee chairs may not have the expertise to determine which of their standards should be performance based and/or risk informed. Additionally, actionable changes would need to be provided. Ed Wallace suggested a multiple-step action item to form a RP3C subgroup to initiate the review and provide recommendations. Budnitz suggested that the RP3C coordinate support of working groups with the Joint Committee of Nuclear Risk Management (JCNRM) SubCommittee on Risk Application (SCoRA).

ACTION ITEM 6/2017-01: Ed Wallace to
1) form a RP3C subgroup to review the list of all ANS standards (current, active, withdrawn) and place each one in one of three categories – RIPB, PB, or not applicable;
2) RP3C subgroup to provide recommendations to consensus committee chairs within the next three months for their feedback;
3) consensus committee chairs to discuss recommendations with their consensus committees;
4) consensus committee chairs to report decision back to the Standards Board and RP3C; and
5) RP3C to follow up with support to working groups in coordination with SCoRA.

DUE DATE: Three months – September 15, 2017

Alan Levin and James O'Brien offered to participate on the RP3C subgroup; James August expressed interest but was tentative in committing. Others were encouraged to consider and let Wallace know if they could help.

Members discussed Nuclear Energy Institute (NEI) guidance documents and the possibility of converting their guidance documents to standards. Steven Stamm explained that a list of NEI guidance documents was prepared with a request for NEI to review and determine if there were any that might warrant conversion to a standard. Stamm reported that the response from NEI to this action was not positive. Members agreed to drop this consideration.

D. Proposed Standards Board Response and RP3C Perspectives
The Standards Board will discuss ANS Executive Committee comments on the Standards Committee Strategic Plan when they meet tomorrow and proposed responses. The drafted response regarding RIPB methods can be found in Attachment 1, 3.D.

Those familiar with the Standards Committee Strategic Plan feel that the plan does not favor performance-based or risk-informed methods. Both methods are incorporated into standards on a case-by-case basis. The majority of members feel that Action Item 6/2017-01 addresses this executive committee comment.

Stamm suggested that an action item be assigned for each consensus committee to develop a number of risk-informed and/or performance-based standards. Members felt this action required direction from the Standards Board to each consensus committee. The suggestion will be made at tomorrow's Standards Board meeting.

ACTION ITEM 6/2017-02: Steven Stamm to suggest that each consensus committee develop a number of risk-informed and/or performance-based standards to the Standards Board at their meeting June 13, 2017. DUE DATE: June 13, 2017

4. RP3C's Operating Plan Activities (Attachment 1-#4; Attachment 2 Slides 8-16; Attachment 3 RP3C Operation Plan-draft)

A. Current Status of O'Brien-Kadambi Efforts
Prasad Kadambi reminded members that the Standards Board tasked the RP3C to develop an operating plan. Currently the draft RP3C Operating Plan (See Attachment 3) is at a very-high level. Members discussed improvements and needed additions to the operating plan. The following suggestions were made:

- to include a self-assessment section with metrics for measurement,
- to include the recommendations and findings from RP3C Action Item 6/2017-01 on standards applicable to RIPB methods in Section 2.3,
- to incorporate standards as pilots,
- to reflect the Standards Committee Strategic Plan, and
- to include a link to the Standards Committee Strategic Plan in the introduction of the RP3C Operating Plan.

The following motion was made:

MOTION:
The RP3C endorses the structure of the draft operating plan as presented with the addition of the items as discussed.

The motion was approve unanimously.

The following motion was made:

MOTION:

The RP3C will revise the commitment dates of the operating plan to September 2017 and to include the use of ANS-3.14-201x, "Process for Aging Management and Life Extension of Nonreactor Nuclear Facilities," (proposed new standard) and ANSI/ANS-58.14-2011 (R2017), "Safety and Pressure Integrity Classification Criteria for Light Water Reactors," as pilots.

ACTION ITEM 6/2017-03: Prasad Kadambi to incorporate the following into the draft RP3C Operating Plan:

- a self-assessment section with metrics for measurement,
- recommendations from RP3C on standards applicable to RIPB methods (Action Item 6/2017-01) in Section 2.3,
- the use of standards as pilots [ANS-3.14-201x and ANSI/ANS-58.14-2011 (R2017)],
- to reflect the Standards Committee Strategic Plan (Link to Standards Committee Strategic Plan to be provided in introduction.)

DUE DATE: September 2017

Steven Stamm suggested that the RP3C schedule calls between meetings as needed to complete tasks instead of waiting for the next physical meeting.

B. Proposed Interactions with NRNFCC Standards

1) ANS-3.14, "Process for Aging Management and Life Extension for Nonreactor Nuclear Facilities"
Link to current draft of ANS-3.14:
https://workspace.ans.org/higherlogic/ws/groups/rp3c/documents/draft1515/document?document_id=3728

2) ANS-57.11, "Integrated Safety Assessment for Fuel Cycle Facilities"
Link to PINS for ANS-57.11:
https://workspace.ans.org/higherlogic/ws/groups/sb/download/725/ANS-57%2011%20Revised%20PINS%20for%20SB%20Approval.doc

3) ANSI/ANS-58.16-2014, "Safety Classification and Design Criteria for Nonreactor Nuclear Facilities"

Mark Linn confirmed that work was on-going on proposed new standard ANS-30.1, "Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs." Additionally, he informed members that a new follow up standard is being proposed for advanced light water reactors by Kent Welter. Development of the proposed new standard will be coordinated between the Large Light Water Reactor Consensus Committee (LLWRCC) and the Research and Advanced Reactor Consensus Committee (RARCC). Members agreed that the RP3C can be used as a resource to help working groups incorporate RIPB insights into ANS standards. Robert Budnitz suggested that the JCNRM be used as a resource as well. He explained that they have volunteers that they cannot place and would likely be willing to help on ANS working groups looking to incorporate RIPB insights.

C. Consideration of Nuclear Innovation Alliance (NIA) White Paper on "Major Portions" of a Standard Design Approval (See Attachment 2, Slide 9)
Kadambi suggested using the NIA white paper as a way to be more proactive to address ANS Executive Committee comments. The sentiment of the members was that it was premature to address the NIA proposal.

D. Proposal by Robert Busch for Standards Board to Issue Directive (See Attachment 2, Slide 16)

Kadambi informed members that the past Nuclear Criticality Safety Consensus Committee (NCSCC) Chair Robert Busch proposed that the following statement be adopted by the Standards Board at their last meeting (Nov. 2016):

> "Standards development shall include economic considerations as evaluated from graded approaches and risk-informed insights for ensuring the protection of operating personnel, the public, and the environment with a level of safety commensurate with other hazards and their physical risks."

The statement was issued to the Standards Board for their comments. RP3C was tasked with incorporating comments and proposing a statement for Standards Board endorsement. The recollection was that Busch suggested the statement be incorporated into a high-level document like the rules, procedures, or policies. One consideration discussed was changing the text to be a permissive statement. The discussion did not find a resolution as RP3C members felt they need to know the purpose of the statement as well as where it will be incorporated before making a recommendation. Kadambi will seek clarification from the Standards Board.

ACTION ITEM 6/2017-04: Prasad Kadambi to request clarification from the Standards Board on the purpose and placement/use of the statement proposed by Robert Busch so that the RP3C can address appropriately. DUE DATE: June 13, 2017

5. NRC's Standards Forum and RP3C's Role (Attachment 2, Slide 17)

The NRC Standards Forum was not discussed due to a lack of time.

6. Licensing Modernization Project Papers, Status and Schedule

The Licensing Modernization Project was not discussed due to a lack of time.

7. RP3C Report to Standards Board

Prasad Kadambi will report RP3C discussions to the Standards Board on the response to the ANS Executive Committee comments, the status of the draft RP3C Operating Plan, and the action item assigned to evaluate all standards and projects and recommend incorporation of RIPB methods as appropriate.

8. Review of Open Action Items

Due to limited time, action items were not reviewed.

9. Other Business

No other business was discussed.

10. Next Meeting

The RP3C plans to hold a meeting on Monday at the next two ANS national meetings. The next two ANS national meetings are as follows:

- ANS Winter Meeting, October 29-November 2, 2017, Washington, DC
- ANS Annual Meeting, June 17-21, 2018, Philadelphia, PA

11. Adjournment

The meeting was adjourned.

Action Item Status Report

This report includes action items assigned at the 6/12/17 meeting and those that remain open from previous meetings. As reported under agenda item #8 of the 6/12/17 RP3C minutes, time did not allow for discussion of action items at the 6/12/17 meeting.

Action Item	Description	Responsibility	Status
6/2017-01	Ed Wallace to 1) form a RP3C subgroup to review the list of all ANS standards (current, active, withdrawn) and place each one in one of three categories – RIPB, PB, or not applicable; 2) RP3C subgroup to provide recommendations to consensus committee chairs within the next three months for their feedback; 3) consensus committee chairs to discuss recommendations with their consensus committees; 4) consensus committee chairs to report decision back to the Standards Board and RP3C; and 5) RP3C to follow up with support to working groups in coordination with SCoRA. DUE DATE: Three months – September 15, 2017	Wallace	OPEN
6/2017-02	Steven Stamm to suggest that each consensus committee develop a number of risk-informed and/or performance-based standards to the Standards Board at their meeting June 13, 2017. DUE DATE: June 13, 2017	Stamm	OPEN
6/2017-03	Prasad Kadambi to incorporate the following into the draft RP3C Operating Plan: • a self-assessment section with metrics for measurement, • recommendations from RP3C on standards applicable to RIPB methods (Action Item 6/2017-01) in Section 2.3, • the use of standards as pilots [ANS-3.14-201x and ANSI/ANS-58.14-2011 (R2017)], • to reflect the Standards Committee Strategic Plan (Link to Standards Committee Strategic Plan to be provided in introduction.) DUE DATE: September 2017	Kadambi	OPEN
6/2017-04	Prasad Kadambi to request clarification from the Standards Board on the purpose and placement/use of the statement proposed by Robert Busch so that the RP3C can address appropriately. DUE DATE: June 13, 2017	Kadambi	Superseded by direction from the Standards Board
11/2016-01	Ed Wallace to provide Mark Linn specifics on the SAP so that his working group can populate a SAP for ANS-30.1. DUE DATE: N/A)	N/A	N/A
11/2016-02	Mark Linn and the ANS-30.1 Working Group to develop a SAP. DUE DATE: N/A1)	N/A	N/A
11/2016-03	Wallace to provide the list of participants in the Southern Company project on the modernization of technical requirements for licensing on nonlight water reactors. DUE DATE: June 1, 2017	Wallace	Completed Team Lead: Amir Afzali – Southern Co Services Karl Fleming – Fleming Consultant – PRA and RIPB practices

Action Item Status Report

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Action Item	Description	Responsibility	Status
			Ed Wallace – GNBC Associates – RIPB practices and Licensing Peter Hastings – Hastings Group – Licensing Prasad Kadambi – Kadambi Consulting – Performance Based Practices Steve Freel / Brandon Hough – Studsvick – Advance Tools Advisors: George Apostolakis, Jeff Merrified
11/2016-04	Prasad Kadambi to check with the Standards Board to see if the RP3C Bylaws should be expanded to permit the development of a process standard. DUE DATE: June 1, 2017	Kadambi	OPEN
11/2016-05	Prasad Kadambi to check with the Standards Board to see if RP3C is allowed to address the questions coming out of the licensing-modernization project. DUE DATE: June 1, 2017	Kadambi	OPEN
11/2016-06	Mark Linn to provide the current draft of ANS-30.1 to Pat Schroeder along with an explanation of the feedback he needs. DUE DATE: December 1, 2016	Linn	Completed Draft provided & issued for review.
11/2016-07	Pat Schroeder to issue the ANS-30.1 draft to RP3C for comment. DUE DATE: December 1, 2016	Schroeder	Completed Draft issued for comment. Comments available HERE
11/2016-08	RP3C to provide feedback to Mark Linn on the ANS-30.1 draft. DUE DATE: January 15, 2017	RP3C	Completed Comments available HERE
11/2016-09	RP3C/Prasad Kadambi to prepare a one-pager to summarize a PB Framework. DUE DATE: April 1, 2017	Kadambi/RP3C	OPEN
11/2016-10	Consensus committee chairs to review the PB Framework white paper once developed. DUE DATE: May 1, 2017	Consensus committee chairs	OPEN
11/2016-11	RP3C to prepare a brief, five-slide presentation with a simple perspective explaining risk-informed/performance-based for use at consensus committee meetings. DUE DATE: June 1, 2017	Kadambi/RP3C	OPEN
11/2016-12	Prasad Kadambi and Ed Wallace to review the list of previously assigned action items to determine if any remain relevant. DUE DATE: June 1, 2017	Kadambi, Wallace	OPEN

Attachment 1 – Additional Information to Agenda Points

3.A Outcome of Standards Board Meeting on November 8, 2016

Standards Board Action Item for RP3C:
Action Item 11/2016-24: James O'Brien and Prasad Kadambi to develop a path forward to complete the RIPB Plan consistent with the current RP3C Bylaws.

3.B Strategic Plans for ANS and the Standards Committee

Excerpt from ANS Strategic Plan:
Produce and maintain ANS consensus standards and promote their adoption as standards of choice by the nuclear science and technology community.

The Society will pursue the following strategies regarding this goal:

a. Promote ANS standards to the nuclear science and technology community and other relevant stakeholder groups.
b. Identify and establish relationships with other appropriate organizations for standards development.
c. Identify, evaluate and select standards for revision or development.
d. Increase participation in the ANS standards development.

Excerpt from Standards Committee Strategic Plan
Incorporate risk-informed and performance-based methods in ANS standards, where appropriate, by:

a. Develop the Risk-Informed Performance-Based Principles and Policy Committee Operating Plan
b. Develop a Risk-Informed Performance-Based Principles training package for training of ANS Standards Committee members.
c. Conduct training of consensus committees and working groups.
d. The RP3C will work with each consensus committee to develop a prioritized list and schedule for incorporating risk-informed and performance-based principles into its standards. Collaboratively, they will Identify and define any new standards that are related to risk-informed and performance-based principles. Some of such work may already have been assigned to other standards working groups, and so it is important to work with the Standards Board and consensus committees to identify an appropriate WG lead (and consensus committee) for the standards development with the objective of avoiding duplication.
e. Publishing a Nuclear News Article to inform other members of the Society of the benefits of this risk-informed and performance-based effort
f. Developing presentation materials that can be used to inform other industry groups as to the benefits and use of the ANS Standards Committee risk-informed and performance-based standards activities

3.C ANS Executive Committee Comments Relevant to RP3C

Excerpt from ANS Executive Committee's Comments on SC Strategic Plan:

6) In Goal #1, Initiative D (incorporate risk-informed and performance-based methods), there is too much emphasis on performance-based methods and not enough emphasis on risk-informed methods. The industry is moving very quickly to implement a number of risk-informed initiatives (TSTF 505, 50.59, etc.) and this is a real opportunity for ANS to be a leader in providing standards for both the industry and the regulator. We need to focus on this and be proactive.
7) Also related to Goal #1, ANS Position Statement #46 strongly encourages the implementation of Risk-Informed, Performance-Based regulation. The Executive Committee would like to see Initiative D be implemented as quickly as possible.
Link to ANS PS #46: http://cdn.ans.org/pi/ps/docs/ps46.pdf

3.D Proposed Standards Board Response and RP3C Perspectives

Excerpt from Proposed Standards Board Response to Executive Committee
"The focus equally included both Risk and performance based. Work needs to be done in both of these areas to incorporate them into ANS Standards. The goal for ANS Standards to take a leadership role in these areas will be added to the plan."

3.E Proposal by Robert Busch for Standards Board to Issue Directive

STATEMENT PREPARED BY ROBERT BUSCH FOR CONSIDERATION:

Standards development shall include economic considerations as evaluated from graded approaches and risk-informed insights for ensuring the protection of operating personnel, the public, and the environment with a level of safety commensurate with other hazards and their physical risks.

Comments on Busch Statement:

J. August: Reword to "STATEMENT FOR CONSIDERATION: Standards development shall include economic considerations evaluated from risk-informed insights and graded approaches to quality to manage risk ensuring the radiological health and safety, physical protection and well-being of the operating plant, its staff, the public and environment commensurate with hazards using an overall graded risk approach.

R. Budnitz: "I believe that this Statement needs to be qualified to indicate that it only applies to those standards for which it makes sense to consider the "economic considerations" that are mentioned, in the context of an objective to protect workers, the public, or the environment. Other standards need to be exempted. Specifically, for some standards the end-point or objective simply has nothing to do with such objectives. Examples would be a standard on how to calibrate an instrument, or how to assure that a computer code does its arithmetic correctly, or a standard seeking to standardize how to deploy seismic instruments in the field. Standards like these need to be exempt from this requirement stated."

R. Busch: "Would be better to change first line to: "Development of nuclear safety standards shall include ..." "

G. Carpenter: "I disagree with endorsing the statement (concur with Jim O'Brien's comments), and disagree with having economic considerations an explicit factor - safety should be our overriding concern."

D. Eggett: "Suggested insertions/deletions: [Insertions: insert "/performance based" after risk-informed insert "from degraded operating equipment" after environment], [Deletion: delete the phrase "other hazards and" at the end so it reads "with the level of safety commensurate with their physical risk." "Other hazards" is too nebulous, needs to be more specific to add value to the statement.]

G. Flanagan: "I don't think the statement should be a blanket for all ANS standards (not ANS policy) It might be something the consensus committee and WG want to consider in developing a standard when applicable."

NP Kadambi: "Two basic ideas are presented: (1) Graded safety; and (2) comparison between hazards. In the abstract both seem sensible to consider in standards. It is not at all clear that any Standards Board action on the statement is meaningfully relevant to standards development and maintenance. On the other hand, approving a statement like this is very risky because it can be misinterpreted in multiple ways. The statement should be set aside until more information about intended outcome objectives is available."

S. Levinson: "What is the context for this "requirement?" All standards development do not (should not) require economic considerations. (This would be moot for the PRA Standards.) If economic considerations are included, why would the approaches be limited to "graded approaches" and "risk-

informed insights" -- there are other valid approaches. Finally, the term "graded approaches" needs to be defined."

J. O'Brien: "The Policy Manual for the ANS Standards Committee and I do not believe the standards board should be reviewing/endorsing stand alone "statements" by its members. This type of statement (on that has a continuing action associated with it) could be included in a revision to the ANS Standards Committee Rules and Procedures or the ANS consensus committee procedures and then given appropriate review by the Standards Board. Alternatively if a person want to state his/her position during a meeting that could be included in the meeting minutes."

A. Smetana: "I don't believe this should be a blanket policy of the Standard Board as there are standards where the statement does not apply. As an example, I don't know how you would risk inform or have a graded approach to decay heat data. Instead, individual working groups should be informed that a risk informed / graded approach is an option if appropriate for their particular standard."

A. Sowder: "This seems a bit odd. Why does the Standards Board need to endorse a "shall" statement that directs a consensus committee to do what it can already do on its own? Is the RP3C resistant to this idea? If not, why is an endorsed statement needed? If the RP3C is against the idea, then is this the right vehicle? Taken on its own, the statment lacks context. What graded approaches? This really warrants a more substantive position statement to provide the context and meaning to the various elements. What graded approaches are acceptable? Does this apply to all standards?"

D. Spellman: "There is no valid reason for this statement as Andy Sowder notes. We should not try to focus any standards on economic issues since we provide standards that protect the safety of the public and in some cases, implement requirements of other agencies."

S. Stamm: "Change to a "should" statement."

4. RP3C's Operating Plan Activities

RP3C's Operating Plan Activities:
Link to draft operating plan:
https://workspace.ans.org/higherlogic/ws/groups/rp3c/documents/calendar/document?document_id=3695
(NOTE: Also see Attachment 2)

Link to draft RP3C Procedures:
https://workspace.ans.org/higherlogic/ws/groups/rp3c/documents/calendar/document?document_id=3696
(NOTE: Also see Attachment 3)

Link to current draft of ANS-3.14:
https://workspace.ans.org/higherlogic/ws/groups/rp3c/documents/draft1515/document?document_id=3728

Link to PINS for ANS-57.11: https://workspace.ans.org/higherlogic/ws/groups/sb/download/725/ANS-57%2011%20Revised%20PINS%20for%20SB%20Approval.doc

5.A Communications with NRC Staff on Standards Forum

NRC Staff Notification of Standards Forum:
Link to initial notification: https://workspace.ans.org/higherlogic/ws/groups/rp3c/discussions/2565
Link to follow-up discussion with staff:
https://workspace.ans.org/higherlogic/ws/groups/rp3c/discussions/2569

ANS Standards Committee RP3C Meeting

San Francisco, CA

June 12, 2017

Agenda

- Welcome, Roll Call & Introductions
- Approval of Meeting Agenda
- Status of Interaction with Standards Board
  - SB direction on RP3C Operating Plan
  - Strategic Plan flow down from ANS to SB to RP3C
- RP3C Operating Plan Activities
  - Current status of O'Brien-Kadambi efforts
  - Proposed Interactions with NRNFCC standards
    - ANS-3.14
    - ANS-57.11
    - ANS-58.16
  - Consideration of NIA White Paper on "Major Portions" of a Standard Design Approval
  - Bob Busch proposal to SB
- NRC's Standards Forum and RP3C's Role
  - Communications with NRC staff
  - RP3C proposed response to NRC staff ANS-58.16
- Licensing Modernization Project Papers, Status and Schedule
- RP3C Report to SB
  - Summary of discussions on SC Strategic Planning, Busch proposal, and NRC Standards Forum
  - RP3C action assignments and schedule on RP3C Operating Plan
- Open Items & Action Items
- Next Meeting, Adjournment
  - ANS Winter Meeting, October 29 to November 2, 2017, Washington, DC

SB Direction to RP3C

Action Item 11/2016-24: James O'Brien and Prasad Kadambi to develop a path forward to complete the RIPB Plan consistent with the current RP3C Bylaws.

- Focus is on implementing RIPB concepts in the context of ANS standards.
- Implementation examples serve to communicate with CCs better than drafting descriptive text of RIPB concepts.
- Implementation examples serve to engage WG members in the context of familiar technical issues thereby enabling better grasp of RIPB concepts.
- Other opportunities in charting the path forward have been presented by the strategic planning process that has now engaged the ANS Executive Committee and the Standards Committee.
- This engagement enables clarifying RIPB concepts at a higher level.

ANS Leadership and Standards

- The ANS Standards Committee has enjoyed strong attention from ANS leadership over the past five or so years
- The ANS Strategic Plan over this period has reflected performance objectives to demonstrate leadership in nuclear science and technology.
  - Outreach to stakeholders
  - Establish relationships with other SDOs
  - Provide resources to maintain standards
  - Broaden participation in standards development
- RP3C was created to add RIPB modernization to the strategic objectives of the Standards Committee where it applies.
- There is strong connection between NRC's RIPB initiatives and the joint activities with ASME to develop PRA methodology standards.
- The new Standards Committee Strategic Plan offers further opportunities for standards modernization consistent with ANS strategy.

ANS Executive Committee Inputs

- Summary of Executive Committee Comments:
  - Excessive emphasis on performance-based methods
  - Insufficient emphasis on risk-informed methods
  - TSTF-505 (Risk-Informed Extended Completion Times) is an example of ANS to take the lead on standards
  - 10 CFR 50.69 (Risk-Informed Categorization and Treatment of SSCs) is another example of possible initiative by ANS
  - ANS PS-46 on RIPB regulation is noted
  - Implement incorporation of RIPB methods as quickly as possible
- RP3C's report to the SB should reflect consensus on
  - What is the right balance between RI and PB?
  - How to address lack of user community demand?
  - How should the standardization process be used to help industry on RI initiatives?
  - Application of PB methods for 10 CFR 50.69

RP3C's Role in the Standards Committee Strategic Plan

- RP3C's engagement with all eight CCs needed to develop. Prioritized list and schedule for standards modernization is needed.
- RP3C's training of Standards Committee members proceeds on the basis of fulfilling the most urgent needs for modernization within each CC.
- Specific products that contribute:
  - Operating Plan
  - Implementation pilots
  - New projects plus incremental improvements in existing standards
  - Develop presentation material
  - Publish articles
- RP3C's outreach to the broader ANS technical community and socialization of RIPB concepts will proceed in parallel.
- Challenge is lack of appreciation for needs and benefits of modern standards by the users.
  - "Chicken & egg" issue with demand for modern standards
  - Need to make a compelling case for simultaneous improvements in safety, security, economics, and public acceptance

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Activity on RP3C's Operating Plan

- Attachment 2 is latest draft of O'Brien-Kadambi draft of RP3C Operating Plan.
  - Envisioned brief guidance document as the beginning task
  - Guidance to be used in indoctrination of WGs
  - RP3C provides review and support to WGs
  - Outreach to SDOs, industry, and regulators
  - Ad hoc efforts with SCoRA and grant requests
- Basic outline of Operating Plan is fairly complete.
- Guidance document presents challenges because brevity relative to RIPB methods may not be possible.
- Practical path forward:
  - Use available guidance
  - Learn through implementation
- We need to reach consensus on the Operating Plan and have RP3C members come forward to work with WGs.

Implementing Examples

- Existing pilot on ANS-30.1 is ongoing.
  - WG engaged with RP3C at last meeting
  - Appear to be proceeding on their own
- One issued and two standards in development in NRNFCC have suitability as candidates.
  - ANS-3.14 (on aging management) has rough draft
  - ANS-57.11 (on ISA) is in development for some time
  - ANS-58.16 (on SSC classification) has been issued
- Nuclear Innovation Alliance's proposal on regulatory approval of "Major Portions" offers possibilities.
  - May illustrate performance-based application of 10 CFR Part 52

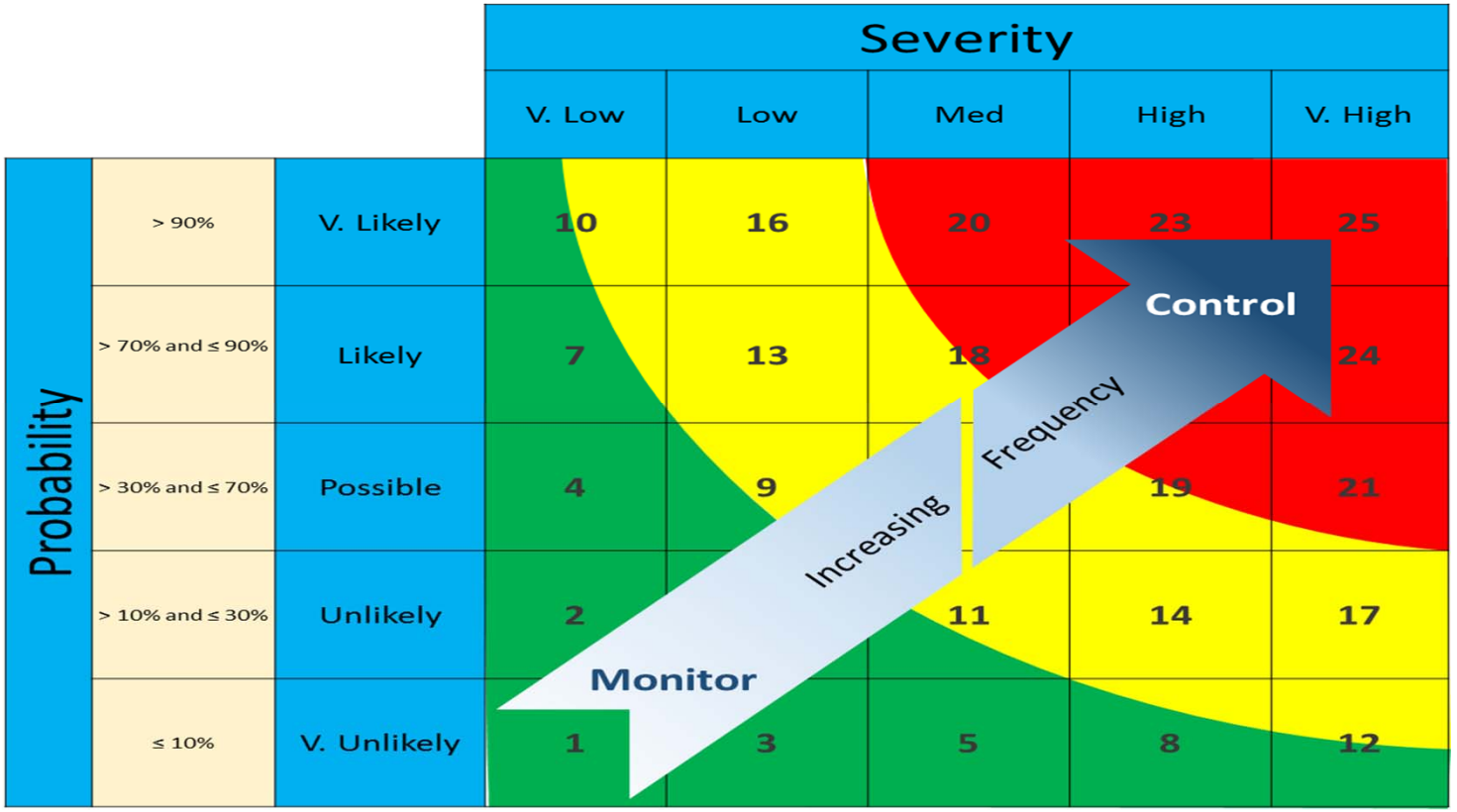
Procedure for Support of Standards Development

Refer to Attachment 3 of Agenda

- This is meant to be a “how to” procedure.
  - How to incorporate RIPB factors during re-affirmation and revision
  - New standards proposed for development
  - Guidance for interaction with RP3C including participation in RP3C as a member
- Clarify SB expectations.
- Candidates for RIPB inclusion are those “shall” statements that are unnecessarily prescriptive.
- An RI standard is one that achieves outcomes with acceptable level of risk.
  - Does not have to be numerical, can be qualitative
- A PB approach contrasts with a prescriptive one.
  - Consistent with NRC’s “High Level Guidance” and NUREG/BR-0303
  - Considers integrated outcomes that includes economic, operational and other factors
  - Specifies attributes that characterize the outcome
- Specifies documentation for review of result by SB.

RI Example – ANS-3.14

"Process for Aging Management and Life Extension for NRNF"



RI Example – ANS-3.14 (continued)

Risk considerations using constructed measures

		Impact				
Safety		Minimum impact in safety position that causes an incident requiring first aid or a slight injury/illness with no treatment.	Minor impact in safety position that causes an incident requiring recordable, medical treatment, restricted work, ...	Moderate impact in safety position that causes an incident resulting in a lost time injury/illness or permanent disability.	Significant impact in safety position that causes an incident resulting in a single fatality or permanent disability.	Exceptional impact in safety position that causes an incident with multiple fatalities.
Security		Minimum impact to security objectives.	Minor impact to security objectives; loss of material, information, or data with minor impact.	Moderate impact to security position that causes a loss of materials, information, or data; ...	Significant impact to security position that causes a major loss of material, information, or data; ...	Exceptional impact to security position that causes a catastrophic loss of material, information, or data; ...
Mission Delivery		≤ 1 week	> 1 week and ≤ 4 weeks	> 4 weeks and ≤ 8 weeks	> 8 weeks and ≤ 16 weeks	> 16 weeks
Quality		Minimum impact from requirement observation. Impact was fully contained within operational role.	Minor impact from requirement observation identified. Corrective action required.	Moderate impact from systemic requirement non- compliance. Multiple corrective actions required.	Significant impact from requirement non-compliance is not identified until after delivery to customer (quality escape).	Exceptional impact from systemic requirement non- compliance is not identified until after delivery ...
Cost Efficiency		≤ $50K	> $50K and ≤ $250K	> $250K and ≤ $1M	> $1M and ≤ $10M	> $10M
Technical		Minimum impact but recoverable technical performance and baseline mission objectives.	Minor reduction in technical performance. Minimal impact to baseline mission objectives.	Moderate reduction in technical performance. Tolerable impact to baseline mission objectives.	Significant reduction in technical performance. Unacceptable impact to baseline mission objectives.	Exceptional degradation in technical performance. Unable to meet baseline mission objectives.
Legal / Compliance		Minimum impact from lawsuit or regulatory enforcement action	Minor non-compliance with regulatory requirements of site.	Moderate impact to site that results in litigation. Missed milestone or commitment to regulatory entity ...	Significant impact results in delay of compliance agreement schedule. Issue likely to result in civil penalties. ...	Exceptional impact results in debarment, criminal prosecution, impacts management and operating contract, ...
Environmental		Minimum impact that is fully contained and insignificant.	Minor short-term impacts confined on-site, no regulatory exceedance.	Moderate impact confined on-site, regulatory exceedance, or any off-site impact.	Significant impact for on- site, regulatory exceedance, any off-site impact, or enforcement action.	Exceptional impact, long-term liability, or irreversible damage.
Community		Minimum impact to site complaint(s) from abutters, local stakeholder groups, or local government.	Minor impact to site complaint(s) and/or regulator complaints from abutters, local stakeholder groups, ...	Moderate impact in site complaint(s) and/or regulator complaints from abutters, local stakeholder groups, ...	Substantial impact in persistent site complaints and/or regulator complaints from community and. ...	Exceptional impact in persistent site complaints and/or regulator complaints from key international stakeholder ...
Reputation		Minimum impact with negative local media coverage. No disruptions in operations.	Minor impact with negative local media coverage. Minor disruption in operations.	Moderate impact with negative regional media coverage. Disruption of operations. ...	Significant impact with sustained negative regional or national media coverage; impact to site operations. ...	Exceptional impact with influential national or international negative media coverage. ...
		V. Low	Low	Med	High	V. High
Probability	> 90%	V. Likely	10	16	20	23	25
	> 70% and ≤ 90%	Likely	7	13	18	22	24
	> 30% and ≤ 70%	Possible	4	9	15	19	21
	> 10% and ≤ 30%	Unlikely	2	6	11	14	17
	≤ 10%	V. Unlikely	1	3	5	8	12

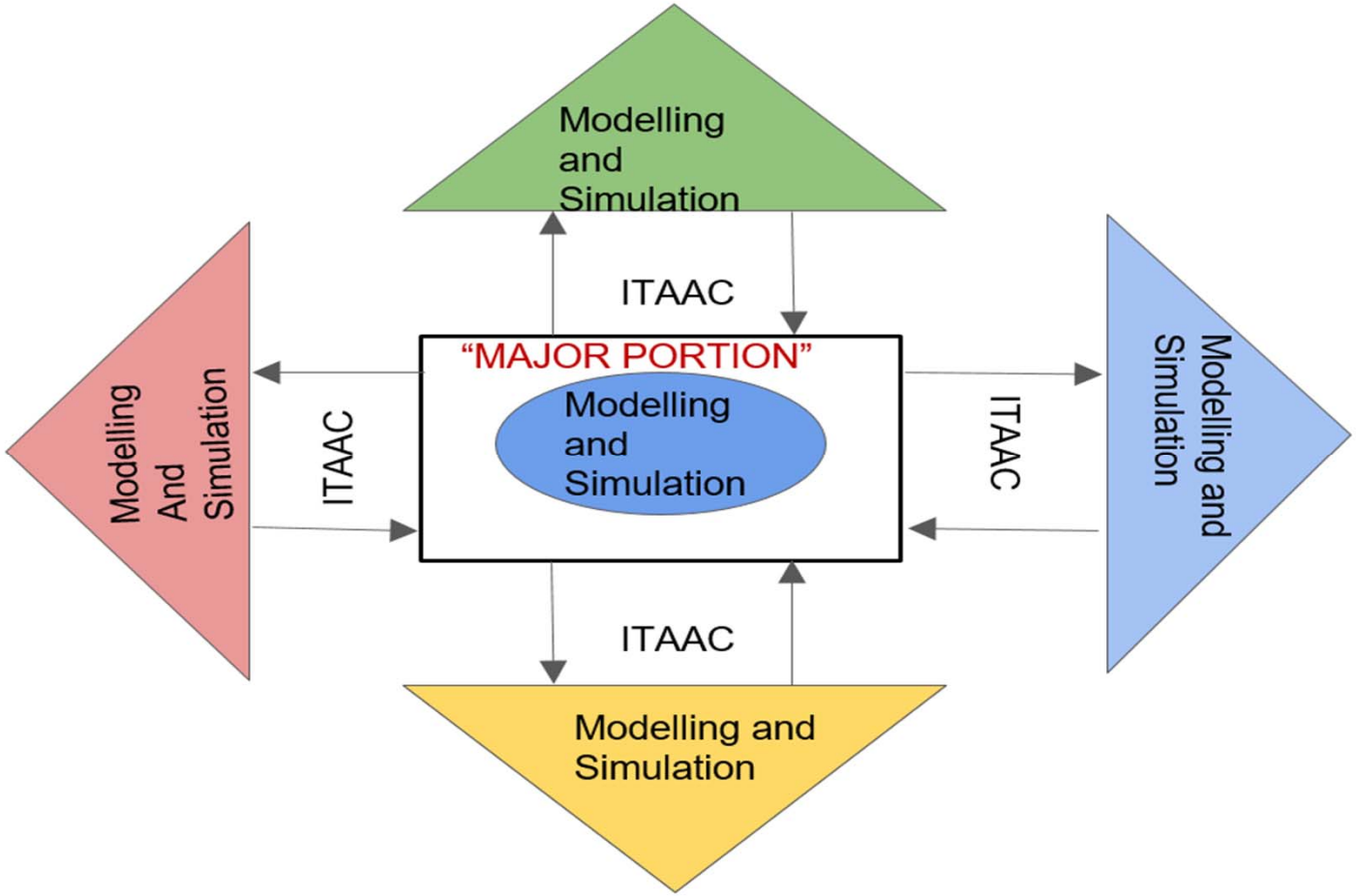
PB Example – ANS-57.11

- "Integrated Safety Assessments for NRNF"
- Directed at 10 CFR Part 70 regulations
- Excerpts from PINS
  - "…use risk-informed insights.."
  - "...performance-based approach is applied to design criteria and QA controls."
- ISA evaluation considers radiological, criticality, chemical and fire hazards.
- Outcome objective includes integration into ANSI/ANS-58.16-2014.

RIPB Example – ANS-58.16

- "Safety Categorization and Design Criteria for NRNF" issued in 2014
- Parallels ANSI/ANS-58.14-2011 (R2017) on LWR SSC classification
- NRNFs often unique with potential high hazards such as fires, explosions, spills and leaks, nuclear criticality etc.
- Hazards analysis and DBEs not standardized as with LWRs
- RIPB concepts not a part of either standard
- Directed at 10 CFR parts 70 and 830
- Safety criteria for low, intermediate and high unmitigated consequences for facility workers, collocated workers and the public are specified.
- Reference is provided to voluntary consensus standards from a variety of SDOs to address issues such as single failure criterion, environmental qualification, civil-structural issues, criticality hazards, etc.
- Useful guidance is available in ANSI/ANS-2.26-2004 (R2010) on categorization of SSCs for seismic design.

10 CFR Pt 52 SDA and "Major Portions" Approval



Busch Proposal to SB

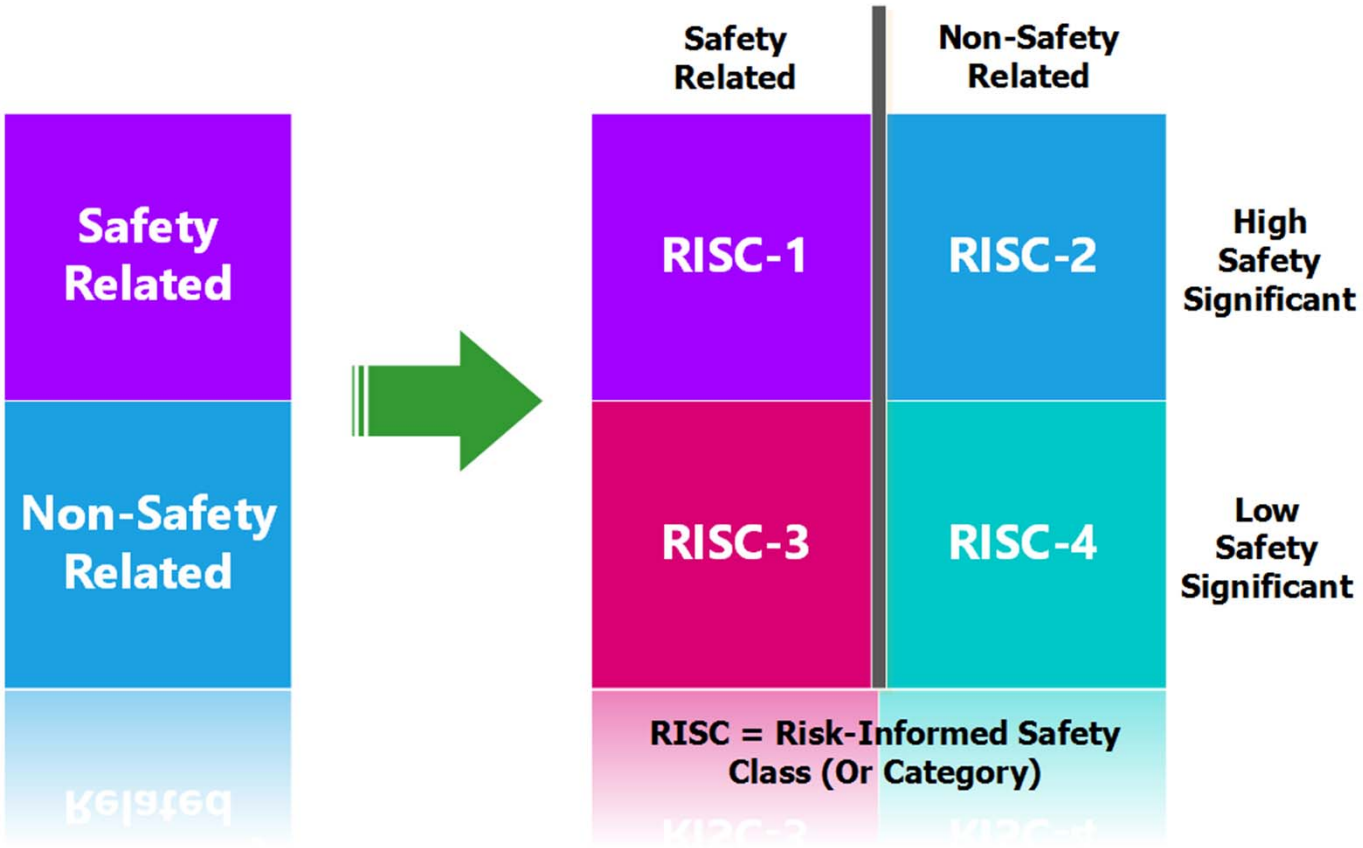
Standards development shall include economic considerations as evaluated from graded approaches and risk-informed insights for ensuring the protection of operating personnel, the public, and the environment with a level of safety commensurate with other hazards and their physical risks

- Wide variety of comments from SB members, some reflecting on RP3C
- Lack of information on source concerns makes it hard to define outcome objectives for proposal
- Scope of proposed statement appears to be well within the range of application of the proposed RP3C Operating Plan
- Recommendation options:
  - Subsume into RP3C Operating Plan and work with NCSCC
  - Recommend modification
  - Recommend rejection
- RP3C formulate recommendation for SB consideration

NRC's Standards Forum

- NRC Standards Forum replaces NESCC
- Concept involves SDO champions working with counterparts in EPRI, NRC, and industry
- Opportunity to involve multiple SDOs
- RP3C area of interest, "Methodology for Risk Informed Strategies"
- In light of ANS Executive Committee input, should RP3C recommend that a standard be developed for employing 10 CFR 50.69 in non-LWR design and licensing?

Potential Model for ANS-30.2



LMP, ANS, and RP3C

- Status of Licensing Modernization Project
- Impact on ANS standards
- How RP3C can help

Action Item Status

- Action Item 6/2013-01: Kadambi to update and distribute next draft of the Risk-Informed and Performance-Based (RIPB) Plan with member comments incorporated. (RIPB Plan renamed RP3C Vision Plan.)
- Action Item 6/13-05: Kadambi to prepare a note on weaving RIPB ideas into Tier 3 issues as defined by NRC.
- Action Item 6/13-07: Kadambi to prepare a note on how consensus standards activities can help address long standing issues regarding defense-in-depth (DID).
- Action Item 11/2013-01: George Flanagan to provide Mark Peres a copy of the current ANS-54.1 draft for an example.
- Action Item 11/2013-02: Amir Afzali to provide George Flanagan the name of Southern Nuclear Company's technical expert to help on ANS-54.1.
- Action Item 11/2013-03: Amir Afzali to provide suggestions on how the RP3C Vision Plan can emphasize safety.

Closing

- **Other Business**
- **Next Meetings**
  - ANS Winter Meeting, October 29-November 2, 2017, Washington, DC
- **Adjourn and Thank You!**

BACKUP
&
BACKGROUND
SLIDES

Example Outcome Objectives for Advanced Reactor Design

- Design decisions for advanced reactors are based on optimizing performance to support safety, economic, and societal objectives.
  - If regulatory precedents need to be considered, the costs of doing so will be balanced against the compromises needed relative to the main objectives.
- The assessment of effectiveness relative to accomplishing the above objectives will be part of the designer's decision making framework.
  - Assessment methods are commensurate with the importance of the design decisions relative to the functional objectives.
- Implementation decisions will focus on maximizing the benefits related to the technology in question.
- The level of risk associated with unknown factors would be subject to the designer's articulation of "how safe is safe enough (HSISE)."

A Standardized PB Framework

- What is emerging is that RI is useful in certain areas but opportunities for PB are more abundant.
- Prescriptive and deterministic requirements are likely beneficial for some DB considerations.
- A designer could choose to assure safety margins using a PB approach.
- Reliability of safety outcomes is the main consideration.
- Available PB approach requires suitable parameters for performance observation and measurement.
- It also requires an appropriate monitoring system.

Performance Measures and Attributes

- PB framework based on NUREG/BR-0303 would consider safety margin as a performance measure in a scenario-based system.
- The safety margin can be defined in a graded manner dependent on whether DB, BDB, or residual risk is being considered.
- The gradation can be on the basis of level of confidence in the safety margin based on rigor of validation and/or conservatism of the analysis.
- The performance measure can also include the acceptable level of the probability of exceedance.
- A graded approach could consider as acceptable lower confidence levels in the safety margin as scenario frequency decreases.
- Similarly it may be acceptable to have increasing levels of probability of exceedance given a threshold being set.
- The PB framework would provide the designer flexibility to fulfill the attributes in the most economical manner.

Optimizing Performance Objectives Between Multiple Outcomes

- Consider outcomes related to safety, economics, and public acceptance.
- A designer is concerned about all three, but a framework does not exist to perform trade-offs transparently.
- The practices guide would provide top-down (IDMF) and bottom-up guidance among multiple hierarchies.
- An outcome objective for the guidance is that traceability and trackability would be available.
- Relationship between design practices and associated regulatory practice is based on functional analysis.

Designers' Outcome Considerations

- Safety
  - Functional adaptation of regulatory criteria based on principles and policies
  - Focus on enhancing benefits of technology
  - Focus on innovative methods and tools
- Economics
  - Consider practices more broadly beyond nuclear practice
  - Discrepancies reconciled through IDMF at levels above practices.
  - Discrepancies within nuclear technology would invoke NUREG/BR-0058, "Regulatory Analysis Guidelines."
- Public Acceptance
  - Involves local considerations and value judgements
  - Likely to primarily involve region of residual risk
  - May involve notions of defense-in-depth and HSISE

RIPB Management Framework

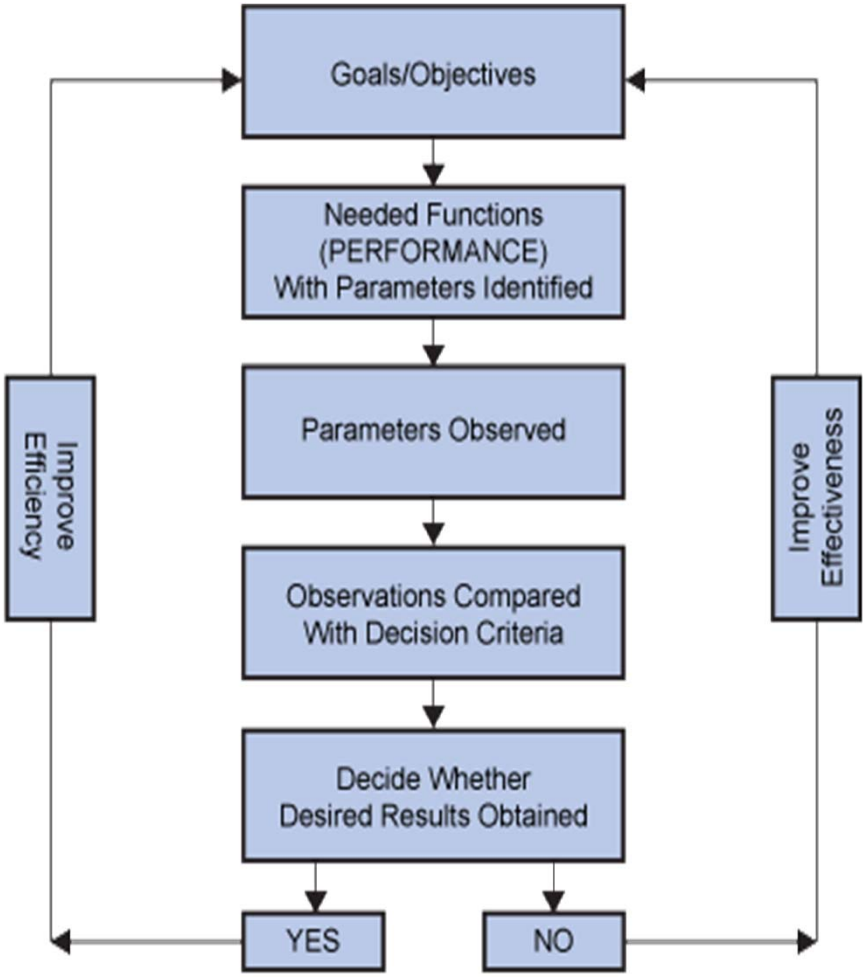
Suitable combination of processes to:

1. Model systems and assess risk
   a) Risk need not always involve exposure to radioactivity
   b) Risk can also be defined in terms of failure to meet objectives
   c) How much PRA quality is sufficient to know this?
   d) Success can be defined as adequately low probability that an outcome will not be achieved
2. Specify and monitor performance objectives
   a) A suitable combination of objectives constitutes an outcome
   b) A successful outcome can be defined as a high enough probability that a specified set of objectives will be achieved
3. Conduct integrated decision-making
   a) Multi-attribute decision-making under uncertainty is a recognized part of decision theory disciplines
   b) A process with well defined success criteria involves a structured set of activities, each of which is characterized by a suitable set of qualitative and quantitative observable parameters.
   c) How likely is it that parameters observed are acceptable but outcome is unacceptable? (See NUREG/CR-6833)

Principles and Policies

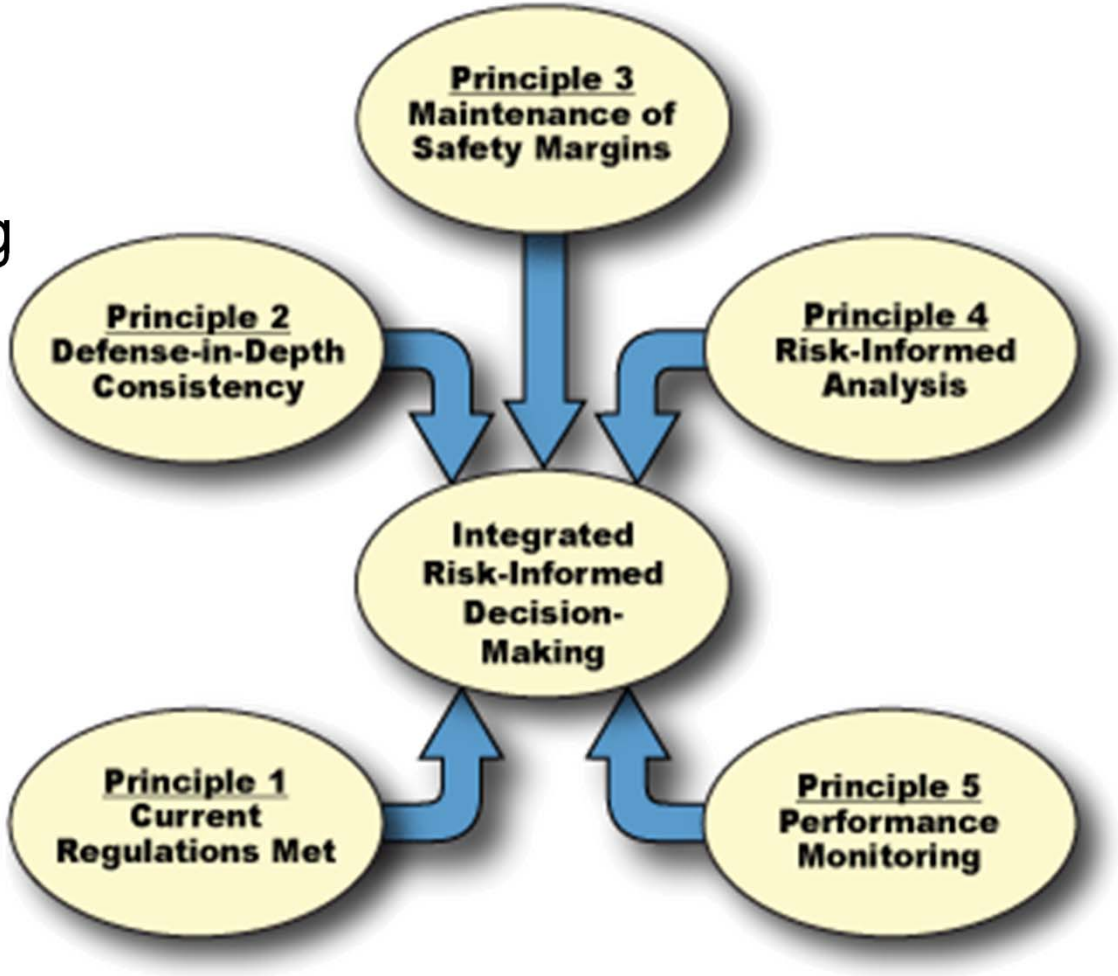
Principles	Policies
• **Licensed activities must be conducted with "no undue risk"**	• Assure low probability of accidents that can adversely affect health and safety
• **Experience with operational facilities shows "no undue risk" criteria met with deterministic approach that considers safety margins, uncertainties and defense-in-depth**	• Probabilistic methods should be used to complement deterministic approaches to improve safety and incorporate realism and more efficiently assure "no undue risk" .
• **The regulated community assures safety by conforming to requirements developed by an independent regulatory authority through open and participatory processes such as rulemaking, licensing, inspections and assessments (collectively called the Regulatory Framework).**	• Voluntary consensus standards developed with duly accredited processes are an effective adjunct to regulatory requirements, and should be relied upon to improve the efficiency and effectiveness of implementing safety requirements.
• **Implementation of "no undue risk" can be pursued with a wide range of methods involving probabilistic approaches which fall under the discipline of decision-making under uncertainty.**	• Constructing a PRA is just one of the approaches for implementing probabilistic methods, and other methods should also be examined for risk-informed options.

Steps for Performance-Based Approach Implementation



RIPB Decision Framework

- Source: RG 1.174
- Basis for binning
- Can a change impact licensing basis?



Stamm comments 11/18/2016
Comments were made on George Flanagan's markup

Risk-Informed Performance-Based Principles and Policy Committee
Operating Plan
DRAFT 11-18-16

1. Introduction

In 2013, the American Nuclear Society's (ANS) Standards Board (SB) established a Risk-Informed and Performance-Based Principles and Policy Committee (RP3C) responsible for developing approaches, priorities, responsibilities and schedules for implementation of risk informed and performance based (RIPB) principles in ANS standards.

This operating plan describes the RP3C goals and activities/processes that RP3C will perform/utilize to meet its responsibilities consistent with the June 2015 RP3C bylaws.

2. RPC3 Activities/Processes

2.1 Development of RIPB Guide for ANS Committees and Working Groups

The RP3C will develop a brief (one to two) pager on concepts/methods that can be used to make ANS standards more risk-inform and/or performance-based during revision or initial development. This guide will discuss the integration of existing requirements with risk informed and performance based requirements.

Schedule:

- 1st draft sent to RP3C committee — January 15
- Comments included and 2nd draft sent to RP3C — February 28, 2017
- 3rd draft sent to Standards Board for balloting — April 30

Responsibilities:

- Lead Prasad Kadambi

2.2 Indoctrination of Standards WGs in RIPB

The RP3C will set up webinar to brief the WGs on RIPB guide, outline advantages of inclusion RIPB in standards, and how the RP3C will operate to support WGs in developing more RIPB standards.

Schedule:

- Draft of training package provided to Standard Board — May 2017
- Trail run of training provided to RP3C and Standard Board — June 2017
- Amended presentation based on RP3C and SB feedback — July 2017
- Begin Webinar presentations to CCs and WGs — August 2017

Responsibilities:

- Lead Ed Wallace

2.3 RP3C support and review of ANS standards

The RP3C will develop a process for RP3C support and review of ANS standards including review of PINS, early interface with WG to identify areas and approaches that can be used in the standard, support of WG during draft standard development, review of draft standard prior to being sent for CC balloting.

Schedule:

- Draft of process document provided to Standard Board December 31
- Comments included and 2nd draft sent to RP3C February 28, 2017
- 3rd draft sent to Standards Board for balloting April 30

The RP3C will work with each consensus committee to develop a prioritized list and schedule for incorporating risk-informed and performance-based principles into its standards

Schedule:

- Develop February 28, 2017

Responsibilities:

- Lead Jim O'Brien

Identify and define any new standards that are related to risk-informed and performance-based principles that are not assigned to other standards working groups and work with the SB and CCs to identify an appropriate WG lead (and CC) for the standards development.

2.4 Interface with standards organization, industry groups and regulators

Interface with industry groups and organizations, as requested by the SB, for discussions related to achieving better coordinated risk-informed and performance-based principles and topical activities.

Specifically will interact with the JCNRM, NEI, INPO, NRC, and DOE to get their perspectives on how ANS standards could be developed or revised that make them more RIPB and better support industry and regulator objectives to support safe and efficient nuclear facility designs and operations as related to standards.

It is expected that the work of RP3C will consider and promote a wide range of outcome-oriented probabilistic applications in helping ANS standards activities become more risk-informed and performance-based. A key area where a huge amount of literature exists waiting for application is decision theory and methods for decision-making under uncertainty. The RP3C will focus on developing a paper on how probabilistic/decisionmaking applications may be utilized to support for desired safety outcomes in the use of ANS standards Clearly defining safety outcomes, together with performance assessment and monitoring, are essential elements of a performance-based approach.

Schedule:

- Perform initial set of discussions February 28, 2017

Responsibilities:
(Multiple, e.g.,)

- Amir Afzali, Advanced Reactor Regulatory Task Force
- Ed Wallace, various
- Bill Reckley, NRC
- Jim O'Brien, DOE

Additional activities to be included on an ad hoc basis:

1. Interface with JCNRM – SCORA to coordinate risk application development and avoid duplication of efforts
2. Identify potential funding opportunities to advance ANS standards development and use. With the approval of the SB Chair pursue those not assigned to a Consensus Committee or other SB committee.