



# MINUTES

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

Hilton Orlando Bonnet Creek • Orlando, FL  
November 12, 2018

### 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  
Todd Anselmi, Enercon Services, Inc.  
\*Amir Afzali, Southern Company  
\*Robert Budnitz, Lawrence Berkeley National Laboratory  
Gene Carpenter, U.S. Department of Energy  
\*Nilesh Chokshi, Individual  
George Flanagan, Oak Ridge National Laboratory  
\*Kathryn Hanson, Individual  
\*Alan Levin, U.S. Department of Energy  
Stanley Levinson, Individual  
\*Mark Linn, Oak Ridge National Laboratory  
Carl Mazzola, Project Enhancement Corporation  
James O'Brien, U.S. Department of Energy  
\*William Reuland, Individual  
Andrew Smetana, Savannah River National Laboratory  
\*Robert Youngblood, Idaho National Laboratory

### Guests:

Donald Eggett, Individual  
Ernest Elliott, N3B—Los Alamos  
\*Julie Jarvis, Bechtel Corporation  
Jun Liao, Westinghouse  
\*Donald Spellman, Individual  
Patrick White, Massachusetts Institute of Technology

*\*participated by phone*

### 1. Welcome, Roll Call & Introductions

RP3C Chair Prasad Kadambi called the meeting to order. Those physically in attendance and those on the phone introduced themselves. Kadambi apologized that he was not able to be in Orlando. The meeting was facilitated by Kadambi through use of a webinar.

### 2. Approval of Meeting Agenda

Prasad Kadambi directed members to a presentation prepared to use as a guide throughout the meeting—[See Attachment 1](#). He is looking for increased engagement between the RP3C and the consensus committees and working groups. ANS has eight consensus committees covering a wide

range of subjects. Amir Afzali explained that the entire community is expressing interest in moving to incorporate risk-informed, performance-based (RIPB) methods in everything, but he doesn't see this happening in ANS standards. He expressed concern that RP3C is not making enough of a difference and should re-evaluate its work. Kadambi referred to several items on the agenda which will provide the status and progress of RP3C's efforts to support ANS working groups in their use of RIPB methods. He added that Standards Board reinforcement with working groups is needed.

The agenda was approved as presented.

### **3. Status of Interaction with Standards Board**

- Outcome of SB Meeting on June 17, 2018, Relative to RP3C  
Prasad Kadambi reminded members that the last RP3C meeting was held on June 16, 2018, the day before the Standards Board meeting. Today's RP3C meeting would be used to review feedback from the Standards Board's June 17, 2018, meeting and progress made by RP3C since this time.
- RP3C Actions on Standards Committee Strategic Plan Goals & Objectives  
Kadambi directed members to Goal #1, Item D, of the SMART Matrix—[Attachment 2](#). Item D has six associated actions for RP3C. One of those actions is to develop an operating plan. Kadambi reminded members that the operating plan was prepared and previously submitted to RP3C. The operating plan was subsequently issued to the Standards Board for review and approval after the June 2018 meeting. Kadambi explained that the Standards Board review resulted in comments that the operating plan was redundant to the SMART Matrix. As a result, the operating plan has been incorporated into the SMART Matrix to reduce redundancy and for simplification.

Amir Afzali questioned what we can do to get working groups buy into the benefits of RIPB methods. Kadambi suggested that Afzali bring this up at the Standards Board meeting for direction tomorrow. Donald Eggett added that we need to make sure we have industry input in our standards development.

### **4. RP3C Procedural Guidance Development**

James O'Brien addressed the committee on the status of procedural guidance for RIPB standards development. The small group in charge of developing this guidance is facing a challenge of how to do it and how much flexibility to give. He added that it's not black and white. O'Brien stated that the ANS/ASME Joint Committee on Nuclear Risk Management (JCNRM) Subcommittee on Risk Application is also working on a guidance document and has the same questions. See slides 5-7 from the meeting presentation (Attachment 1) for more details.

### **5. Consensus Committee Feedback on RP3C Recommendations**

RP3C Recommendation Tracking Spreadsheet—[Attachment 3](#)  
Prasad Kadambi reminded members of the effort by Ed Wallace, Jim August, and Alan Levin. The three of them reviewed all ANS standards and projects resulting in the development of a list of 23 standards that they all agreed could benefit from inclusion of RIPB methods. Consensus committees were asked to evaluate the short list of standards, initiate appropriate action, and report back to RP3C. Kadambi reviewed feedback provided by each consensus committee. See slides 11-16 of the meeting presentation (Attachment 1) for more details.

Kathryn Hanson reported that the ANS-2.27 Working Group has been working with the ANS-2.29 Working Group and will likely have a draft available soon. Kadambi asked her to provide him a copy of the draft when available.

ACTION ITEM 11/2018-01: Kathryn Hanson to provide Prasad Kadambi a copy of draft standard ANS-2.27, "Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments," when available."  
DUE DATE: When Available

## 6. Working Group Feedback from ANS-30.1

Mark Linn provided members an explanation of what draft standard ANS-30.1, "Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs," is trying to achieve. It is not a design criteria document and does not specify design criteria. The emphasis is to promote the use of RIPB methods and techniques to provide a more flexible design process commensurate with the safety of a given reactor technology. ANS-30.1 will be technology neutral. See slides 17-22 for more details including two diagrams titled New Reactor RIPB Standards Structure and New Reactor Design Timeline, both created by Linn.

Donald Spellman questioned whether there has been any discussion of a standard on integrated risk-informed decision making process. While Kadambi is in favor of an integrated risk-informed decision making process standard, he reminded all that RP3C does not write standards.

Ed Wallace expressed concern with the second bullet on slide 20 of the meeting presentation (Attachment 1) which states "Should address early design when PRA not possible to prepare." Wallace doesn't see this boundary as a constraint to the development of ANS-30.1 and offered to work with Linn on the language to be consistent with the Licensing Modernization Project (LMP).

ACTION ITEM 11/2018-02: Ed Wallace to work with Mark Linn to revise bullet 2 of slide 20 ("Should address early design when PRA not possible to prepare") of the meeting presentation (Attachment 1) to be consistent with LMP language.  
DUE DATE: March 1, 2019

Stanley Levinson suggested that the advanced light water reactor (ALWR) standard in development under the JCNRM would be useful to Linn in the development of ANS-30.1 and that he should contact Robert Budnitz for a draft copy.

ACTION ITEM 11/2018-03: Mark Linn to ask Robert Budnitz for a draft copy of the ALWR standard.  
DUE DATE: March 1, 2019

Linn was also recommended to review the LMP white papers.

## 7. RIPB Lessons from ANS-2.26

Prasad Kadambi introduced Robert Youngblood to provide members a lesson on the use of RIPB methods which have already been applied in an ANS standard. Youngblood used portions of ANSI/ANS-2.26-2004 (R2017), "Categorization of Nuclear Facility Structures, Systems, and Components for Seismic," as good examples of RIPB methods that were broadly applicable and could be applied to other standards. Youngblood explained the connection and hierarchy of the suite of standards that includes ANSI/ANS-2.26-2004 (R2017), ANSI/ANS-2.27-2008 (R2016), "Criteria for Investigations of Nuclear Materials Facilities Sites for Seismic Hazard Assessments," ANSI/ANS-2.29-2008 (R2016), "Probabilistic Seismic Hazard Analysis," and ANSI/ASCE/SEI 43-05, "Seismic Design Criteria for Structures, Systems and Components in Nuclear Facilities". The higher on the hierarchy the greater the flexibility required. When you want to be risk informed and performance based, it makes sense to start with a hierarchy. See slides 23-29 of the meeting presentation (Attachment 1) for more details.

Nilesh Chokshi stated that the way you choose your design is based on the performance goal. That's how ANSI/ASCE/SEI 43-05 is done. Kadambi said that ANSI/ASCE/SEI 43-05 is very prescriptive, but the flexibility is in ANSI/ANS-2.26-2004 (R2017). You need to look at the whole picture. Kadambi added that there is a lot of guidance available, but it needs to be put together with the guidance being prepared by RP3C. NUREG/BR-0303, "Guidance for Performance-Based Regulation," is one such available document.

## 8. Changing Environment

- U.S. Nuclear Regulatory Commission (NRC) Initiatives  
A Commission Paper, SECY-18-0096, "Functional Containment Performance Criteria for Non-Light-Water-Reactors," has been issued to reduce prescription in favor of design objectives and performance standards. DG-1353, "Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Approach to Inform the Content of Applications for Licenses, Certifications, and Approvals for Non-Light-Water-Reactors," has also been issued. The guide should help identify scope and depth of information to be provided in applications. The draft guide is targeting LMP guidance.
- Industry Initiatives  
Nuclear Energy Institute (NEI) 18-04, "Risk-Informed Performance-Based Guidance for Non-Light Water Reactor Licensing Basis Development," has been presented to the Advisory Committee on Reactor Safeguards sub-committee. An affirmative action is expected on NEI 18-04. DG-1353 substantially endorses this guidance.
- Standards Development Organization (SDO) Initiatives (ANS and Others)/Community of Practice —[Attachment 4](#)  
Prasad Kadambi informed members of a recommendation from Kent Welter to form a "Community of Practice" (CoP) to aid collaboration of working group members on RIPB methods. Kadambi explained the CoP as an open forum with no requirements or assignments. Standards Board support is needed for success. Ed Wallace stated the premise is a group of professionals who share knowledge around a specific topic, craft, or profession. RP3C would like to help setup the CoP. The purpose is to improve communication and knowledge across organizational boundaries. The point is to make sure it is not burdensome for participants. A webpage through Workspace could be established. A group of questions to be answered about forming the CoP were presented for discussion.

While not all agreed it was necessary, Kadambi and Wallace feel it is important to get concurrence from the Standards Board before proceeding with formation of the CoP. They would hope that a sponsor for this activity would come out of the Standards Board. William Reuland offered to be a go between the RP3C and the Standards Board on this subject. James O'Brien agreed that forming a CoP is a good idea, but he expressed concern with the CoP distracting from other RP3C activities. He'd like to complete the RIPB guidance document before taking on more.

<p>ACTION ITEM 11/2018-04: James O'Brien to send Prasad Kadambi an email with his thoughts on formation of the CoP. DUE DATE: December 31, 2018</p>
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## 9. Review of Interaction with Other Standards Working Groups

Schedule of RIPB Standards in Development—[Attachment 5](#)

Prasad Kadambi directed members to the list of standards currently in development using RIBB methods and provided working group chairs of these projects an opportunity to provide a status update.

**10. RP3C Report to Standards Board**

The discussions during today's RP3C meeting will be reported to the Standards Board at their meeting the following day—November 13, 2018.

**11. Review of Open Action Items**

Open action items from previous meetings were reviewed. A status of these action items as discussed can be found following these minutes.

**12. Other Business**

No other business was addressed.

**13. Next Meeting**

Upcoming ANS meetings:

- 2019 ANS Annual Meeting at Hyatt Regency Minneapolis from June 9-13, 2019
- 2019 ANS Winter Meeting at Marriott Wardman Park from November 17-21, 2019

The RP3C plans to meet at its set time on Monday from 2:30 p.m. to 6:00 p.m. during the ANS Annual Meeting to be held June 9-13, 2019, Minneapolis, MN, as well as during the ANS Winter Meeting, November 17-21, 2019, Minneapolis, MN.

**14. Adjournment**

The meeting was adjourned.

## RP3C Action Item Status Report (As discussed at 11/12/18 meeting)

Action Item	Description	Responsibility	Status/Action
11/2018-01	Kathryn Hanson to provide Prasad Kadambi a copy of draft standard ANS-2.27, "Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments," when available." DUE DATE: When Available	Kathryn Hanson	OPEN
11/2018-02	Ed Wallace to work with Mark Linn to revise bullet 2 of slide 20 (Should address early design when PRA not possible to prepare) of the meeting presentation (Attachment 1) to be consistent with LMP language. DUE DATE: March 1, 2019	Ed Wallace Mark Linn	OPEN
11/2018-03	Mark Linn to ask Robert Budnitz for a draft copy of the ALWR standard. DUE DATE: March 1, 2019	Mark Linn	OPEN
11/2018-04	James O'Brien to send Prasad Kadambi an email with his thoughts on formation of the CoP. DUE DATE: December 31, 2018	James O'Brien	OPEN
9/2018-01	Prasad Kadambi to contact Gary DeMoss with an invitation to join the RP3C subgroup tasked with preparing a RIPB guidance document.	Prasad Kadambi	CLOSED
9/2018-02	RARCC Chair George Flanagan to discuss revision of ANSI/ANS-53.1-2011 (R2016) at RARCC's meeting scheduled for November 12, 2018. DUE DATE: November 12, 2018	George Flanagan	CLOSED On RARCC's agenda for 11/12/18 meeting.
9/2018-03	Ed Wallace and Pat Schroeder to help establish routine teleconferences for working groups under the Advanced Initiatives Subcommittee. DUE DATE: October 15, 2018	Ed Wallace Pat Schroeder	In works and to be discussed at RP3C's 11/12/18 meeting with proposal to form CoP.
9/2018-04	Prasad Kadambi, James O'Brien, Steven Stamm, and Ed Wallace to review the proposed changes to the SMART Matrix. DUE DATE: October 15, 2018	Prasad Kadambi James O'Brien Steven Stamm Ed Wallace	CLOSED Teleconference held 10/12/18.
9/2018-05	Pat Schroeder to facilitate a webinar for the next RP3C meeting. DUE DATE: September 30, 2018	Pat Schroeder	CLOSED Webinar scheduled and announced.
6/2018-01	ACTION ITEM 6/2018-01: Pat Schroeder to provided Prasad Kadambi and Ed Wallace call in details for the next FWDCC teleconference. DUE DATE: June 30, 2018	Pat Schroeder	CLOSED No teleconference held; call in details provided for FWDCC's meeting scheduled 11/12/18.
6/2018-02	Prasad Kadambi to review the RP3C Bylaws and update the title of the operating plan or recommend updating the RP3C Bylaws accordingly. DUE DATE: February 28, 2019	Prasad Kadambi	OPEN
11/2016-11	RP3C to prepare a brief, five-slide presentation with a simple perspective explaining RIPB for use at consensus committee meetings.	Prasad Kadambi	OPEN



# ANS Standards Committee RP3C Meeting

Orlando, FL

November 12, 2018

# Agenda



1. Welcome, Roll Call & Introductions
2. Approval of Meeting Agenda
3. Status of Interaction with Standards Board (SB)
  - Outcome of SB Meeting on June 17, 2018, Relative to RP3C
  - RP3C Actions on Standards Committee Strategic Plan Goals & Objectives
4. RP3C Procedural Guidance Development—Jim O'Brien
5. Consensus Committee Feedback on RP3C Recommendations
6. Working Group Feedback from ANS-30.1—Mark Linn
7. RIPB Lessons from ANS-2.26—Bob Youngblood
8. Changing Environment
  - NRC Initiatives
  - Industry Initiatives
  - SDO Initiatives (ANS and Others)/Community of Practice
9. Review of Interaction with Other Standards Working Groups
  - Review work on specific standards and obtain feedback
  - Inputs from Consensus Committees
10. RP3C Report to Standards Board
11. Review of Open Action Items
12. Other Business
13. Next Meeting, Adjournment
  - 2019 ANS Annual Meeting at Hyatt Regency Minneapolis from June 9-13, 2019

# RP3C-Standards Board (SB) Interaction



- Report to SB on Operating Plan (OpPlan)
  - RP3C had reported on the OpPlan for several meetings.
  - OpPlan submitted to SB for vote, but did not pass.
  - Meanwhile RP3C was engaged in discussion on SMART Matrix.
  - SMART Matrix had all elements of the OpPlan in addition to activities of consensus committees (CCs).
  - In the interest of better coordination with CCs, it was decided to focus on SMART Matrix.

# SB SMART Matrix



- SB SMART Matrix reflects Standards Committee Strategic Plan.
- RP3C covered by Goal #1 (D):
  - Goal #1=align standards development priorities with current and emerging needs
  - Goal#1(D)=incorporate RIPB methods in ANS standards
- The six activities under Goal#1(D) are shown in Attachment 1 of the agenda.

# Procedural Guidance for RIPB Standard Development



- Purpose
  - To outline a process that can be used by developers of standards to incorporate risk informed and performance based approaches
- Approach
  - Guidance on steps to take to make a standard more performance based
  - Guidance on steps to take to make a standard more risk informed
  - Examples of how this can be done using existing ANS standards

# Procedural Guidance for RIPB Standard Development



- Performance Based Guidance: Steps
  - Define ultimate outcome of the standard
  - Define the approach (major steps) to obtaining the outcome
  - Determine whether there are alternative approaches for achieving the outcome
- Performance Based Guidance: Discussion
  - All standards prescribe to some degree what (the outcome) is to be obtained from using the standard and to different level, how to obtain the outcome.
  - In order for a standard to be a “standard,” it must define and require the use of an approach for achieving an outcome.
  - The degree of flexibility equates to the amount of performance based.
  - This has been characterized as providing “what” needs to be done versus “how” to do it.

# Procedural Guidance for RIPB Standard Development



- Risk Informed Guidance: Approaches/Options
  - Make the ultimate outcome risk informed (e.g., consequence at a given frequency): An example of this is seismic standards.
  - Specify the use of probabilistic or statistical methods for achieving the outcome: An example of this is a standard that uses collection of an expert based data (or other data) such as the seismic hazards process.
  - Allow different approaches to be made to achieve outcomes but require that the approach used be justified to provide an appropriate level of confidence on the accuracy or repeatability of achieving the outcome. An example of this is where the margin of safety provided (or amount of conservatism) is based the confidence (or uncertainty) associated with the data or the process used in achieving the outcome.
  - Use risk insights to support decisions on the scope, focus, level of rigor and sophistication of a program (e.g., radiation protection program).

# Procedural Guidance for RIPB Examples



- **DESIGN BASIS ACCIDENT RELATED (ANS-2.3)**

- **Performance-Based Features**

- Outcome: The outcome from the use of the standard is: *an estimate the frequency of occurrence and the magnitude of parameters associated with rare meteorological events...* This is a good clear performance based outcome statement.
    - Process for achieving outcome:
      - *Tornado hazard probability models shall account for the following:*
        - » *constant or gradations of velocity along and across the tornado path;*
        - » *meteorological conditions affecting the site;*
        - » *topographical features surrounding the site;*
        - » *biases in reporting occurrence and velocity of tornadoes on target structures*

This is performance based because it provides a broadly based statement on what needs to be considered but does not provide details on how to account for these items.

- **Risk-Informed Feature**

- None identified
    - The following is an example of a non performance based non risk informed feature.

*The height of the radial inflow layer shall be at least 0.35 R. Above this height, the radial wind is assumed to be zero or to flow outward.*

# Procedural Guidance for RIPB Examples



- **DESIGN ANALYSIS RELATED (ANS-2.21)**
  - **Outcome**
    - Current Introduction Statement**
      - *Required analyses are provided for a meteorological assessment of the ultimate heat sink to ensure that design temperatures and cooling capacity requirements for the facility are met.*
    - Conversion into Outcome**
      - *A determination of whether design temperature and cooling capacity requirements for the ultimate heat sink for a facility are met.*
  - **Other Performance Based features**
    - *Ultimate heat sinks shall be designed to have the cooling capacity to provide sufficient cooling water at the maximum allowable inlet temperature under the most adverse meteorological conditions expected for the power plant climatic regime.*

This is a good performance based statement.
  - **Risk Informed Statements/Features**
    - *The results of the 10-year–or–longer simulation with several extreme events shall be used to perform extreme value statistical analyses that project the most extreme weather conditions for the expected license period of the power plant, which could be 60 years or more*

Categorization of ANS Standards							RP3C Opportunity				Applicability					
CC Owner	DESIGNATION			TITLE	STATUS	Status Indicator	RIPB	RI	PB	D	Adv Rx focus	AR applicability	Likely Timing of Need*	NT- <3 yrs MT 3-5 yrs LT >5 yrs		
9	ESCC	ANS-	28	Determining Design Basis Flooding at Power Reactor Sites	withdrawn standard; active project	P		AEJ								3
27	ESCC	ANS-	226	Categorization of Nuclear Facility Structures, Systems, and Components For Seismic Design	current standard approved 2004 (R2010)	A	AE	J								2
28	ESCC	ANS-	227	Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments	current standard approved 2008 (R2016)	A	AJE									3
35	LLWRCC	ANS-	31	Selection, Qualification, and Training of Personnel for Nuclear Power Plants	current standard approved 2014	A				AEJ						3
36	LLWRCC	ANS-	32	Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants	current standard approved 2012	A	JE			A						2
62	LLWRCC	ANS-	313	Nuclear Facility Reliability Assurance Program (RAP) Development	active project	A	AEJ									3
63	NRNFCC	ANS-	314	Process for Aging Management and Life Extension for Nonreactor Nuclear Facilities	active project	A	AEJ									3
206	LLWRCC	ANS-	181	Radioactive Source Term for Normal Operation of Light Water Reactors	revision approved 2016	A				AEJ						3
280	LLWRCC	ANS-	5110	Auxiliary Feedwater System for Pressurized Water Reactors	current standard approved in 1991 (R2008); revision in development	A	E		AJ							2
288	RARCC	ANS-	531	Nuclear Safety Design Process for Modular Helium-Cooled Reactor Plants	current standard approved 2011 (R2016)	A	AEJ									3
313	RARCC	ANS-	541	Nuclear Safety Criteria and Design Process for Liquid-Sodium-Cooled-Reactor NPPs	active project; historical revision	P	AEJ									3
318	RARCC	ANS-	546	LMFBR Safety Classification and Related Requirements	inactive project; draft issued for trial use only	I	J									3
334	LLWRCC	ANS-	561	Containment Hydrogen Control	active project	P	AE		J							2

# LLWRCC Feedback



## Tracking of RP3C Recommendation to Incorporate RIPB Methods

CC Owner (WGC)	DESIGNATION	Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach	
LLWRCC (WGC: J. Sickle)	ANS- 3 1		Believed to be NA for RIPB Maintenance to be considered by 11/20/2019	RP3C recommends PB approach with fitness-for-service considerations	
LLWRCC (WGC: M. Smith)	ANS- 3 2		Maintenance to be considered by 4/4/2022	RP3C considers this a high priority standard for RIPB	
LLWRCC (WGC: J.)	ANS- 3 13	Project being re-evaluated; WG being reformed		RP3C considers this a high priority for advanced non-LWRs	
LLWRCC (WGC: K. Geelhood)	ANS- 18 1		Maintenance to be considered by 11/1/21	LMP work in context of DG-1353 should be considered	
LLWRCC (WGC: E. Johnson-Turnipseed)	ANS- 51 10		Revision currently in final stage was initiated before RP3C. Revision anticipated to be approved in 2019. Next maintenance to be considered in 2024.	RP3C has reported interactions with WG	
LLWRCC (WGC: J. Glover)	ANS- 56 1		Inactive project to be discussed at 11/14/18 LLWRCC meeting.	Work done with LMP on H2 control is relevant	

# LLWRCC Feedback (continued)



CC Owner (WGC)	DESIGNATION				Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach
LLWRCC (WGC: J. Glover)	ANS-	56	8			NA - a revision of this standard has been in development for some time; prior to formation of RP3C and is expected to be issued for ballot is 2019 with ANSI approval the following year. The next maintenance consideration would be by 2024.	Part 50 App J is PB
LLWRCC (WGC: H. Liao)	ANS-	58	8				
LLWRCC (WGC: OPEN)	ANS-	58	9		PINS in development		SFC may be one of the high priority standards for LMP guidance application
LLWRCC (WGC: M. Linn)	ANS-	58	14			Maintenance to be considered by 1/17/2022	LMP guidance definitely applicable
LLWRCC (WGC: M. Dooley)	ANS-	59	51		PINS in development		High likelihood of PB guidance being applicable
LLWRCC (WGC: M. Dooley)	ANS-	59	52		PINS in development		High likelihood of PB guidance being applicable

# RARCC Feedback



CC Owner (WGC)	DESIGNATION				Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach
RARCC (WGC: J. August)	ANS-	53	1			Maintenance to be considered at 11/12/18 RARCC meeting	RP3C working with WG Chair
RARCC (WGC: G. Flanagan)	ANS-	54	1		Draft in final stages of approval		RP3C's input will be provided to SB
RARCC (WGC: OPEN)	ANS-	54	6			NA - no plans to resurrect this inactive project	Needs more consideration

# NRNFCC Feedback



CC Owner (WGC)	DESIGNATION				Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach
NRNFCC (WGCs: T. Anselmi & C. McMullin)	ANS-	3	14		Draft estimated to be completed for NRNFCC review in November 2018		RP3C working with CC Chair
NRNFCC (WGC: P. Rogerson)	ANS-	58	16			Maintenance to be considered by 9/4/19	High likelihood of LMP guidance being applicable

# FWDCC Feedback



CC Owner (WGC)	DESIGNATION				Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach
FWDCC (WGC: OPEN)	ANS-	57	1			Maintenance to be considered by 6/16/2021	LMP LBE approach may be applicable
FWDCC (WGC: R. Browder)	ANS-	57	3			Maintenance to be considered by 2/27/2023	LMP guidance document may be applicable

# ESCC Feedback



CC Owner (WGC)	DESIGNATION				Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach
ESCC (WGC: Y. Gao)	ANS-	2	8		Reballot estimated November 2018		RP3C interaction is ongoing. Awaiting WG Feedback
ESCC (WGC: & D. Clark)	ANS-	2	26		PINS in development		Being addressed in 11-2018 RP3C Meeting
ESCC (WGC: K. Hanson)	ANS-	2	27		Draft estimated to be completed for subcommittee review in September 2019		Needs coordination with ANS-2.26

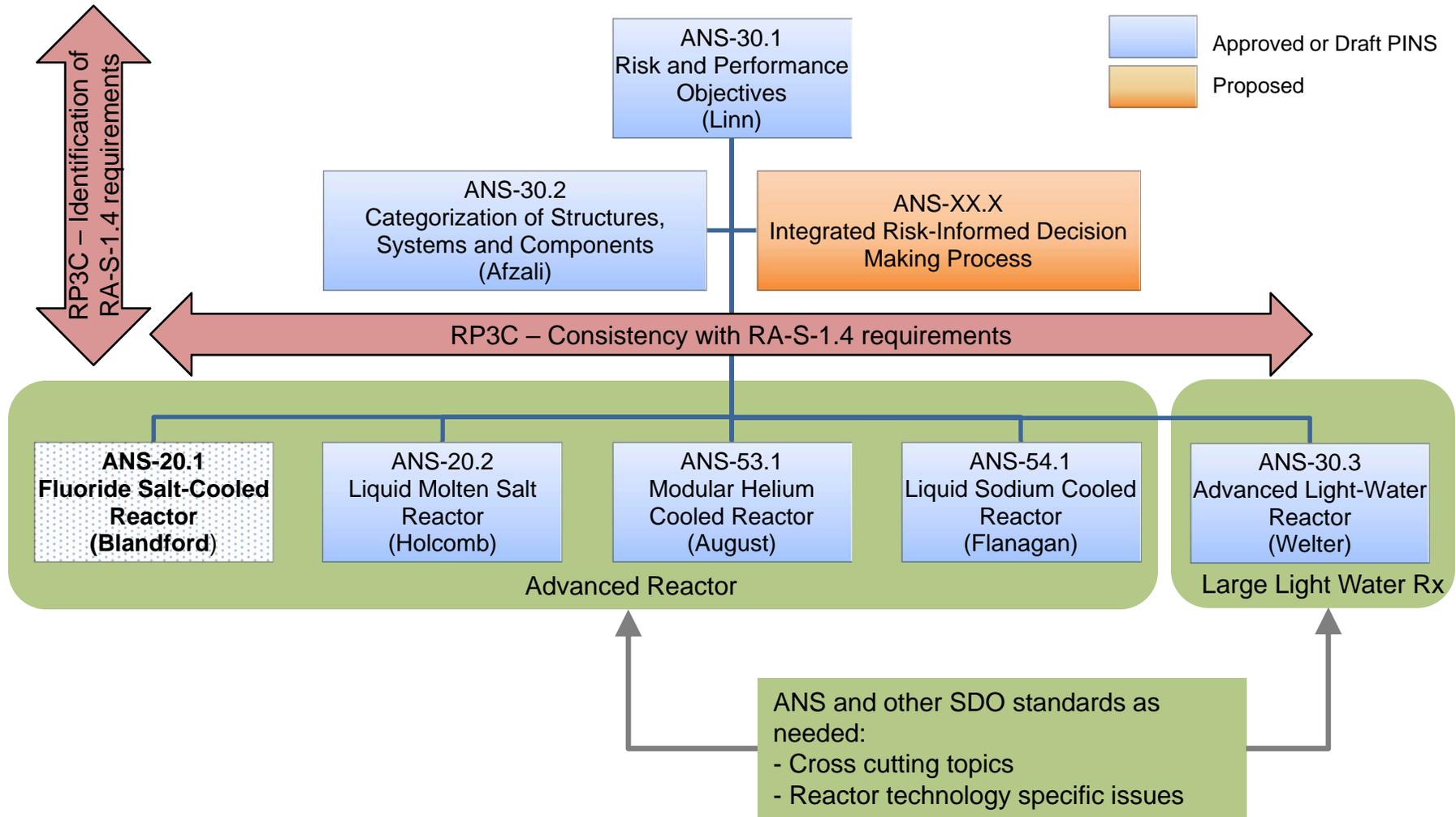
# What is ANS-30.1?



## ***Integrating Risk and Performance Objectives into New Reactor Nuclear Safety Designs***

- It is not a design criteria document and does not specify design criteria.
- Emphasis is to promote the use of risk-informed and performance-based (RIPB) methods and techniques to provide more flexible design process commensurate with the safety of a given reactor technology.
- It is a technology neutral standard.
- It is to provide a consistent RIPB framework for lower-tier, technology-specific advanced reactor standards.
- It allows for augmentation of deterministic design requirements using RIPB methods and results or the replacement of deterministic requirements with equivalent requirements based on RIPB methods.
- It allows early discussion of RIPB insights on design-basis events, equipment-safety classification, defense in depth, and high-level, safety criteria.

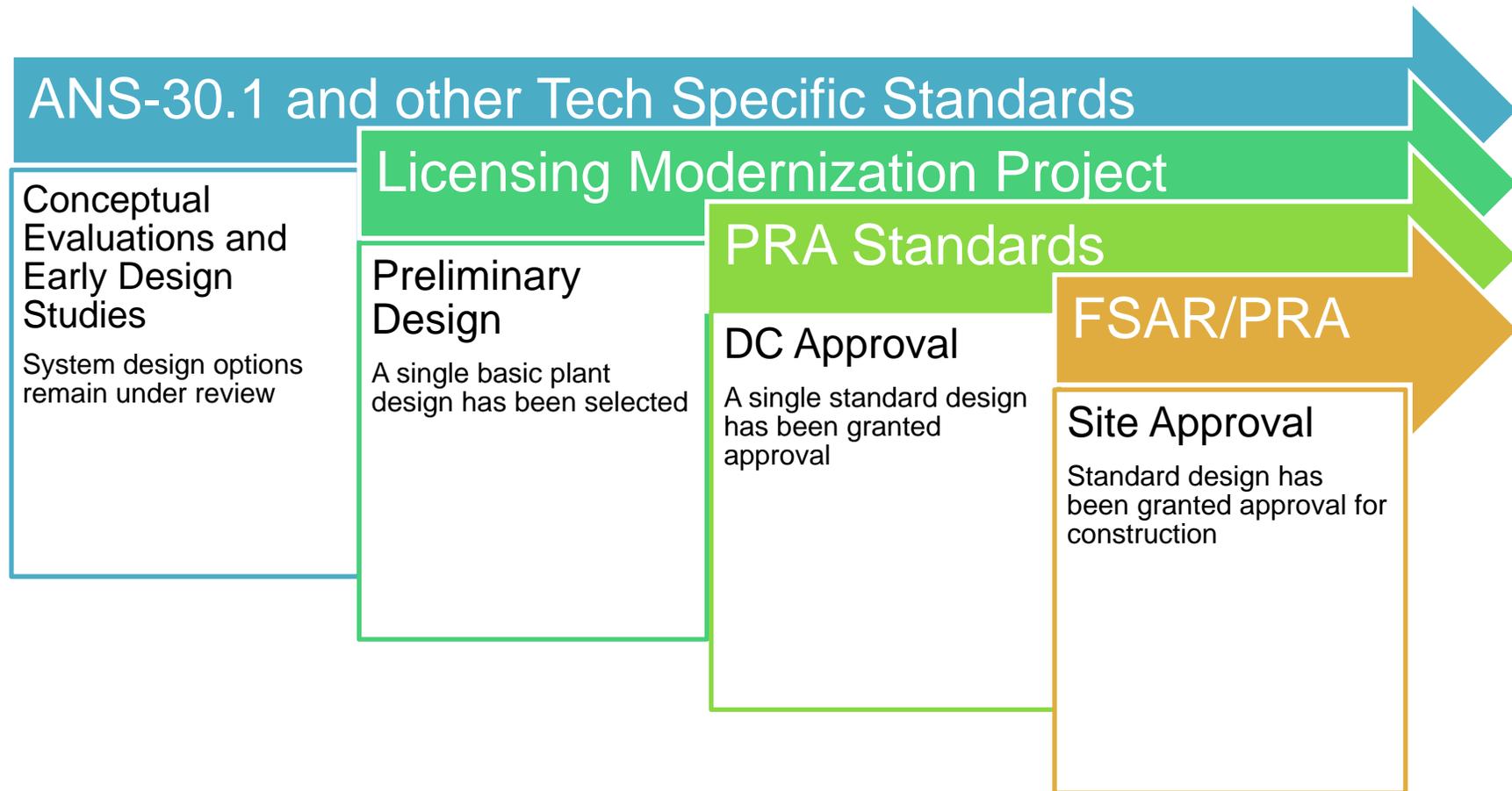
# ANS New Reactor RIPB Standards Structure



# New Reactor Design Timeline



# ANS



# Boundaries of ANS-30.1



# ANS

Integration of ANS-30.1 with other activities placed constraints on the document.

- Provide consistent RIBP framework across all new reactor technologies
- Should address early design when PRA not possible to prepare
- Be consistent with the Licensing Modernization Project
- Be consistent with existing PRA standards such as ASME/ANS RA-S-1.4-2013

# Contents of ANS-30.1



## ANS-30.1 currently addresses

- The definition of RIPB methods, how they differ from PRA, and how to integrate them into the design process
- General requirements that are sufficient and necessary for a process to develop a robust RIPB reactor design
  - Develop principle design criteria
  - Use a systems engineering process
  - Use a quantitative process to evaluate defense in depth
  - Evaluate design(s) using sequence-based assessments
- Use of RIPB methods to derive safety insights
- The affirmation of acceptable design results
- Identification of ASME/ANS RA-S-1.4-2013 objectives and requirements appropriate for early design considerations
- Compendium of RIPB methods applications and examples

# Needs of ANS-30.1



## ANS-30.1 is in current need of

- Consensus by immediate stakeholders on the current draft content and subject intent. Specific content change or layout feedback is needed to provide WG direction
- Assistance in definition of appropriate RA-S-1.4 requirements (vertical) and consistency in application of those requirements across all tech-specific standards (horizontal)
- Direct and active interaction with WGs preparing lower tier standards to ensure consistent incorporation of ANS-30.1 requirements
- Involvement by the Standard's Board to ensure progress on the new reactor RIPB standards structure is achieved in a timely manner

# What ANS-2.26 Does

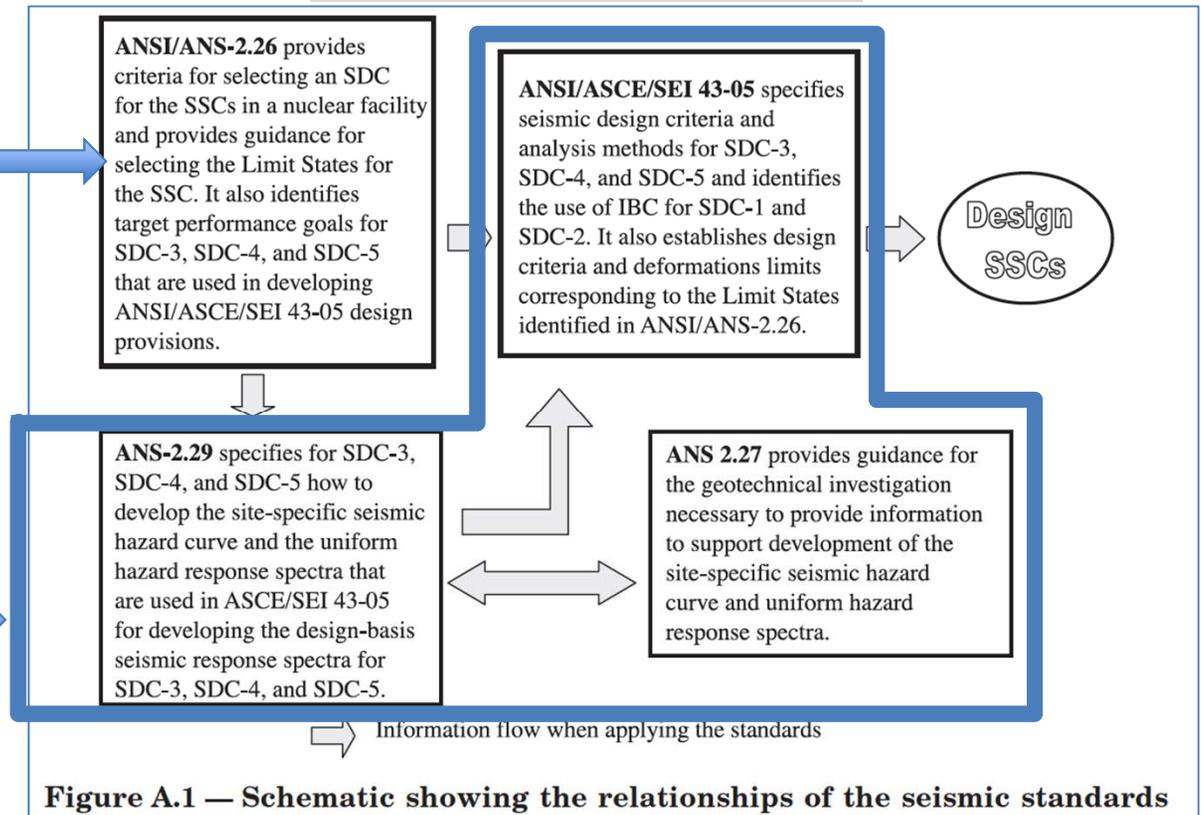


Figure from Appendix A:

ANS-2.26:  
Assign a “Seismic Design  
Category (SDC):”

Given the potential  
consequences of failure,  
assign a performance  
criterion: specifically, a  
*failure probability criterion*.

The other standards  
then tell you how to go  
about engineering  
satisfaction of this criterion.



# Objectives Hierarchy from Appendix C of ANS-2.26

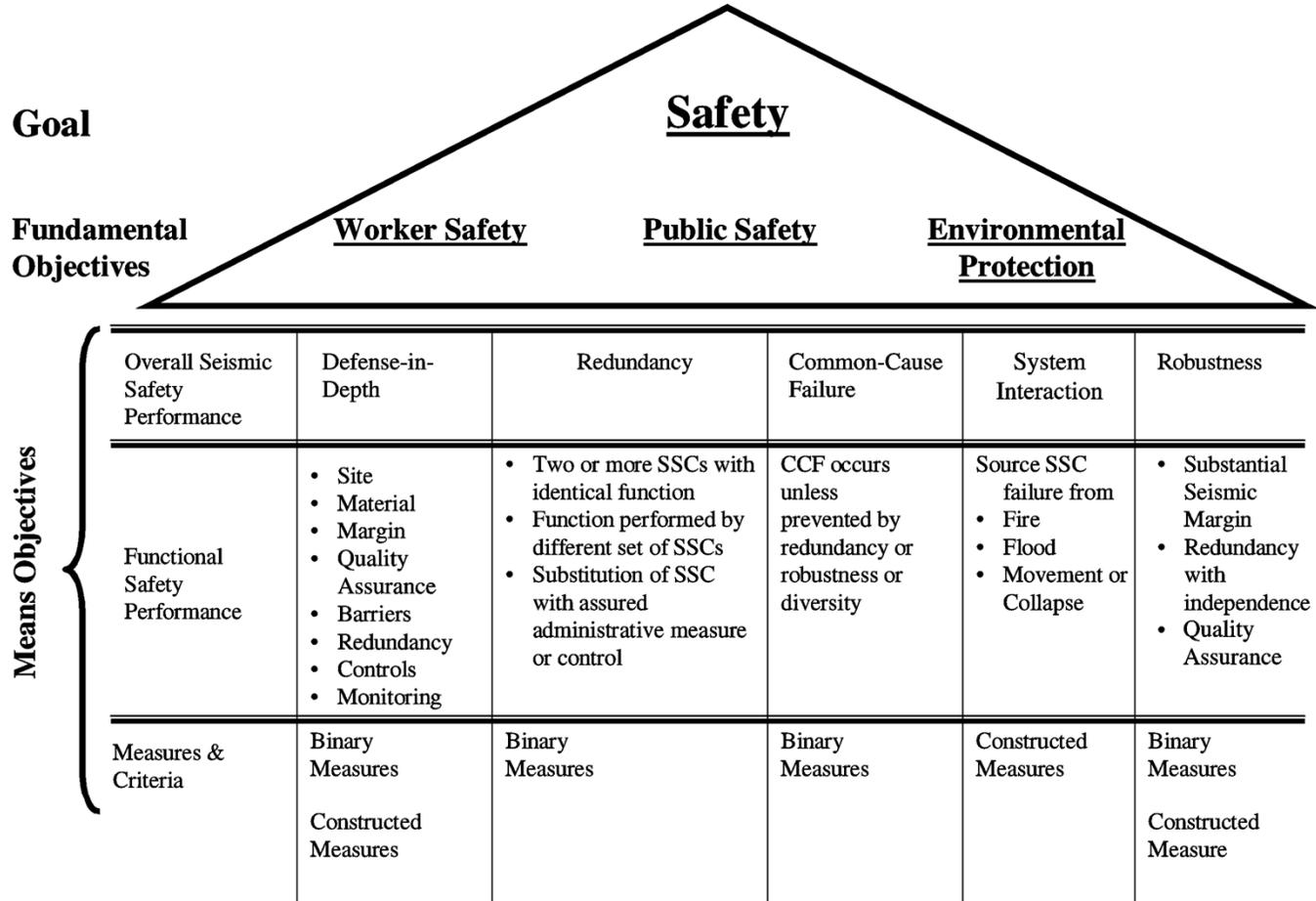
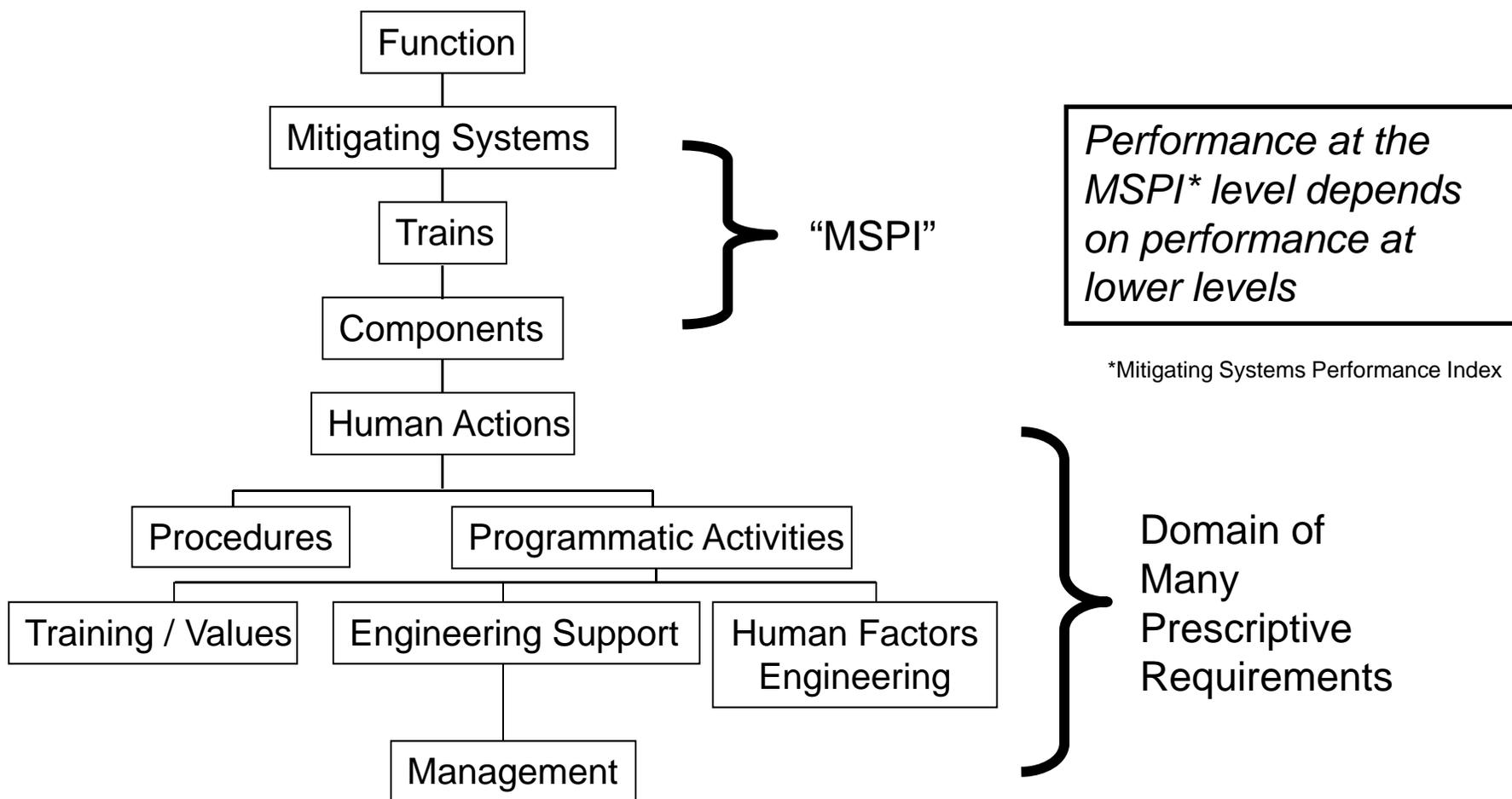


Figure C.1—Objectives hierarchy

# Hierarchy of Performance Levels Under Mitigating Systems Cornerstone



## The four attributes [of performance-based approaches] discussed in the Commission's White Paper:



1. Failure to meet the predetermined performance standard will not result in an immediate safety concern. (Can margin be estimated realistically, and if so, what is known about it?)
2. Measurable or calculable parameters are available to determine whether the performance standard is met. (Can performance parameters be identified that provide measures of performance and the opportunity to take corrective action if performance is lacking?)
3. The performance standard is based on objective criteria. (Can objective criteria be developed that are indicative of performance?)
4. The licensee or the NRC has flexibility in the method used to achieve the desired performance level. (Is flexibility for the NRC or licensees available consistent with the level of margin?)

# To what degree does ANS-2.26 have those four attributes?



- Failure to meet the predetermined performance standard will not result in an immediate safety concern.
  - Yes; if the SSC’s seismic performance is supposed to be a failure probability of 1E-6, but it’s really 1E-5, that’s probably not an immediate *safety* concern.
- Measurable or calculable parameters are available to determine whether the performance standard is met.
  - Yes, at least calculable ones, at least at the design stage. But how would we confirm that the SSC is still good after 15 years?
  - There is a *lot* of modeling involved in claiming that the seismic performance goal is met. And this sort of reliability goal is not literally provable in practice.
- The performance standard is based on objective criteria.
  - Yes.
- The licensee or the NRC has flexibility in the method used to achieve the desired performance level.
  - For the piece of the problem addressed by ANS-2.26, yes; but engineering the seismic performance (implementing the other standards that complete the picture) involves more prescriptive codes governing SSC details.

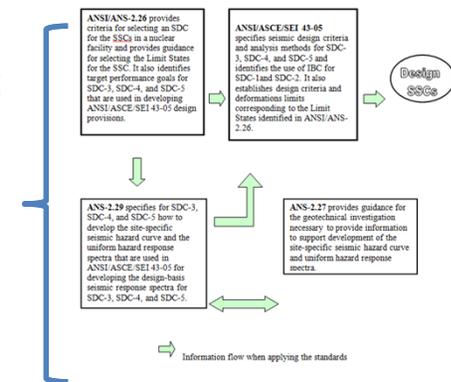


Figure A.1—Schematic showing the relationships of the seismic standards

# Comments



- There's a strong tendency for technology-neutral requirements documents to be at least somewhat performance-based.
  - Their technology-neutrality is achieved by focusing on higher levels of the objectives hierarchy.
  - *This implies flexibility.*
- The need to apply to a spectrum of technologies is addressed by general protocols (tied to high-level objectives) that tell users how to levy requirements on themselves.
  - ANS-2.26 has users characterize the consequences of accidents, and then determine themselves which SDC to apply.
    - Failure of this SSC has potential consequences of X, therefore set criterion at 1E-5 ...
  - *This implies flexibility.*
- However, we need to look at the whole picture, not just ANS-2.26.

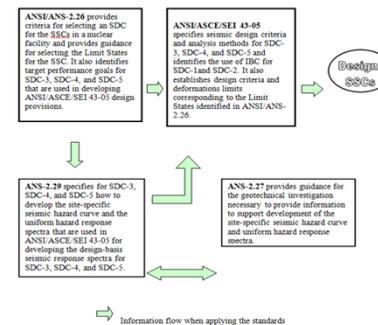


Figure A.1—Schematic showing the relationships of the seismic standards

# Lessons from ANS-2.26: Categorization of nuclear facility SSCs for seismic design



Note key thoughts / principles in the “Backup 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).”

10/30/17

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## 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.

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# SECY-18-0096, “Functional Containment ...”



- Reduce prescription in favor of design objectives and performance standards
- Focus on functional performance for the purpose of radionuclide retention
- White Paper on RIPB and NUREG/BR-0303 offered as references
- Provides integrated and technology-inclusive approach for determining appropriate performance measures.
- Completeness for adequate safety finding supported by “Reactivity Control” and “Decay Heat Removal” in addition to focus on “Radionuclide Retention”

# Draft Guide DG-1353



“Guidance for a TI-RIPB Approach to Inform the Content of Applications for Licenses, Certifications, and Approvals for non-LWRs”

- Functionally similar to RG-1.70
- Help identify scope and depth of information to be provided in applications
- Define methodology versus prescribe LWR-centric content
- Expected to endorse industry documents and consensus standards
- Currently targeting Licensing Modernization Project (LMP) guidance document

# Licensing Modernization Project



- NEI-18-04, “RIPB Guidance for non-LWR Licensing Basis Development”
  - Covers LBE selection, SSC classification, and defense-in-depth
  - DG-1353 substantially endorses this guidance
  - Application of the guidance has been tested in variety of current projects
  - Presented to ACRS sub-committee

# RIPB Community of Practice



# ANS

- Enable communication of practices, challenges, and opportunities
- Open architecture knowledge sharing
- Experience has been gained at NRC and NuScale
- Appears useful for RP3C efforts with addressing issues related to ANS CCs
- Also useful for collaboration with SCoRA
- Standards Board support and direction is needed for success

# Action Item Status



## **See Attachment 7**

- 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 for provide Mark Peres a copy of the current AIS 4.1 draft plan 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 Annual Meeting, June 9-13, 2019, Minneapolis, MN
  - ANS Winter Meeting, November 17-21, 2019, Washington DC
- **Adjourn and Thank You!**

# BACKUP

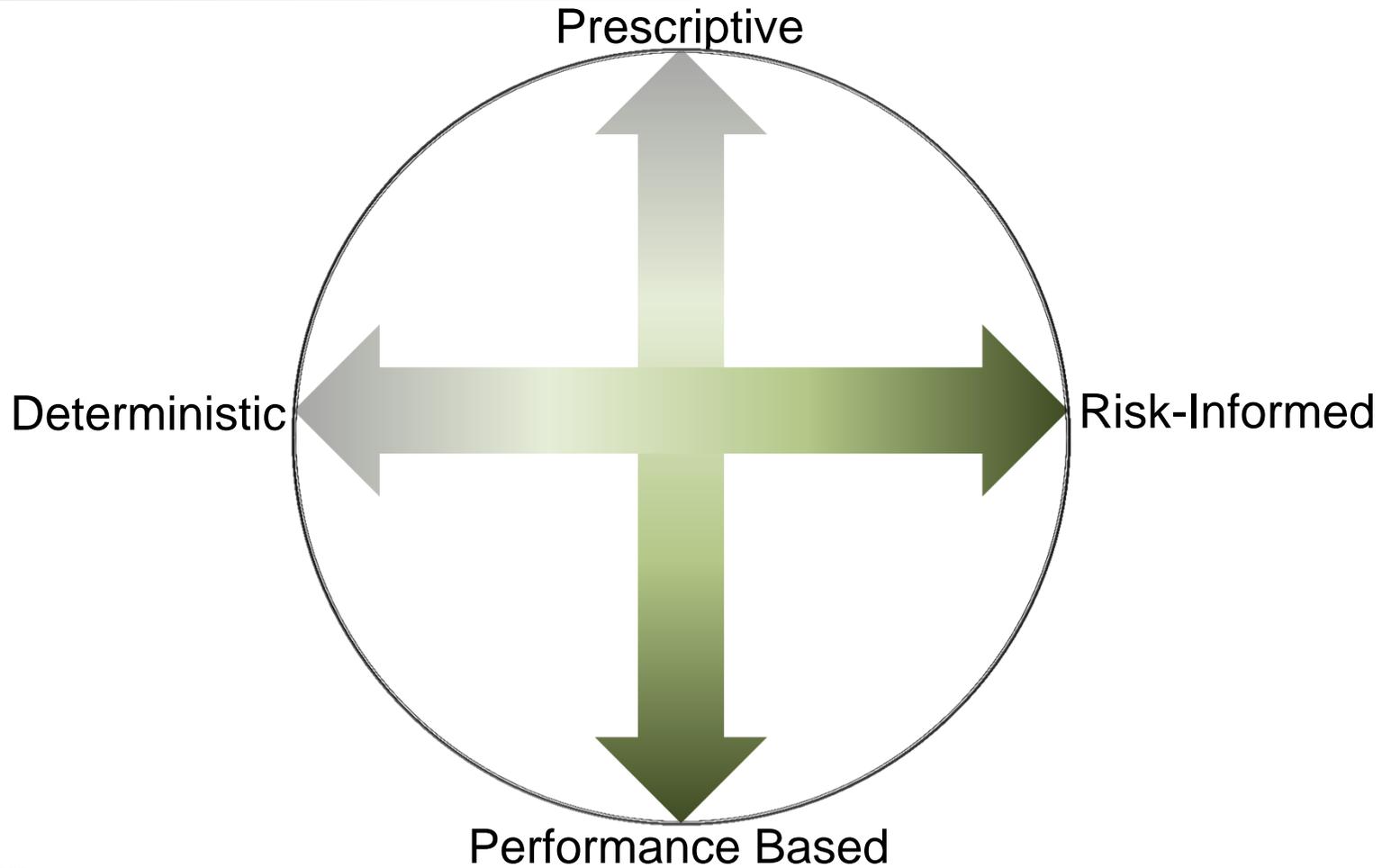


# BACKUP & BACKGROUND SLIDES

# RP3C's SMART Matrix



<b>RP3C Activity</b>	<b>Specific</b>	<b>Measurable</b>	<b>Attainable</b>	<b>Resources</b>	<b>Time</b>
Activity 1					
Activity 2					
Activity 3					
Activity 4					
Activity 5					
Activity 6					
Activity 7					
Activity 8					



# NRC Benchmark Risk-Informed Safety



- Risk-Informed Approach
  - Explicit consideration of a broader set of challenges
  - Logical means for prioritizing challenges
  - Consideration of broader set of resources
  - Identify and quantify sources of uncertainty
  - Better decision-making by testing for sensitivity
- Every standard that employs RI approach should test outcome for these attributes

# NRC Benchmark Performance-Based Safety



- **Performance-Based Approach**
  - Measurable or calculable (observable) parameters to monitor performance
  - Objective criteria to assess performance
  - Flexibility in meeting performance criteria to encourage and reward improved outcomes
  - Framework for failure to meet a performance criterion; will not constitute an immediate safety concern
- **Every use of PB approach should test for these outcome attributes**

- **RIPB Approach**
  - Focus attention on the most important activities
  - Objective criteria regarding performance
  - Measurable or calculable (observable) parameters to monitor performance
  - Flexibility in meeting performance criteria to encourage and reward improved outcomes
  - Focus on results for safety decision-making
- **RIPB implementation should test for these attributes**

# 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 RIPB approach.
- Confidence//Reliability of achieving safety outcomes is the main consideration.

# 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) What type of risk analysis and how much quality in the analysis is sufficient to know this?
  - d) Success can be defined as adequately low probability (with appropriate level of certainty) 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 (with appropriate level of certainty) 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)

**RP3C Portion of SMART Matrix for ANS SC Strategic Plan – Updated 10/24/2018**

A SMART strategic plan consists of goals that are **Strategic, Measurable, Attainable, Realistic and Time-related**. This matrix takes each of the Initiatives in the ANS SB Strategic Plan and defines the specific activities that need to be done for each Goal and Objective along with its proposed schedule and responsibility. This is a living document. Updates and comments from Standards Board Members will be solicited and the plan adjusted.

Initiative	Assigned Responsibility (Functional Title)	Specific Action Items Needed to Accomplish the Initiative	Status/ Comments	Scheduled Completion Date	Actual Completion Date
Completed  Near Term  Overdue 					
<b>Goal #1 Align Standards Development Pories with Current and Emerging Needs</b>					
A. Incorporate risk-informed and performance-based methods in ANS standards, where appropriate, by:					
1. Develop the Risk-Informed Performance-Based Principles and Policy Committee Standards Plan	RP3C Chair	Provide draft of Risk-Informed Performance-Based Principles and Policy Committee Operating Plan for SB approval.	A draft plan was provided for SB ballot. Although not approved the information that was developed during the review process provided valuable input into this matrix.. A separate Operating Plan is no longer required.		8/31/2018
	RP3C Chair	Provide draft ANS Risk Informed and Performance Based Standards Plan (which will provide the approaches and procedures to be used by ANS SC consensus committees, subcommittees and working groups to implement risk informed and performance based principles in a consistent manner) for review & comment prior to use in pilot applications	Jim O'Brien to lead effort	9/30/2017 9/30/2018	
	RP3C Chair	Manage the resolution of comments and send resulting Draft Plan to Standards Manager for issuance for use on two pilot standards.	Jim O'Brien to lead effort	12/1/2017 12/31/2018	
	RP3C Chair	Pilot Plan on two standards	Jim O'Brien to lead effort	3/31/2019	
	RP3C Chair	Incorporate lessons learned from pilots and send to Standards Board for ballot as a new policy or procedure.	Jim O'Brien to lead effort	5/10/2019	
	RP3C Chair	Manage the resolution of comments and send resulting document to Standards Manager for issuance as a policy or procedure.	Jim O'Brien to lead effort	6/30/2019	

**RP3C Portion of SMART Matrix for ANS SC Strategic Plan – Updated 10/24/2018**

Initiative	Assigned Responsibility (Functional Title)	Specific Action Items Needed to Accomplish the Initiative	Status/ Comments	Scheduled Completion Date	Actual Completion Date
2. Develop a Risk-Informed Performance-Based Principles training package for training of ANS Standards Committee members.	RP3C Chair	Develop Risk-Informed and Performance-Based Training Package for SC members and provide to SB for review.	Ed Wallace to lead. To be developed in parallel with procedure finalization	<del>12/1/2017</del> 1/31/2019	
3. Conduct training of consensus committees and working groups.	CC Chairs	Schedule training for CC/WGs as needed, supported by RP3C training resources. CCs and RP3C to coordinate.	Ed Wallace to lead.	3/31/2019	
	RP3C Chair	Conduct Training for all applicable CCs.	??? to lead	6/30/2019	
4. 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 SB and CCs to identify an appropriate WG lead (and CC) for the standards development with the objective of avoiding duplication.	RP3C Chair CC Chairs	Review ANS standards and narrow the list to 23 potential RP3C standards "Initial Priority List" and send to applicable. CCs review the list and provide their inputs on applicability and schedule for each of the 23 standards.	Completed. Link to spreadsheet with CC evaluations and schedules— <a href="#">ACCESS HERE</a>	9/30/2017	8/20/2018
	CC Chairs	<i>Requested CCs review and confirmation of actions on Phase 1 list of potential RIPB standards and RP3C feedback on insights</i>	<u>CC Response status:</u> ESCC – 3/22/18 FWDCC – Input provided pending LLWRCC – partial information provided 1/22/18; full details remain pending NCSCC – responded N/A 1/30/18 as no NCSCC standards are on the short list. NRNFCC – N/A standards part of RP3C pilot program RARCC – 7/9/18 SRACC – confirmed N/A 1/30/18 as no SRACC	9/30/2018	

**RP3C Portion of SMART Matrix for ANS SC Strategic Plan – Updated 10/24/2018**

Initiative	Assigned Responsibility (Functional Title)	Specific Action Items Needed to Accomplish the Initiative	Status/ Comments	Scheduled Completion Date	Actual Completion Date
			standards are on the short list.		
	RP3C Chair	Manage joint discussions of the actions and schedule for the Initial Priority List of approaches and schedule and provide the results to the Standards Board for discussion at a Standards Board meeting. Mange any required interfaces with CCs and WGs. WGs and CC Management are to give this effort priority.	Agreed approaches and schedules with CC chairs to be incorporated into spreadsheet ( <a href="#">ACCESS HERE</a> ).	4/30/2019	
5. Publishing a Nuclear News Article to inform other members of the Society of the benefits of this risk-informed and performance-based effort	RP3C Chair	<i>Nuclear News (NN)</i> article drafted, approved by SB Chair, and forwarded to <i>NN</i> editor. Via Standards Manager		<del>11/1/2017</del> 12/31/2018	
6. 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	RP3C Chair	Develop presentation package for use with other industry groups and submit to SB for approval.	To be developed in parallel with plan finalization	3/1/2019	
	RP3C Chair	Contact appropriate organizations to make presentations at NRC RIC, ANS UWC, and owners' groups.		<del>7/1/2018</del> 4/30/2019	
	RP3C Chair	Make presentations at a minimum of 2 groups.		5/31/2019	

### Tracking of RP3C Recommendation to Incorporate RIPB Methods

				  		
CC Owner (WGC)	DESIGNATION			Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach
ESCC (WGC: Y. Gao)	ANS-	2	8		 Reballot estimated November 2018	RP3C interaction is ongoing. Awaiting WG Feedback
ESCC (WGCs: D. Clark)	ANS-	2	26		 PINS in development	Being addressed in 11-2018 RP3C Meeting
ESCC (WGC: K. Hanson)	ANS-	2	27		 Draft estimated to be completed for subcommittee review in September 2019	Needs coordination with ANS-2.26
LLWRCC (WGC: J. Sickie)	ANS-	3	1		 Believed to be NA for RIPB Maintenance to be considered by 11/20/2019	RP3C recommends PB approach with fitness-for-service considerations
LLWRCC (WGC: M. Smith)	ANS-	3	2		 Maintenance to be considered by 4/4/2022	RP3C considers this a high priority standard for RIPB
LLWRCC (WGC: J. August)	ANS-	3	13		 Project being re-evaluated; WG being reformed	RP3C considers this a high priority for advanced non-LWRs
NRNFCC (WGCs: T. Anselmi & C. McMullin)	ANS-	3	14		 Draft estimated to be completed for NRNFCC review in November 2018	RP3C working with CC Chair
LLWRCC (WGC: K. Geelhood)	ANS-	18	1		 Maintenance to be considered by 11/1/21	LMP work in context of DG-1353 should be considered
LLWRCC (WGC: E. Johnson-Turnipseed)	ANS-	51	10		 Revision currently in final stage was initiated before RP3C. Revision anticipated to be approved in 2019. Next maintenance to be considered in 2024.	RP3C has reported interactions with WG
RARCC (WGC: J. August)	ANS-	53	1		 Maintenance to be considered at 11/12/18 RARCC meeting	RP3C working with WG Chair
RARCC (WGC: G. Flanagan)	ANS-	54	1		 Draft in final stages of approval	RP3C's input will be provided to SB
RARCC (WGC: OPEN)	ANS-	54	6		 NA - no plans to resurrect this inactive project	Needs more consideration
LLWRCC (WGC: J. Glover)	ANS-	56	1		 Inactive project to be discussed at 11/14/18 LLWRCC meeting.	Work done with LMP on H2 control is relevant

## Tracking of RP3C Recommendation to Incorporate RIPB Methods

					  		
CC Owner (WGC)	DESIGNATION				Estimated Schedule for Drafts in Development Using RIPB Methods	Estimated Consideration Date to Incorporate RIPB Methods	RP3C Proposed Approach
LLWRCC (WGC: J. Glover)	ANS-	56	8			NA - a revision of this standard has been in development for some time; prior to formation of RP3C and is expected to be issued for ballot in 2019 with ANSI approval the following year. The next maintenance consideration would be by 2024.	Part 50 App J is PB
FWDC (WGC: OPEN)	ANS-	57	1			Maintenance to be considered by 6/16/2021	LMP LBE approach may be applicable
FWDC (WGC: R. Browder)	ANS-	57	3			Maintenance to be considered by 2/27/2023	LMP guidance document may be applicable
FWDC (WGC: R. Eble)	ANS-	57	11		Draft estimated to be completed for NRNFCC review in November 2018		RP3C is ready to help
LLWRCC (WGC: H. Liao)	ANS-	58	8		Draft estimated to be completed for subcommittee review in November 2019		
LLWRCC (WGC: OPEN)	ANS-	58	9		PINS in development		SFC may be one of the high priority standards for LMP guidance application
LLWRCC (WGC: M. Linn)	ANS-	58	14			Maintenance to be considered by 1/17/2022	LMP guidance definitely applicable
NRNFCC (WGC: P. Rogerson)	ANS-	58	16			Maintenance to be considered by 9/4/19	High likelihood of LMP guidance being applicable
LLWRCC (WGC: M. Dooley)	ANS-	59	51		PINS in development		High likelihood of PB guidance being applicable
LLWRCC (WGC: M. Dooley)	ANS-	59	52		PINS in development		High likelihood of PB guidance being applicable

# Community of Practice Exploratory Meeting

K. Welter

September 2018

# What are Communities of Practice (CoPs)?

- Group of professionals who share knowledge around a specific topic, craft, or profession
- Can form organically or be directed
- Can be physical, virtual, or combinations thereof

# Three Key CoP Characteristics

- Domain
  - No merely a club or loose network
  - Membership implies a commitment to the domain of interest with a shared level of competency
- Community
  - Members agree on joint activities and discussions
  - Interact and learn together, but don't necessarily work together on a daily basis
- Practice
  - Not an interest club or group
  - Members are practitioners who are experiences, stories, tools, and ways to address recurring problems

# Core Value Proposition

- Improve communication and knowledge sharing across organizational boundaries
- Build relationships that support continuous learning

# Example Virtual Community

The screenshot shows a LinkedIn group page for the 'Community of Practice Systems Engineering (CoP SE)'. The page features a dark blue header with the LinkedIn logo and navigation options like 'My Groups' and 'Discover'. Below the header, the group name and member count (7,417) are displayed, along with a 'Member' button. The main content area includes a 'Start a conversation' section, a post by Vincent ARNOULD about the IEEE SoSE conference agenda, and a post by Rémy Fannader. The right sidebar contains an 'ABOUT THIS GROUP' section with a description of systems engineering and a 'MEMBERS' section with a list of group members.

**Community of Practice Systems Engineering (CoP SE)**  
7,417 members

**Start a conversation with your group**  
Enter a conversation title...

**Conversations** Jobs

**Vincent ARNOULD**  
Combat System Architect / System Engineering Manager  
9h

**The full Agenda of the IEEE SoSE conference has been published. Hope to see you there !**  
<http://sosengineering.org/2018/june-19-21/>  
Like Comment

Reply to this conversation...

**Rémy Fannader**  
Author, Founder & Owner of Caminao  
1mo

**ABOUT THIS GROUP**  
Systems engineering is an interdisciplinary approach encompassing the entire technical effort to evolve and verify an integrated and total life-cycle balanced set of system, people, and process solutions that satisfy customer needs.

In this community we post news about Systems Engineering worldwide. Please join in and post your news. We all are eager to know stuff about: courses, where they are and who is giving them. SE-tooling: what's new, what is free or cost-efficient. Requirements, configuration management, etc. etc.

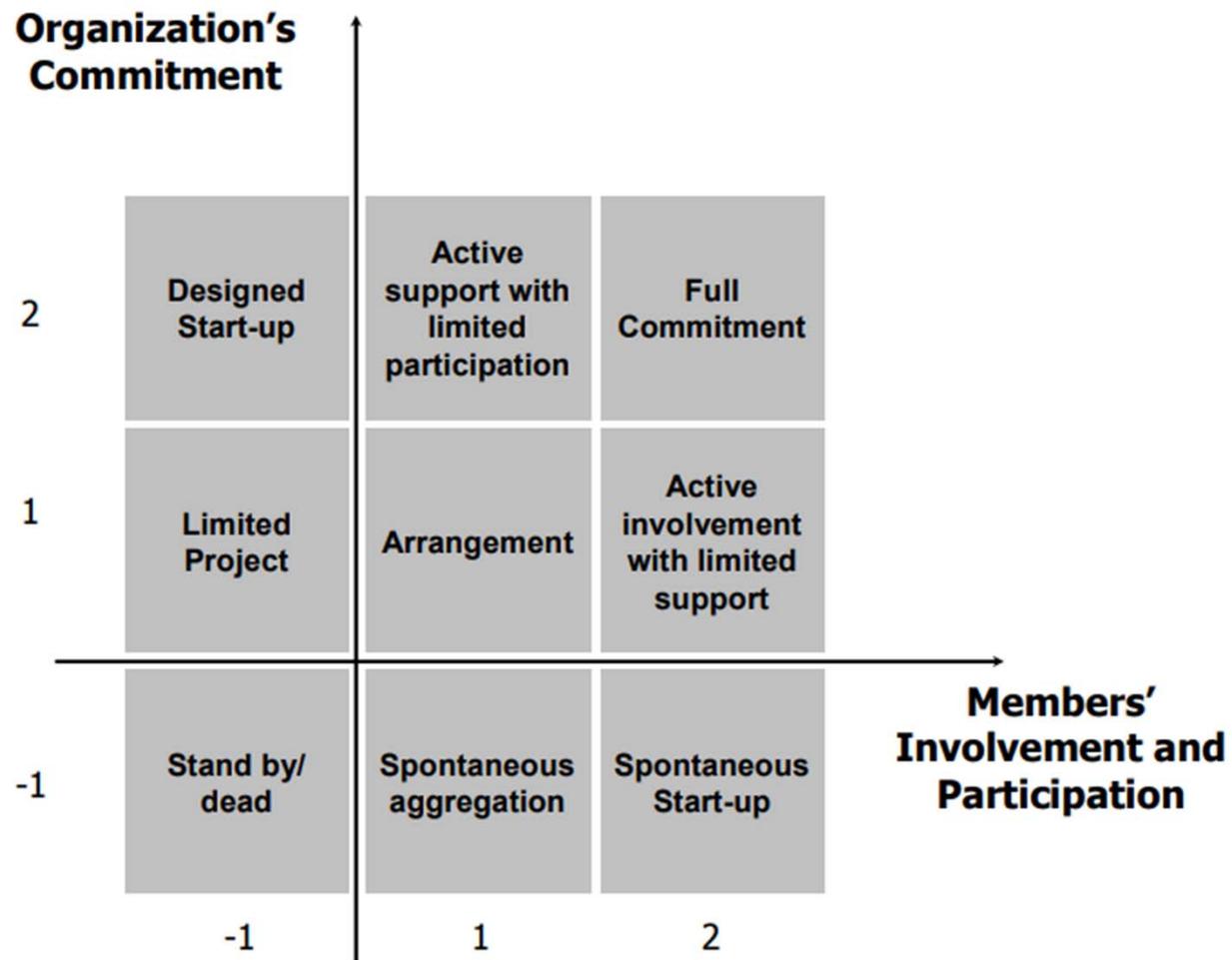
Best of all...  
if you are new to systems engineering: this is the place to ask your questions!

Have fun! **Show less**

[Group rules](#)

**MEMBERS** 7,417 members

# CoP: Evolutionary Model



Source: *Building Communities of Practice that work: a case study based research* Mariano Corsoa , Andrea Giacobbea, Department of Management, Economics and Industrial Engineering Polytechnic of Milan

# CoP: Building Phase

Levers to create members' interest (to move from level -1 to level 1)	
Organization	<p>Provide resources to organize the community launch.            Identify someone who coordinates the initiative.            Point the domain to fundamental knowledge for business.            Define boundaries from existing or latent networks.            Provide a physical space and/or a technology tool that facilitates the connection, access and contribution to the <i>community</i>.            Define clearly domain and boundaries with regards to members' competences.            Define clearly the domain in order that it is specific but not too restrictive.            Develop and support an organizational culture that foster knowledge sharing.            Allow the access to the community during work hours.</p>
Coordinator	<p>Organize the community launch.            Realize marketing actions towards potential members (community brand).            Leverage on unexpressed members' needs and define domain.            Underline the importance of the topics regards business.            Identify potential members from existing networks.            Contribute to the boundaries definition.            Organize meetings and informal events (if possible face to face).            Identify the most active and interested members in order to create a core group.            Identify and involve opinion leader.            Respect the organization's core values.            Use newsletters, invitations, link to the community's intranet spaces in order to promote the community.            Animate community's space stimulating participation.            Develop contents that fit with members' professional characteristics and present them in a familiar way.</p>

Source: *Building Communities of Practice that work: a case study based research* Mariano Corsoa , Andrea Giacobbea, Department of Management, Economics and Industrial Engineering Polytechnic of Milan

# Group Questions

- Do you think there is a need/interest in forming an CoP?
- What type of business justification can be made?
- What type of problems can the CoP help solve?
- Should the CoP be formal or informal?
- How regularly should the CoP meet?
- Should a website site be developed for the CoP?
- More questions?

## Schedule of ANS Standards in Development using RIPB Properties (November 2018)

Standards Project	Draft	+4 months SubC or Preliminary	+6 months 1st CC Ballot/Comment	+4 months 2nd CC Ballot/Comment	+2 weeks ANS Standards	+2 Weeks ANSI Approval	~4 months Publication
	App'd by WG	Review/Comment Resolutions	Resolutions (concurrent PR)	Resolutions (concurrent PR)	Board Certification	ANSI Approval	Publication
ANS-2.8 (Y. Gao) / *ESCC (C. Mazzola) Determine External Flood Hazards for Nuclear Facilities JCNRM Rep: V. Anderson, R. Schneider			Nov - Apr 2019	May - Aug 2019	Sept 2019	Sept 2019	Jan 2020
Note: Working group resolving ballot comments and late NRC comments. Significant changes being made to the draft. Second full ballot to be issued.							
ANS-2.22 (T. Jannik)/*ESCC (C. Mazzola) Environmental Radiological Monitoring at Operating Nuclear Facilities JCNRM Rep:	Nov 2019	Dec - Mar 2020	Apr - Sept 2020	Oct - Jan 2021	Feb 2021	Feb 2021	Jun 2021
ANS-2.26 (D.Clark) / *ESCC (C. Mazzola) Categorization of Nuclear Facility SSCs for Seismic Design JCNRM Rep:			A PINS is in development for a revision. Schedule TBD.				
ANS-2.27 (K. Hanson)/*ESCC (C. Mazzola) Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments JCNRM Rep:	Sept 2019	Oct - Jan 2020	Feb - July 2020	Aug - Nov 2020	Dec 2020	Dec 2020	Apr 2021
ANS-2.29 (E. Gibson)/*ESCC (C. Mazzola) Probabilistic Seismic Hazard Analysis JCNRM Rep: A. Kammerer	Sept 2019	Oct - Jan 2020	Feb - July 2020	Aug - Nov 2020	Dec 2020	Dec 2020	Apr 2021
ANS-3.8.7 (R. Markovich) / *LLWRCC (G. Carpenter) Properties of Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities JCNRM Rep:			On hold -- consideration of redirection for new non-LWR reactors				
ANS-3.13 (J. August) / *LLWRCC (G. Carpenter) Nuclear Facility Reliability Assurance Program (RAP) Development JCNRM Rep:			Project plan in development to re-establish path forward.				
ANS-3.14 (T. Anselmi & C. McMullin)/*NRNFCC (J. O'Brien) Process for Aging Management and Life Extension of NRNF JCNRM Rep: J. O'Brien	Nov 2018	Dec - Mar 2019	Apr - Sept 2019	Oct - Jan 2020	Feb 2020	Feb 2020	Jun 2020
ANS-20.1 (E. Blandford) / *RARCC (G. Flanagan) Nuclear Safety Design Criteria for Fluoride Salt-Cooled High-Temperature NPPs JCNRM Rep: R. Bari, R. Budnitz	June 2019	Jul - Oct 2019	Nov - Apr 2020	May - Aug 2020	Sept 2020	Sept 2020	Jan 2021
ANS-15.22 (D. Cronin)/*RARCC (G. Flanagan) Classification of Structures, Systems and Components for Research Reactors JCNRM Rep:	Dec. 2019	Jan-Apr 2020	May-Oct 2020	Nov-Feb 2021	Mar 2021	Mar 2021	Jul 2021
ANS-20.2 (D. Holcomb) / *RARCC (G. Flanagan) Nuclear Safety Design Criteria and Functional Performance Requirements for Liquid-Fuel Molten Salt-Reactor Nuclear Power Plants JCNRM Rep:			On hold due to NRC considering a SECY on functional containment which would have a substantial impact on the content of the standard.				

## Schedule of ANS Standards in Development using RIPB Properties (November 2018)

Standards Project	Draft	+4 months SubC or Preliminary	+6 months 1st CC Ballot/Comment	+4 months 2nd CC Ballot/Comment	+2 weeks ANS Standards	+2 Weeks ANSI Approval	~4 months Publication
	App'd by WG	Review/Comment Resolutions	Resolutions (concurrent PR)	Resolutions (concurrent PR)	Board Certification	ANSI Approval	Publication
ANS-30.1 (M. Linn) / *RARCC (G. Flanagan) Risk-Informed & Performance-Based NPP Design Process JCNRM Rep: D. Johnson/K. Fleming/A. Maioli	Feb 2019	Mar - Jun 2019	Jul - Dec 2019	Jan - Apr 2020	May 2020	May 2020	Sept 2020
ANS-30.2 (A. Afzali) / *RARCC (G. Flanagan) Categorization Classification of SSCs for New Nuclear Power Plants JCNRM Rep: R. Grantom	Project on hold awaiting determination of path forward with evaluation on the Licensing Modernization Project.						
ANS-30.3 (K. Welter)/*LLWRCC (G. Carpenter) Advanced Light-Water Reactor Risk-Informed Performance-Based Design Criteria and Methods JCNRM Rep:	Sept 2019	Oct - Jan 2020	Feb - July 2020	Aug - Nov 2020	Dec 2020	Dec 2020	Apr 2021
ANS-54.1 (G. Flanagan) / *RARCC (G. Flanagan) Nuclear Safety Criteria & Design Process for Liquid-Sodium-Cooled NPPs JCNRM Rep: R. Budnitz		Closed 8/5/17	Closed 4/9/18	Nov - Feb 2019	Mar 2019	Mar 2019	Jul 2019
	A copy of the draft provided to RP3C & SCoRA on 2/6/18. -- Comment responses to RARCC ballot issued for consideration.						
ANS-57.2 (R. Browder) / *FWDCC (D. Hillyer) Design Requirements for LWR Spent Fuel Storage Facilities at NPPs JCNRM Rep:	Mar 2020	Apr-Jul 2020	Aug - Jan 2021	Feb - May 2021	Jun 2021	Jun 2021	Oct 2021
ANS-57.11 (B. Eble) / *NRNFCC (J. O'Brien) ISAs for Nonreactor Nuclear Facilities JCNRM Rep:	Nov 2018	Dec - Mar 2019	Apr - Sept 2019	Oct - Jan 2020	Feb 2020	Feb 2020	Jun 2020
ANS-58.8 (H. Liao)/*LLWRCC (G. Carpenter) Time Response Design Criteria for Safety-Related Operator Actions JCNRM Rep:	Oct 2018	Oct-Jan 2019	Feb-Jul 2019	Aug - Nov 2019	Dec 2019	Dec 2019	Apr 2020
	Subcommittee ballot issued 10/24/18 with close date of 11/22/18						

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\*= ANS responsible consensus committee

FWDCC = Fuel, Waste, & Decommissioning Consensus Committee

LLWRCC = Large Light Water Reactor Consensus Committee

NRNFCC = Nonreactor Nuclear Facilities Consensus Committee

RARCC = Research and Advanced Reactors Consensus Committee