

Advanced Reactor Stakeholder Public Meeting

June 18, 2020

Telephone Bridgeline: (888) 390-0788

Passcode: 4560771#



Time	Agenda	Speaker
10:00 - 10:10	Opening Remarks	NRC
10:10 - 10:15	Overview of Advanced Reactor Integrated Schedule of Activities	J. Segala, NRC
10:15 - 10:45	NRC Endorsement of the Advanced Non-LWR PRA standard	M. Gonzalez, M. Stutzke, NRC
10:45 - 11:10	Overview of NEI 20-09, "Performance of PRA Peer Reviews Using the ASME/ANS Advanced Non-LWR Standard"	V. Anderson, NEI
11:10 - 11:30	Promoting Preapplication Participation	B. Beasley, NRC
11:30 - 12:00	Discussion of Annual Fee Regulations for Non-LWRs	K. Austgen, NEI
12:00 - 12:15	Concluding Remarks and Future Meeting Planning	NRC/AII





Advanced Reactor Integrated Schedule of Activities

	Summary of Integrated Schedul	e a	nd	l R	le	gu	ıla	to	ry	Αc	cti	vi	tie	5	/ 111	nd	at	96	n	6	/ 1	0	12	02	20	1)	
														•	(u	Ju	at	Cu		0,	_	,				,	
	Advanced Reactor Program - Su	ımm	ary	of	In	teg	gra	ted	Sc	_	_	_	and	Re	gu	late	огу	Ac	tiv	itie	s*						
Strategy 1 Knowledge, Skills, and Capability Strategy 2 Computer Codes and Review Tools Strategy 3 Flexible Review Processes Strategy 4 Consensus Codes and Standards		_	67.4			. 1100					200	_	EDO					_		_	4						
			Concurrence (Division/Interoffice) • EDO Concurrence Period Federal Register Publication Commission Review Period													ı											
			Public Comment Period T ACRS SC/FC (Scheduled or Planned												(be	ı											
	trategy 5 Policy and Key Technical Issues		Draft Issuance of Deliverable External Stakeholder Interactions Final Issuance of Deliverable 1 Public Meeting (Scheduled or Planned)												ı												
5	trategy 6 Communication		Fin	al los	uan	00 05	Den	verab				_	Puto	Me	iting	(Sch	HJUH	d or	Harr	W(5)	J					Versio	
			_	_	_	_	_		P	rese	_	-				_								_		enon	10
	Regulatory Activity	2		D	100		_	_	_	_	20	20	_	_	_		_	_	_	_	2	021	_	_	_	_	_
Strategy		Papers Papers	Guidance	ulemaking	NEIMA	Complete	Jan	Feb	Apr	May	Jun	Jul	Aug	San San	Nov	Dec	Jan	Feb	Apr	may	aun	Jul	Aug	Sep	Oct	Nov	Dec
	Development of non-Light Water Reactor (LWR) Training for Advanced Reactors (Adv. Rus) (NEIMA Section 103(a)(5))			П	101		Н	1	T		Г			T	t			T	T	T	T	t	Т	Г	Г	Г	Г
	FAST Reactor Technology		Н	Н	×	×	Н	-	-	Н	Н	Н	$\overline{}$	+	۰		-	+	+	۰	۰	۰	t	F	т	г	Н
1	High Temperature Gas-cooled Reactor (HTGR) Technology				х	×	П	\neg					\neg	†		П	\dashv	7	1	+	Ť	T	\pm	\vdash	П		
	Molten Salt Reactor (MSR) Technology				х	Х		\exists	\blacksquare					T	Τ		\Box	7	T	T	Τ	Τ	Ε	Г			
	Competency Modeling to ensure adequate workforce skillset	\perp				×		_	_						\perp	L		_	1	_	1	┸	┸	L	\perp	\perp	\perp
	Identification and Assessment of Available Codes					×		_	_					1	_	Ц	\perp	4	1	1	1	1	\perp	\perp	\vdash	\perp	\sqcup
	Development of Non-LWR Computer Models and Analytical Tools						Н	+	+				-	+	-			-	+	+	+	+	+	-			
	Code Assessment Reports Volumes 1 (Systems Analysis) Code Assessment Reports Volumes 2 (Fuel Perf. Analysis)	-	-	Н		×	H	+	+	\vdash	Н	Н	+	+	+	H	+	+	+	+	+	+	+	+	\vdash	\vdash	\vdash
	Code Assessment Reports Volumes 3 (Source Term Analysia)		\vdash	Н		×	H	+	+	\vdash	Н	Н	+	+	+	Н	\vdash	+	+	+	+	+	+	+	Н	\vdash	Н
2	Code Assessment Reports Volumes 4 (Fuel Cycle Analysis)								\pm					٠t				1	\pm	\pm	1	\pm	\perp				\Box
	Code Assessment Reports Volumes 5 (Dose Analysis)																7			T	\mathbf{I}	Г	Γ				
	Non-LWR MELCOR (Source Term) Demonstration Project						Н	1					1	+	-			-	+	+	1	1					\vdash
	Research on Innovative Methods to Enhance Seismic Safety for Design and Construction of Adv. Rxs						П					П		1					1		1	1					
	Develop Regulatory Roadmap for Adv. Rxs	-	\vdash	Н			H	+	-		Н	Н	+	+	+		+	+	+	+	+	+	+	+	Н	\vdash	Н
	(NEIMA Section 103(a)(1))	1		П	×	×	П					П	Ш	1	1	H			1		1	1		1			
	Develop prototype guidance for Adv. Rxs					×	\Box	\neg							T			1	T	Ť	T	T	\top	\vdash	Г		Г
	Develop non-LWR Design Criteria for Adv. Rxs					×								T					1	Τ	Т	Т					
	EPRI Topical Report on Tri-structural Isotropic (TRISO) Fuel		×							٧		v		T	F		\Box	\perp	T	T	T	T	F	F	\Box		\vdash
	Quality Assurance Program Plan for Sodium-cooled FAST Reactor Metallic Fuel Data Qualification					×																					
	Develop Fuel Qualification Guidance for Adv. Rxs		×		×									1													
		-	_	_																							





NRC Endorsement on the Advanced Non-LWR PRA Standard

Michelle M. Gonzalez- RES/DRA Marty Stutzke- NRR/DANU

Objectives

- Update on the advanced non-LWR PRA standard (ANLWR) review/endorsement
- Update on the NRC planned schedule for endorsement and schedule for future public engagement
- Endorsement of NEI's guidance on peer review
- Seek feedback from designers/applicants on the risk-informed applications that they plan to use

Status of Endorsement of ANLWR PRA Standard

- Staff has developed an endorsement plan, "Review and Endorsement of ASME/ANS Advanced NON-LWR PRA Standard Action Plan (ML20104C132)"
 - Task 1 Supporting development of the standard
 - Task 2 Preparation for review of the ANLWR PRA standard and NEI's peer review guidance
 - Task 3 Staff review and endorsement
 - Task 4 Development of schedule for staff review and endorsement*
 - Task 5 Identification of resources*
 - Task 6 Development of communication plan

 Staff completed initial review and submitted ballot comments to the JCNRM on May 22nd

6 of 26

6

^{*} These tasks have been completed

Status of Endorsement of ANLWR PRA Standard

- NRC is preparing to endorse the ANLWR PRA standard. Some of the ongoing activities include:
 - Comparing the ANLWR PRA standard to other PRA standards
 - Enhancing the staff guidance
 - Finalizing the scope of regulatory activities
- Staff will endorse the ANLWR PRA standard with the development of a new regulatory guide (RG), similar to RG 1.200
- Staff anticipates publishing the draft RG for public review and comment by Summer 2021 and the final RG by Fall 2022

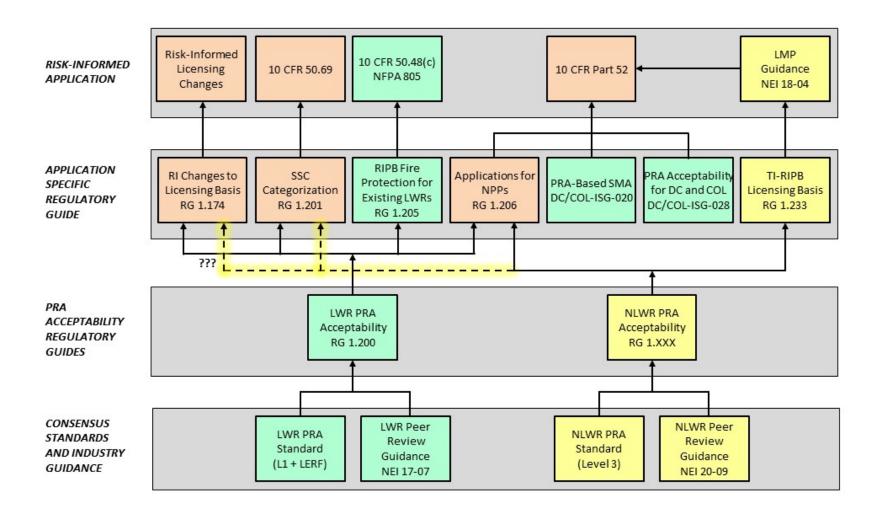
Schedule for Endorsement and Public Engagement

- Draft RG- September 2021
- Public review and comment- September through November 2021
- Final RG- November 2022
- Public meetings
 - First public meeting: July 2020 (tentative)
 - Approximately every 3-6 months thereafter

NEI's Guidance on Peer Review

- Received NEI 20-09, "Performance of PRA Peer Reviews Using the ASME/ANS Advanced Non-LWR Standard"
- Staff to review and endorse concurrently with the ANLWR PRA standard (2021)

Risk-Informed Applications



Acronyms

ANLWR- advanced non-light water reactor

ANS- American Nuclear Society

ASME-American Society of Mechanical Engineers

COL- combined license

DC- design certification

JCNRM- Joint Committee on Nuclear Risk Management

LMP- Licensing modernization project

LWR- light water reactor

NEI- Nuclear Energy Institute

NPP- nuclear power plant

RG- regulatory guide

RIPB- risk-informed performance-based

SSC- structure, system, and component

11 of 26

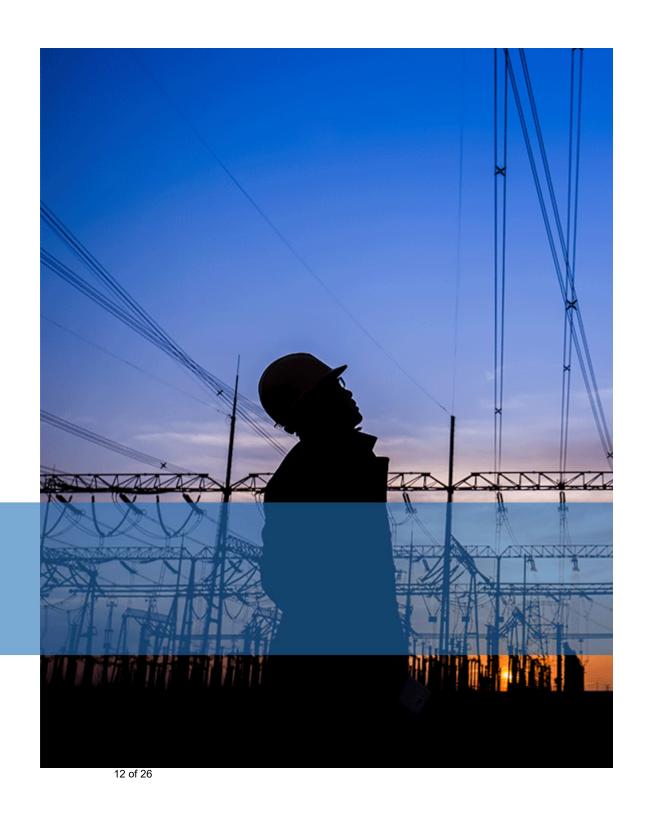
11

NEI 20-09: NLWR PRA Peer Review

Victoria Anderson, NEI

June 18, 2020





©2020 Nuclear Energy Institute



NEI 20-09: NLWR PRA Peer Review Guidance

- Largely based on NEI 17-07 (LWR PRA Peer Review Guidance)
- Retained key aspects of LWR peer reviews
 - Review team
 - Consensus process
 - Assignment of findings for supporting requirements not met
 - Newly developed method process
 - Documentation of review in report

NEI 20-09: NLWR PRA Peer Review Guidance

- NLWR adjustments
 - Reflects differing standard structure
 - Changes to wording on qualifications to reflect novel designs
 - "On-site review" replaced with "final dedicated meetings" based on anticipated design reviews
- Path forward
 - Conduct of Kairos peer review using NEI 20-09 in the future
 - Future revision based on
 - Kairos pilot feedback
 - NRC feedback
 - Changes in final version of NLWR standard ©2020 Nuclear Energy Institute



Reprise of Promoting Preapplication Participation

Ben Beasley, Chief

Advanced Reactor Licensing Branch

Brief Background

- Pre-application interaction:
 - White paper, audit
 - Topical report, Preliminary Safety
 Information Document



- Value
 - Reliable regulatory findings early
 - More efficient permit or license review
 - More visibility for public on key topics

Key Interactions – Topical Reports

- Principle design criteria
- Classification of SSCs
- Fuel qualification
- Source term development
- QA Program
- Safeguards Information Plan
- Accident analysis method

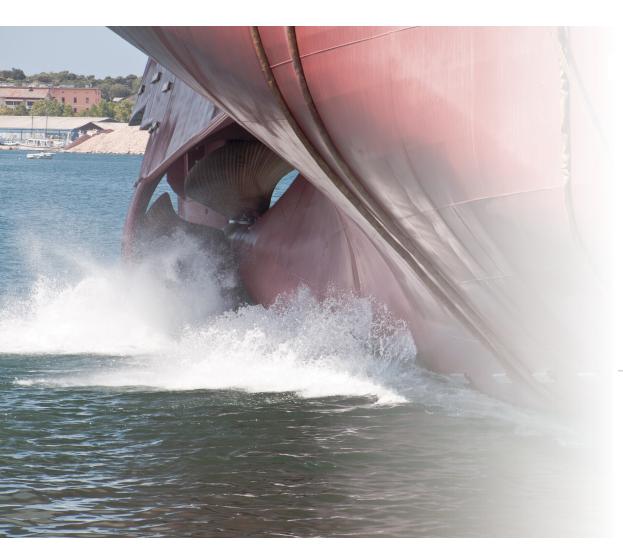
17 of 26

14



What and Why?

- Add definition
 - Specify key activities
- Promote use
 - Offer clear strategies
- Caveats
 - No substantive design changes
 - Timely RAI responses



Strategies

What would be meaningful?

Annual Fee Regulations for Non-Light Water Reactors

June 18, 2020



©2020 Nuclear Energy Institute



- Annual fees outlined in 10 CFR Part 171, governed by OBRA-90
 - Current variable annual fee structure established for light-water SMRs in June 2016
- Currently, annual fees not technology-inclusive and apply only to lightwater reactors (LWRs)
 - Timely consideration given non-LWR application in front of NRC and more developers in pre-application discussions with the NRC

- Urgent need for annual fee regulations for non-LWRs; important for investment decisions
- Meet OBRA-90 requirements
 - Regulatory costs shared equitably among large and smallerscale reactor facilities, as well as among various technologies
 - Reasonable relationship to cost of regulatory services.
- Ensure continued protection of public health and safety





Expand the SMR variable fee rule to include non-LWRs

- Basis for light-water SMR variable annual fee is equally applicable to non-LWRs
- Maximum, minimum, and variable fees are appropriate for large & SMR non-LWRs

Micro-reactors require further consideration

- Fees should be much lower than the variable fee rule minimum.
- Fairness & equitability: fees have disproportionate impact on plant
- Cost of regulatory service expected to be very small

©2020 Nuclear Energy Institute

Longer term considerations



Future annual fee rulemakings based on operating experience of SMRs and non-LWRs

- Verify the expectations that advanced reactors require less regulatory service due to improved safety and simplicity
- Refine the SMR and non-LWR annual fees as detailed information becomes available through operating experience
- Consider whether risk-insights could be used in setting annual fees for SMRs and non-LWRs

Future Meeting Planning and Open Discussion

2020 Tentative Schedule for Periodic Stakeholder Meetings

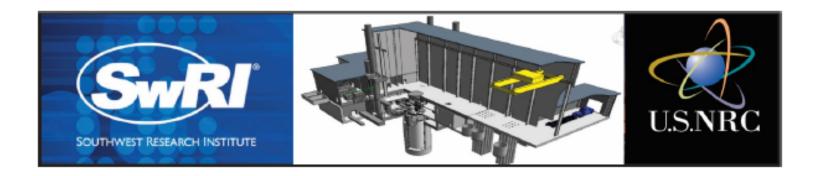
August 6

September 24

November 5







Enhancing Risk-Informed and Performance Based Seismic Safety for Advanced Non-Light Water Reactors

Workshop: September 2-3, 2020, NRC Headquarters

Staff from the Nuclear Regulatory Commission (NRC) and NRC contractors will host a workshop on an enhanced technology-inclusive (TI) and risk-informed and performance based (RIPB) conceptual seismic design approach to achieve desired seismic safety for Advanced Non-Light-Water Reactors (ANLWR). The approach aligns with the Licensing Modernization Project (LMP) framework and may offer an alternative pathway for the design of future ANLWRs. At the workshop, NRC staff and contractors will present perspectives and detailed insights into a proposed seamless integration of seismic probabilistic risk assessment (SPRA) and the LMP framework into the design process; one that leverages the LMP safety criteria and categorization criteria for structures, systems, and components (SSCs) with the performance-based ASCE 43 seismic design criteria. The resulting design process is also integrated with defense-in-depth considerations to produce a risk-balanced seismic design with potential safety and cost benefits, as well as attributes consistent with existing 10 CFR Part 52 and Part 50 licensing processes. This TI-RIPB pathway for ANLWR to design against seismic hazards. Feedback from the ANLWR technical community and stakeholders at the workshop will be used by the NRC in planning future technical activities to further evaluate the feasibility and validity of the proposed TI-RIPB approach.



