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United States Nuclear Regulatory Commission
Protecting People and the Environment

Advanced Reactor Stakeholder Public Meeting

February 20, 2020

Telephone Bridgeline: (888) 593-8429
Passcode: 6767863#

Time	Agenda	Speaker
9:00 - 9:10 am	Opening Remarks and Agenda	NRC/NEI
9:10 – 9:45 am	Status of NRC readiness for non-LWRs and planned update of public website	Monninger/Hayes, NRC
9:45 – 10:00 am	Nuclear Materials Management and Safeguards System (NMMSS) Overview	Shoemaker, NMSS
10:00 – 10:30 am	NRC update on Generic Environmental Impact Statement (GEIS)	Sutton, NRR
10:30 – 10:50 am	NEI Environmental Review Report	Austgen, NEI
10:50 – 11:00 am	Break	ALL
11:00 – 11:45 am	Technology Inclusive Content of Applications Project (TICAP)	Afzali, Southern
11:45 – 12:00 pm	Introduction of NRC Project on Severe Accident Phenomenology and Source Terms Calculations for Representative Designs	Schaperow, NRR
12:00 – 1:00 pm	Lunch	ALL
1:00 – 1:30 pm	Industry Priorities for Codes and Standards	Nichol, NEI
1:30 – 2:00 pm	Update on NRC Plan for Endorsement of Non-LWR PRA Standard	Phan, NRR
2:00 – 2:30 pm	Update from Department of Energy on Non-LWR topics including Micro Reactors	Sowinski, DOE
2:30 – 2:45 pm	Break	ALL
2:45 – 3:15 pm	Update on Non-LWR Policy Issues	Cubbage/Reckley, NRR
3:15 – 3:30 pm	Physical Security Rulemaking Update	Valliere/Andrukat, NRC
3:30 – 3:45 pm	Emergency Planning Rulemaking Path Forward	Segala, NRR
3:45 – 4:00 pm	Future meeting planning and open discussion	ALL

Opportunities for public comments and questions at designated times

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Status of NRC Readiness for Non-LWRs and Planned Update of Public Website

- John Monninger and Michelle Hayes, NRC

  - https://www.nrc.gov/reactors/new-reactors/advanced.html
  - https://www.nrc.gov/reactors/operating/oversight/rop-enhancement.html

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The Nuclear Materials Management and Safeguards System

Mirabelle Shoemaker
Material Control and Accounting Branch
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission

The **N**uclear **M**aterials **M**anagement and **S**afeguards **S**ystem **(NMMSS)**

- U.S. Government database for tracking physical inventory and nuclear material transactions for source and special nuclear material (SNM)
- DOE Sites and NRC licensees with source or special nuclear material that meet the requirements of the applicable regulations report to NMMSS.
- Information submitted to NMMSS allows the U.S. Government to fulfill its commitments for safeguards on material within the U.S.

Reporting to NMMSS

- Nuclear Power Reactors
- Research and Test Reactors
- Independent Spent Fuel Storage Installations (IFSIs)
- Fuel Cycle Facilities
- Greater-Than-Critical-Mass Facilities
- Uranium Mills
- Waste Facilities
- Department of Defense (DOD)/Federal possessors of commercial material
- Agreement State Licensees

- Reportable material types and units
  - Depleted Uranium (Kg)
  - Natural Uranium (Kg)
  - Thorium (Kg)
  - Uranium-233 (g)
  - Uranium-235 (g)
  - Plutonium (g)
  - Plutonium-238, when >10% (0.1g)

Reporting to NMMSS (cont.)

- DOE/NRC **Form 741**, Nuclear Material Transaction Report
- DOE/NRC **Form 742**, Material Balance Report
- DOE/NRC **Form 742C**, Physical Inventory Listing
- DOE/NRC **Form 740M**, Concise Note

- Key Reporting Guidance
  - **NUREG/BR-0006**, "Instructions for Completing Material Transaction Reports (DOE/NRC Forms 741 and 740M)"
  - **NUREG/BR-0007**, "Instructions for the Preparation and Distribution of Material Status Reports (DOE/NRC Forms 742 and 742C)"
  - **NMMSS Report D-24**, "Personal Computer Data Input for NRC Licensees"

2020 Annual NMMSS Users Training

- NMMSS Reporting
- Materials Management
- Nonproliferation
- Facility Operations

- No cost to attend training
- Registration, agenda, and lodging information: https://nmmss2020.linksolutions.com/

Questions

mirabelle.shoemaker@nrc.gov, 301-415-7363

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Update on Generic Environmental Impact Statement for Advanced Reactors

Mallecia Sutton
NRC
February 20, 2020

Status

- Comment period closed for the exploratory process -January 24, 2020
- Staff is preparing responses to public comments on the exploratory process
- Staff developing information paper to describe GEIS structure and potential benefits; currently under management review

Recommendations for Streamlining NRC Environmental Reviews

February 20, 2020

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Challenges & Opportunities

- National Environmental Policy Act (NEPA)
  - intent to inform federal actions based on an assessment of their likely environmental impacts
  - implementation of NEPA has yielded unjustified increases in both length of time to complete the review and associated costs
- Advanced Reactors
  - review proportionate to potential environmental impacts
  - expected to result in small environmental risks
  - environmental benefits and avoided carbon emissions

Overview of Recommendations

1) Allow for the flexibility to use environmental assessments (EAs) and categorical exclusions
2) Increase the use of generic environmental impact statements (GEISs)
3) Incorporate existing environmental analyses into a project's EA or EIS
4) Flexibility to use the applicant's environmental report (ER) as the basis for the draft EA or EIS
5) Reduce unnecessary burden in alternative site analysis
6) Increase efficiency of environmental reviews

1) Allow for the flexibility to use EAs and categorical exclusions

- Requiring an EIS without consideration of the characteristics of advanced reactors and the history of current reactors is not commensurate with anticipated environmental impacts per NEPA.
- For the NRC to leverage EA's in the environmental reviews of advanced reactors, the NRC will have to change the current regulations which prescribe to the NRC which actions require an EIS.
- This recommendation is focused on the NRC considering how it can provide more latitude to consider categorical exclusions based on the circumstances of the proposed action.

2) Increase the use of GEISs

- NEI recommends that NRC leverage the experience of the current reactor fleet, their existing GEISs and drive towards smart environmental reviews that are effective and efficient.

3) Incorporate existing environmental analyses into a project's EA or EIS

- The NRC should streamline its NEPA reviews by codifying into Part 51 the practice of adopting other agencies' EISs.
- The NRC should further expedite the NEPA review process by specifically codifying circumstances where EAs and EISs can reference externally prepared analyses.
- Given the often-duplicative nature of NEPA reviews, heavier reliance on existing environmental analyses has the potential to save significant time and resources for both project applicants and the NRC.

4) Flexibility to use the applicant's ER as the basis for the draft EA or EIS.

- Preparation of the ER is an expensive endeavor for applicants and currently serves as the basis for preparation of the NRC's EIS. Unfortunately, as conducted to-date, the NRC's EIS preparations duplicate the applicant's efforts to develop an ER, wasting time and level of effort, and resulting in costs that are then charged back to the applicant.
- The NRC can amend its regulations by looking to federal agencies that allow more applicant participation in the environmental review process.
  - FERC
  - FAA

5) Reduce unnecessary burden in alternative site analysis

- The CEQ has proposed a revised definition to reasonable alternatives that the NRC should consider. Reasonable alternatives should be analyzed with the lens of what is actually feasible, based on the purpose and need of the applicant's goals and the agency's statutory authority.
- It would be more appropriate to limit the requirement to a description of the process used to select the site, which is likely more important for advanced reactors, many of which will be sited in specific locations to meet a specific need.

6) Increase efficiency of environmental reviews

- Consistent with the NRC Principles of Good Regulation and organizational values, the agency strives for efficiency and continuous learning.
- Many of the procedural efficiencies identified for the safety review should also be considered to increase the efficiency of environmental reviews.
- Additional contributing factors that once addressed in the environmental review context should help achieve and sustain increased efficiency.

Next Steps

NEPA milestones	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	1Q21	2Q21	3Q21	4Q21	1H22	2H22
CEQ	NEI CEQ Comments									Final Rule								
Streamlining NRC Environmental Reviews	NEI ER Paper								Vote SECY			SRM SECY						
1 EA or CatEx						NRC WP	NEI Comments		Staff Rec. RM in SECY			SRM SECY		Draft RM Basis		Proposed Rule		Final Rule
2 ANR GEIS		FRN Comments			Draft NUREG	NEI Comments			Final NUREG				Contingency NUREG update					
4 Incorp. Existing Analyses						NRC WP	NEI Comments		Staff Rec. Policy in SECY			SRM SECY	Is there staff action after policy is set (e.g., guidance)?					
4 Use ER as draft EA or EIS						NRC WP	NEI Comments		Staff Rec. Policy in SECY			SRM SECY	Is there staff action after policy is set (e.g., guidance)?					
5 Alt. Sites Scope					Issue ISG	NEI Comments			Final ISG				RG Update (Placeholder)					
6 Efficiency of Review			NRC Mgmt expectations						Implement efficiencies									

Legend

- NEI Deliverable
- Interim Decision Maker Deliverable
- Final Decision Maker Deliverable

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Break

Meeting/Webinar will begin shortly

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Mapping Fundamental Safety Functions (FSF) to Regulations

Technology Inclusive Content of Application Project (TICAP)

Frank Akstulewicz
AtoZ Reactor Consulting Services

NRC Stakeholder Meeting
February 20, 2020

Southern Company

Outline of the Presentation

- Background
- TICAP Goal
- Next Steps for the FSF Report
- Preview the Content of FSF Mapping Report
- Early Conclusions
- Next Steps and Schedule
- Summary and Questions

TICAP Goal

Develop an endorsable document that outlines the content of an application in a manner that is technology inclusive, risk-informed, performance-based and its scope is limited by LMP methodology and can be submitted to NRC for endorsement

- Output will likely be a process for developing content of application as opposed to a specific set of required information

Key TICAP Products

Fundamental Safety Functions (FSFs) Definition (to NRC 11/2019)

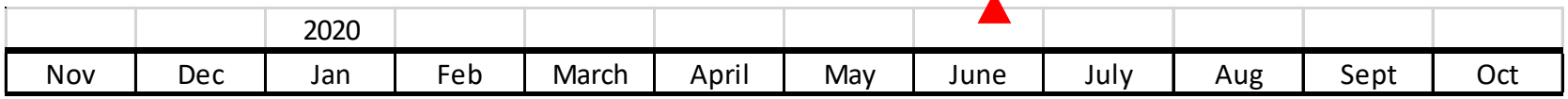
Formulation of Technology Inclusive Content of Application (to NRC 10/2020)

Regulation Mapping to FSFs (to NRC 5/2020)

NEI Guidance Document Annotated Outline (to NRC 10/2020)

LMP-Related Safety Case (To NRC 6/2020)

Tabletop Exercises



Key TICAP Products (cont.)

Differences Between Licensing Paths (to NRC 1/2021)

NEI Guidance Document (draft to NRC 4/2021) (final to NRC 7/2021)

NRC Review

Tabletop Exercises

		2021									
Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct

Next Steps for the FSF White Paper

- Comments received on January 17, 2020
- Conference call on January 29, 2020 to clarify staff comments
- General alignment on scope and direction of paper
  - Comments in two specific areas
    - » FSF and adequate protection
    - » Hierarchy of FSF
- Next steps
  - Update the paper to align with SECY 19-0117 hierarchy of FSF
  - Continue discussion about role of FSF in determining adequate protection
  - Return FSF paper to TICAP internal review process

Purpose of the FSF Mapping Report

- The purpose of the FSF Mapping Report is to demonstrate that the existing body of Part 50 regulatory requirements will map to one or more fundamental safety functions
- This is not a gap analysis exercise in that we are looking for where holes exist for licensing non-LWR technologies
- Will demonstrate equivalence between prescriptive regulatory requirements and performance based fundamental safety functions

Structure of Report

- Background Section
- Section that discusses several efforts related to mapping
- Fundamental safety functions and mapping process
- Overview results table
- Conclusion
- References
- Appendices for content of application mapping

Mapping Process

- Mapping follows outline of Part 50
- Mapping tracks
  - Design requirements
  - Programmatic requirements
  - Administrative requirements
- Mapping applied to regulations at a macro level
- Mapping applied to contents of applications sections at the sub-paragraph level for both Part 50 and 52
- Mapping summarizes the safety objective for each regulation

Sample from Mapping Table

Regulation	Description of the regulation and summary of safety objective, when appropriate	Controlling Reactivity (1)	Removing Heat from the Reactor and Waste Stores (2)	Retaining Radioactive Materials (3)	Programmatic Requirements that support all three FSFs (4)	Administrative or Procedural	Basis or Rationale
50.58	**Hearings and ACRS reviews**					**X**	
50.59	Process for changes to approved licensing bases.				X		Establishes process for changes to approved licensing basis – preserves integrity of approved licensing basis
50.61	Preserve integrity of reactor vessel from temperature event		X	X			
50.61a	Alternatives to 50.61 requirements		X	X			
50.62	Mitigate worst case failure to scram event				X		

Conclusions from Mapping

- All design requirement regulations contained in Part 50 and the Appendices can be mapped to one or more fundamental safety functions – notable exception is emergency preparedness
- There are a few additional requirements for contents of applications in Part 52
  - ITAAC
  - Results of PRA
- Referenced regulations also mapped to FSFs

Next Steps

- Complete the mapping process to assure that fundamental safety functions provide comprehensive examination of initiating events and external hazards appropriate for the technology
- Obtain review and comment from ARRTF
- Provide to NRC for review and comment in May 2020.

- Questions and Comments?

List of Abbreviations

- ARRTF – Advanced Reactor Regulatory Task Force
- FSF – Fundamental Safety Functions
- ITAAC – Inspections, Tests and Acceptance Criteria
- LMP – Licensing Modernization Project
- LWR – Light Water Reactor
- PRA – Probabilistic Risk Assessment
- TICAP – Technology-Inclusive Content of Application Project

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Advanced-Reactor Source Term

Jason Schaperow

Hossein Esmaili

Advanced Reactor Stakeholder Meeting

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- Overall strategy
  - "NRC Vision and Strategy: Safety Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness," December 2016, ML16356A670
- Code strategy for source term
  - "NRC Non-Light Water Reactor Vision and Strategy, Volume 3 – Computer Code Development Plans for Severe Accident Progression , Source Term, and Consequence Analysis," Revision 1, January 2020, ML20030A178

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- Technology inclusive
  - Water-cooled reactor
  - Gas-cooled reactor
  - Sodium-cooled and heat-pipe-cooled
  - Salt-cooled and salt-fueled reactor

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- SCALE – calculates fission product inventories and decay power
- MELCOR – calculates source term to environment
  - Inputs
    - Fission product inventory and decay heat (from SCALE)
    - Geometry of reactor, containment, reactor building
    - Operation of pumps and valves

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- Two staff efforts
  - Advanced-reactor technology-inclusive guidance for developing mechanistic source terms
  - Non-LWR pilot studies to illustrate how to perform source term analysis with MELCOR
    - Supports guidance development

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- Phase 1
  - MELCOR full-plant simulations for 3 representative non-LWR designs
  - Based on publicly available design information
    - E.g., LANL Megapower heat-pipe-cooled reactor

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- Phase 2
  - Workshops to train the staff on source term analysis for the 3 representative non-LWR designs
  - One workshop for each design
  - Prepare staff for design reviews

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- Phase 3
  - Workshops to inform stakeholders on the staff's approach to source term analysis for the 3 representative non-LWR designs
  - One workshop for each design
  - Promote dialogue between NRC and stakeholders

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- Schedule
  - 6 months for each of the 3 representative designs
  - Work starts February 2020

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Lunch

Meeting/Webinar will begin shortly

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Advanced Reactor Codes and Standards Needs Assessment (NEI 19-03)

February 20, 2020

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Benefits of Advanced Reactor Codes and Standards

- Codes and Standards help to:
  - reflect interests from all relevant organizations
  - establish conservatism in the designs
  - provide a framework for standardization

- When endorsed by the regulator, they can:
  - make the regulatory process more efficient and predictable
  - enable more efficient approvals internationally

ANS SPECIAL REPORT: Recommendations

- Congress should fund a DOE program to
  - Assist SDOs and developers
  - Accelerate development/update to key standards

- Department of Energy should
  - Coordinate with SDOs
  - Solicit input from developers, NGOs, other stakeholders
  - Identify and prioritize key codes and standards needs
  - Establish time frame for development and regulatory acceptance

ANS SPECIAL REPORT: Recommendations(cont)

- Department of Energy should
  - provide incentives to national laboratories
  - ensure proactive participation in developing data and methods
  - support a comprehensive overhaul of priority codes and standards
- Nuclear Regulatory Commission should
  - implement process improvements and/or provide the resources
  - ensure timely adoption of advanced reactor standards
  - reevaluate the need for imposing margins in excess of standards
- DOE and/or NRC
  - establish a formal process with the SDOs
  - achieve harmonization of safety margins among consensus standards

Challenges

- Timeliness
  - development needs to support developer plans for licensing, construction and operations
  - important to developers who are making multiyear capital investments
- Resources
  - availability of funding resources to fully develop the desired codes and standards
- Re-invigoration of SDOs
  - potential delays due to lack of resources and/or support information
- Decision process
  - needed to facilitate prioritization of codes and standards development

NEI 19-03, [Rev 0]

Purpose:

- To identify and prioritize needed codes and standards
  - provide the greatest benefit for designs types being developed today
- To identify the need for more streamlined and timely efforts
  - in the development and endorsement of codes and standards

Assessing priorities for what needs to be done

- NEI 19-03 criteria utilized to rank importance of code/standard include, the code /standard will:

1. Support design efforts;
2. Support licensing review;
3. Reduce component fabrication time and costs;
4. Reduce facility construction time and costs; and
5. Reduce O&M costs.

Assessing priorities for what needs to be done (cont)

NEI 19-03 then ranked Codes and Standards determine priority (High, Medium or Low) based on the following:

1. **High -** Codes and Standards that (1) support design and licensing, (2) support either design or licensing and at least two other criteria, or (3) satisfy at least three of the other criteria

2. **Medium -** Codes and Standards that satisfied two of the criteria not specifically related to design or licensing

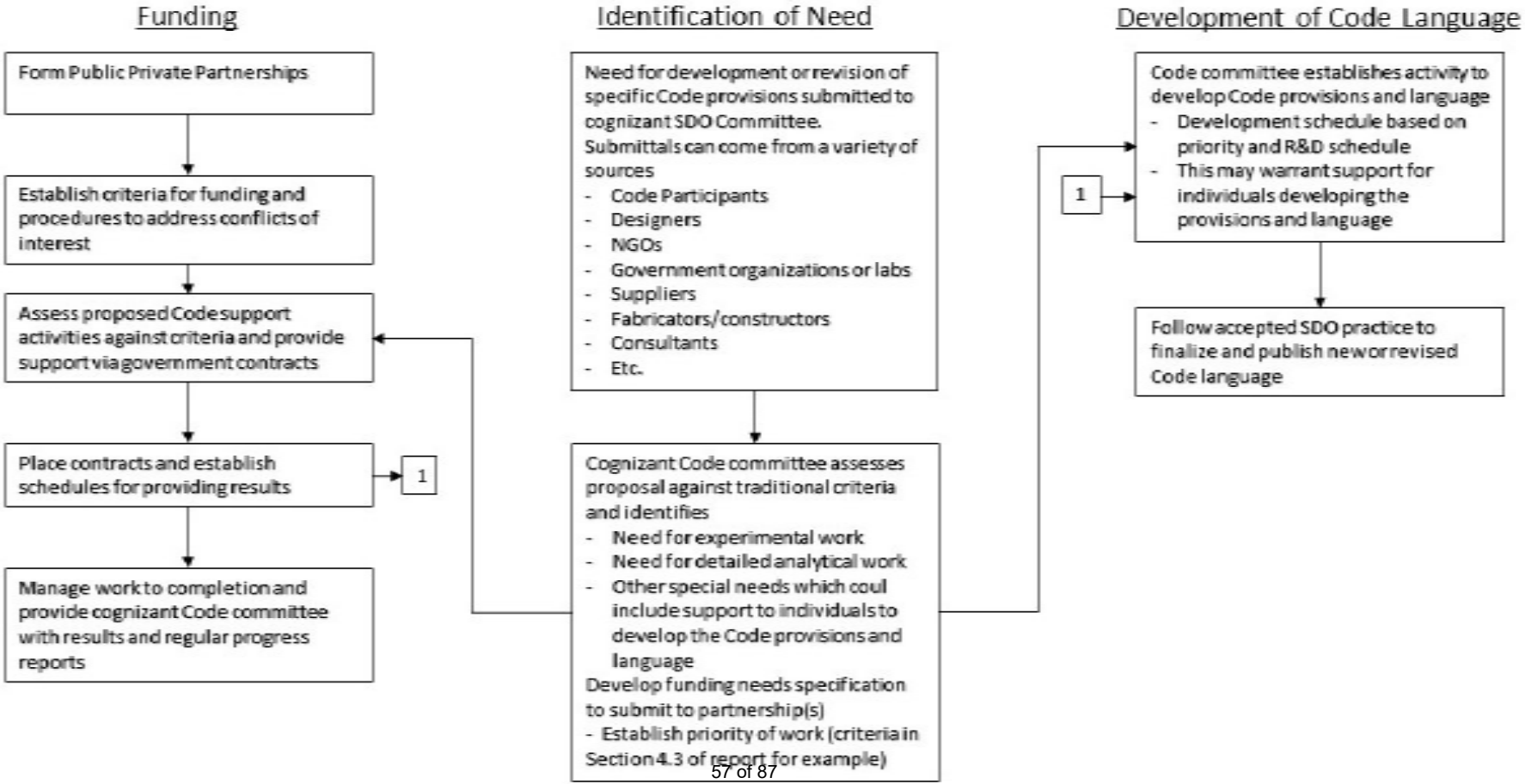
3. **Low -** Codes and Standards that satisfied one of the criteria not specifically related to design or licensing

Results of Prioritization

- A total of 36 standards were included in the prioritization;
  - 18 identified as “High Priority” for near-term development
- Need for new standards on advanced manufacturing methods
  - should be evaluated for prioritization (see NEI Report on Advanced Manufacturing)
- Need to establish an ongoing process to engage DOE, developers and SDOs in determination of near-term development activities
- Recommended that public-private partnerships be formed to provide financial support
  - situations where R&D or other special needs is essential
  - on a schedule that supports the deployment of advanced reactors

NEI 19-03 High Priority Standard (or Equivalent)	SDO
Equivalent to ANSI/ANS 6.4-2006, Concrete for Passive Heat Removal Systems - Irradiation and Thermal Limits	ANS
ANS-30.1-201x Risk-informed Performance-Based Principles and Methods	ANS
ANS-30.2-201x Categorization and classification of SSCs	ANS
ASME/ANS RA-S-1.4-2013 PRA for Non-LWRs (trial use)	ASME/ANS
ANSI/ANS 53.1 Nuclear Safety Design Process for Modular Helium-Cooled Reactor Plants, 2011	ANS
ASME BPVC Division 1 and 2, Subsection NCA, Containment Barrier	ASME
New standards equivalent to SFR-DC 73 for sodium leak detection and mitigation (see NRC RG 1.232)	ANS
ANS 56.2-1984 (ANSI N271-1976), Containment Isolation for Fluid Systems	ANS
ASME AG-1-2009, Air and Gas Treatment	ASME
ASME BPVC Section III, Construction of plant components	ASME
New Standards for Advanced Manufacturing Techniques, including Additive manufacturing	ASME
ASME BPVC Section III Division 1, Subsection NE and Division 2, Containment	ASME
ASME BPVC Section III, Division 5, High Temperature Reactors	ASME
ASME N509-2002, Air Cleaning Units and Components	ASME
ASME QME-1-2007, Qualification of Active Mechanical Components	ASME
NFPA 251, Methods of Tests of Fire Resistance of Building Construction and Materials	NFPA
ACI 349.1R-07, Reinforced Concrete Design for Thermal Effects	ACI
ACI 349-2013, Nuclear Safety-related Concrete Structures and Structural Members	ACI

Proposed Process for coordination between DOE, C&S Organizations and Developers



QUESTIONS?

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Update on NRC Plan for Endorsement of ASME/ANS RA-S-1.4 "PRA Standard for Advanced Non-LWR Nuclear Power Plants"

Advanced Reactor Stakeholder Meeting

Hanh Phan, NRR/DANU
Michelle Gonzalez, RES/DRA

February 20, 2020

Objective

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- Update on the staff's endorsement plan
- Update on the gap analysis of PRA standard
- Update on the industry peer review guidance

Regulations and Guidance

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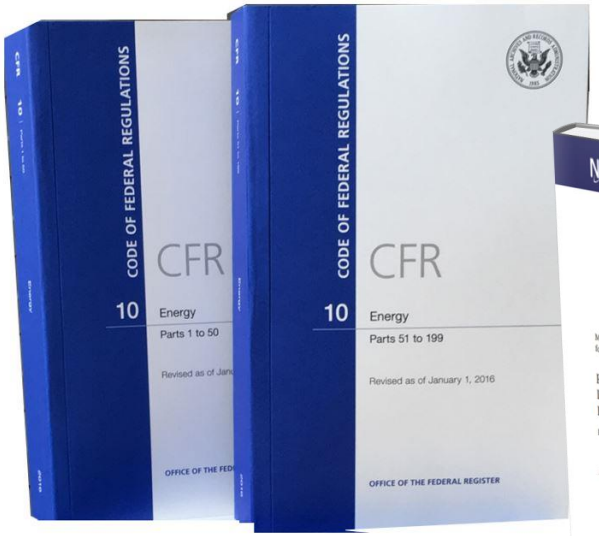
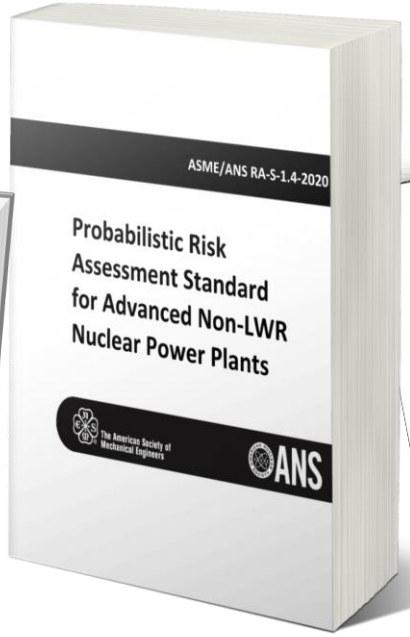
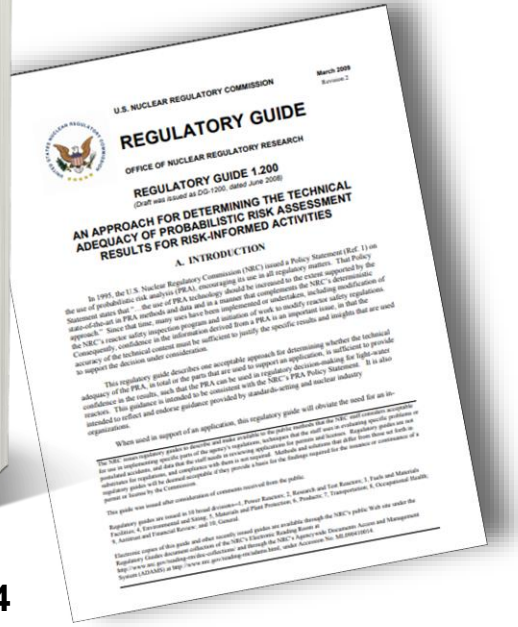


10 CFR 52.47 & 52.79
10 CFR 50.71

NEI 18-04



ASME/ANS RA-S-1.4



RG 1.200

Background

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- **June 27, 2019**, staff informed the stakeholders of its plan to:
  1. Endorse the ASME/ANS trial use advanced non-light-water reactor (non-LWR) PRA standard, developed by the ASME/ANS Joint Committee on Nuclear Risk Management (JCNRM), and
  2. Perform a gap analysis of non-LWR PRA standard to ensure fit for Licensing Modernization Project (LMP) purpose
- **August 15, 2019**, staff updated the stakeholders of its plan and discussed industry guidance on the peer review process
- **August 16, 2019**, staff established the guidelines for review and endorsement of non-LWR PRA standard (ML19235A285)
- **September 26, 2019,** staff notified the JCNRM of its endorsement Plan
- **October 2, 2019**, staff briefed the ACRS on its endorsement plan
- **November 26, 2019**, JCNRM transmitted a letter to the NRC (ML20031D602) expressing concerns about the staff's endorsement of the trial-use standard and proposing that the NRC wait for a new version

Staff's Endorsement Plan

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- JCNRM's letter indicated changes in priority and schedule to ballot the standard in March 2020 and issuing the pre-final-editing version of the standard by December 2020
- Staff considered the JCNRM's schedule and agreed to endorse the pending revision to the standard
- Staff to issue the endorsement plan in March 2020, which includes:
  - Task 1 - Supporting development of the standard
  - Task 2 - Preparation for review of the standard
  - Task 3 - Reviewing the standard
  - Task 4 - Maintaining PRA standard
  - Task 5 - Development of schedule
  - Task 6 - Identification of resources
  - Task 7 - Development of communication plan

Staff's Endorsement Plan

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- Staff to endorse the PRA standard with the development of a new regulatory guide (RG), similar to RG 1.200
- Staff to include an appendix on peer review process and PRA acceptability for LMP, risk-informed applications, and the uses of PRA during DC and COL stages
- Staff anticipates publishing the draft RG for public review and comment by Summer 2021 and the final RG by Summer 2022
- The staff's schedule is dependent on the JCNRM adhering to their proposed schedule of issuance of the standard

Gap Analysis of PRA Standard

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- Assess the technical applicability of ASME/ANS non-LWR PRA standard to PRAs developed for the DC and COL LMP applications to ensure fit-for-purpose standard requirements
- To be performed between March and September 2020 using the pre-final-editing version of the standard
- Results will be incorporated into the RG to convey the staff's position on the use of the non-LWR PRA standard for LMP

PRA Peer Review Guidance

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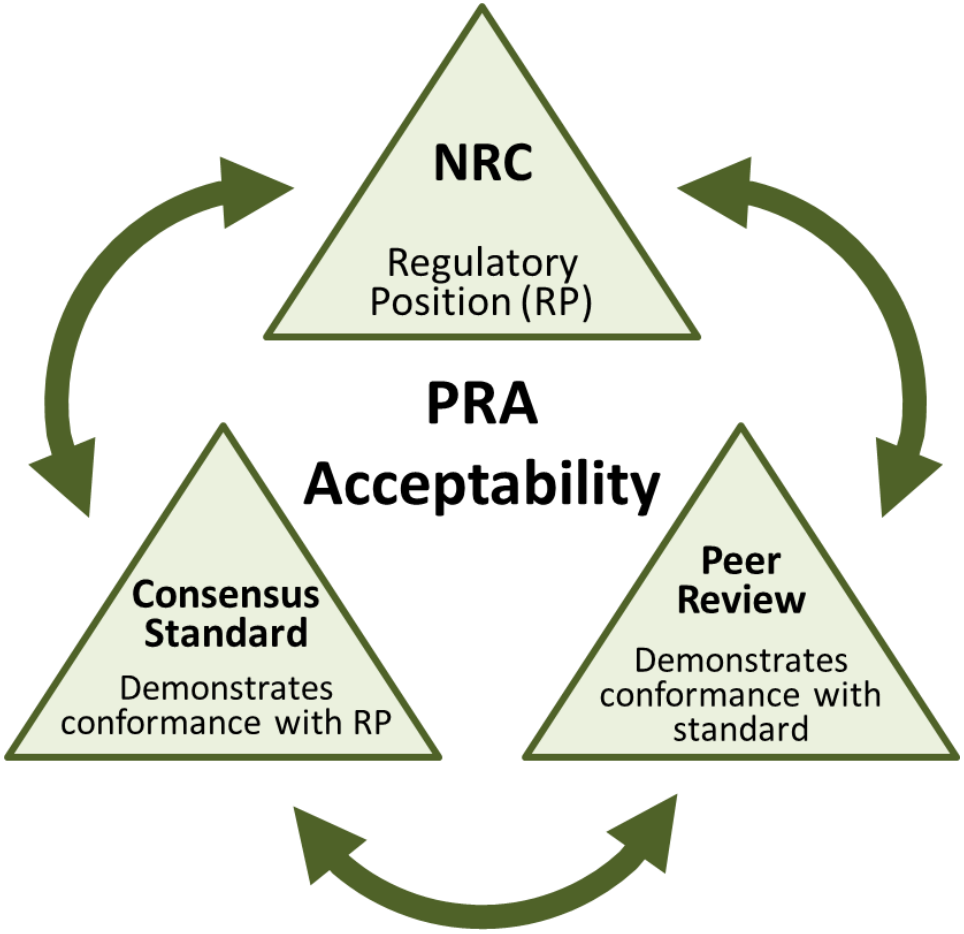

All three elements must work together

PRA Peer Review – NEI 17-07

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PRA Peer Review Guidance

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- An acceptable PRA peer review is one that is performed according to an established process and by qualified personnel, documents the results, and identifies both strengths and weaknesses of the PRA
- Staff to review the industry guidance for an acceptable peer review process, acceptable team qualifications, and acceptable documentation
- Staff to document its position in the RG describing the needed attributes and characteristics for an acceptable peer review process of a PRA for a non-LWR
- Is NEI going to develop the guidance? If so, when?

Update from Department of Energy on Non-LWR topics including Micro Reactors

- Tom Sowinski, DOE

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Break

Meeting/Webinar will begin shortly

Telephone Bridgeline: (888) 593-8429

Passcode: 6767863#

Update on Policy Issues

- Amy Cubbage and Bill Reckley, NRC

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Feburary 2020 UPDATE: Policy Issues – Non-Light Water Reactors

Updated Note/Status to specifically address activities related to non-LWRs	
License for Prototype Reactors	Action Complete Discussion incorporated (Enclosure 1) into NRC's "A Regulatory Review Roadmap for Non-Light Water Reactors" (ML17312B567)
Appropriate Source Term, Dose Calculations, and Siting	SECY paper on population-related siting considerations in concurrence. See ACRS letter dated October 7, 2019 (ML19277H031). Mechanistic source term report being prepared (INL). See also SNL Simplified Approach for Scoping Assessment of Non-LWR Source Terms.
Key Component and System Design Issues	See SECY-19-0117
Offsite Emergency Planning (EP) Requirements	Preparing to publish proposed rulemaking for public comment
Insurance and Liability	Issue discussed during November 2, 2017 stakeholder meeting, including presentation from American Nuclear Insurers. NRC preparing report to Congress with discussion planned at future stakeholder meeting.
Use of Probabilistic Risk Assessment in the Licensing Process	See SECY-19-0117 and activities related to non-LWR PRA Standard
Implementation of Defense in Depth (DiD) Philosophy for Advanced Reactors	See SECY-19-0117
Security and Safeguards Requirements for SMRs	Preparing proposed limited-scope rulemaking Wider discussions of safeguards/security to be pursued in future stakeholder meetings, microreactor discussions, and development of Part 53
Licensing Basis Event Selection	See SECY-19-0117
Fuel qualification, materials qualification	See technology specific activities (TRISO, metal fuel, MSRs). Preparing generic paper on fuel qualification.
Fuel cycle facilities (front end) • Increased enrichments	NEI provided a draft white paper on issues related to industry acquisition and use of higher assay low enriched uranium (HALEU) and fuel cycle facilities needed to support advanced reactors (ML17341A604) Updates on fuel cycle issues in future stakeholder meeting

Feburary 2020 UPDATE: Policy Issues – Non-Light Water Reactors

New Policy Issues - Warranting Immediate Actions?

Functional Containment Performance Criteria	Addressed by SECY-18-0096 and related SRM approving approach
Advanced Manufacturing Techniques	Staff including advanced reactors within broader action plan on advanced manufacturing
Microreactor issues	(Including some items previously listed as no ongoing activities such as manufacturing licenses, staffing (including remote/autonomous operation, and aircraft impact assessment)
Annual Fees	
Content of Applications	

Feburary 2020 UPDATE: Policy Issues – Non-Light Water Reactors

Policy Issues – Non-Light Water Reactors		
Issue as presented on web page & previous meetings – raised questions related to applicability for LWR SMRs and non-LWRs		Updated Note/Status to specifically address activities related to non-LWRs
Open Issues for non-LWRs but no current activities		
Annual Fees	Final Rule (May 2016) - Annual fees scalable based on licensed thermal power rating, applicable only to LWR SMRs	Staff initiating changes (rulemaking) that will be needed to widen scope to address non-LWRs Moved to immediate actions
Manufacturing License Requirements	Pending determination of possible interest from non-LWR developers	SECY-14-0095 states no interest in obtaining a manufacturing license from near-term SMR applicants was expressed. Questions raised by stakeholders regarding possible approaches for non-LWRs given desire to use manufacturing/modular approaches. Staff exploring in light of microreactor development.
Industrial Facilities Using Nuclear-Generated Process Heat	SECY-11-0112 (assess as necessary)	Expect that additional guidance will be needed to address non-LWRs and possible process heat applications (also tied to siting and EP issues)
Fuel cycle facilities (front in)	*Ongoing discussions*	*One issue (increased enrichments) has been moved to ongoing activities portion of the table*
Waste Issues (back end)	Ongoing discussions	Generally deferred to NRC mid-term IAP activities pending specific needs/timeline for technology or design-specific licensing and deployment.

Feburary 2020 UPDATE: Policy Issues – Non-Light Water Reactors

New Policy Issues - Warranting Longer-Term Actions?

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Periodic Advanced Reactor Stakeholder Meeting

Rulemaking for
ALTERNATIVE PHYSICAL SECURITY REQUIREMENT FOR ADVANCED REACTORS

Proposed Rule
(NRC Docket ID: NRC-2017-0227)

February 20, 2020

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Purpose

PURPOSE

- Discuss NRC staff's proposed rule approach
- Discuss staff's review and screening of the December 12, 2019 public meeting comments
- Discuss development of guidance
- Discuss next steps

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Performance Criteria

The staff identified the following three performance criteria that could be used to identify reactors that could make use of the alternative security requirements provided in this proposed rule:

1) The radiological consequences from a hypothetical, unmitigated event involving the loss of engineered systems for decay heat removal and possible breaches in physical structures surrounding the reactor, spent fuel, and other inventories of radioactive materials result in offsite doses below the reference values defined in 10 CFR 50.34(a)(1)(ii)(D) and 52.79(a)(1)(vi); or

2) The plant features necessary to mitigate an event and maintain offsite doses below the reference values in 10 CFR 50.34(a)(1)(ii)(D) and 52.79(a)(1)(vi) cannot reasonably be compromised by the Design Basis Threat for radiological sabotage; or

3) The plant features include inherent reactor characteristics combined with engineered safety and security features that allow for facility recovery and mitigation strategy implementation if a target set is compromised, destroyed, or rendered nonfunctional, such that offsite radiological consequences are maintained below the reference values defined in 10 CFR 50.34(a)(1)(ii)(D) and 52.79(a)(1)(vi)

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Current Rulemaking Approach

- Most likely, 10 CFR 73.55(a) would contain the three performance criteria with applicability and process language
  - Used to identify reactors that could make use of the alternatives provided in this proposed rule
- Most likely, a new paragraph under 10 CFR 73.55 would contain the proposed alternative security requirements
  - Staff reviewed and screened proposed alternatives identified during the December 12, 2019 public meeting
  - Staff identified several for potential inclusion in the proposed rule

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Proposed Alternatives

- Alternative to the requirement in 10 CFR 73.55(k)(5)(ii) that the number of armed responders shall not be less than ten
- Alternative to the requirement in 10 CFR 73.55(i) for the secondary alarm station to be onsite
- Alternative to the requirements in 10 CFR 73.55(e)(9) addressing the designation of vital areas
- Alternative to certain requirements in 10 CFR 73.55(e) addressing physical barriers

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Draft Guidance

- Staff plans to develop a draft Regulatory Guide that will:
  - endorse NEI guidance that NRC finds acceptable for use in meeting one or more of the three performance criteria
  - identify existing relevant NRC guidance or develop new guidance, if needed, for the alternatives

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Next Steps

- Next Public Meeting: April 2020 (tentative)
- Proposed Rule and Draft Guidance
  - Provide to the Commission in December 2020
  - Issue for public comment in early 2021
- Final Rule and Final Guidance
  - Provide to the Commission in May 2022
- Contact: Dennis Andrukat, Rulemaking Project Manager

  Email: Dennis.Andrukat@nrc.gov

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NON-LWR STAKEHOLDER MEETING

EMERGENCY PREPAREDNESS REQUIREMENTS FOR SMALL MODULAR REACTORS AND OTHER NEW TECHNOLOGIES

Proposed Rule
(NRC Docket ID: NRC-2015-0225)

February 20, 2020

EP Requirements for SMRs and ONTs Proposed Rule

Major provisions of the proposed rule include:

- Performance-based alternative to the current EP framework.
- Provision for a scalable determination of the plume exposure emergency EPZ size.
- Requirement to describe ingestion pathway planning capabilities.
- Provision for a hazard analysis of nearby facilities.

EP Requirements for SMRs and ONTs Proposed Rule

- NRC staff submitted the draft proposed rule package to the Commission on October 12, 2018, for review and approval (ADAMS Accession No. ML18134A086).
- The Commission issued SRM-SECY-18-0103 and approved the publication of the proposed rule in the Federal Register in December 2019 (Accession Number: ML19351C729).
- Commission comments were made publicly available in Enclosure 1 of the SRM.

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EP Requirements for SMRs and ONTs Proposed Rule

- The staff is addressing the Commission comments.
- The revised proposed rule package will be sent to the Commission Secretary (SECY) by March 6th.
- If the Commission approves the revised package, the proposed rule will be subsequently published in the Federal Register for a 75-day comment period.
- After a period of approximately 30-45 days, the staff will hold a public meeting during the comment period.

Advanced Reactor Program

Future Meeting Planning and Open Discussion

2020 Tentative Schedule for Periodic Stakeholder Meetings
April 2
May 7
June 18
August 6
September 24
November 5

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