Briefing on 10 CFR Part 53

Licensing and Regulations of Advanced Reactors

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Opening Remarks

Dan Dorman

Executive Director for Operations

Agenda

- **Andrea Veil**, Part 53 Vision
- **Mohamed Shams**, Transformative Attributes and Licensing Framework Comparison
- **Nanette Valliere**, Overview and Stakeholder Feedback
- **Michele Sampson**, Performance-Based Security and Emergency Preparedness Provisions
- **Ilka Berrios**, Rulemaking Process and Outreach

Part 53 Vision

Andrea Veil
Director, Office of Nuclear Reactor Regulation

We Are Committed

- Developing an innovative, predictable, and appropriately flexible framework
- Executing our Implementation Action Plans
- Providing equivalent level of safety with operational flexibility

Developing Part 53

- Leveraging risk-informed approaches
- Taking into consideration stakeholder requests for a more traditional, deterministic option
- Developing options on the appropriate treatment of fusion technologies

Mohamed Shams

Director, Division of Advanced Reactors and
Non-Power Production and Utilization Facilities

Establishes a Transformative Regulatory Framework

Part 53 builds on a **strong foundation** of Commission policies and decisions

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FEATURES

- Evolves use of **risk**
- Leverages **performance-based** requirements
- **Modern**izes licensing basis **change process**
- Includes **consequence-oriented** scalable requirements
- Enables operational **flexibility**
- Optimizes balance between flexibility and **predictability**

Part 53 evolves existing requirements into a modern, risk-informed, performance-based approach

Part 53

Frequency & Consequence-Oriented Requirements

Technology Inclusive

Explicit Consideration of Defense in Depth

QHOs in Rule

Expanded Use of Graded Equipment Performance Requirements

vs

Parts 50/52

Prescriptive Requirements

Optimized for Specific Technology

Augmented for Operating Experience

Conservative Assumptions & Analyses

QHOs Support Deterministic Requirements

Quantitative Health Objectives (QHOs) - Risk of:

- Immediate health effects within 1 mile of site < 5E-7/year
- Latent health effects within 10 miles of site <2E-6/year

Equivalent Safety

PART 53

Risk-informed, performance-based requirements scaled based on design features and safety margin

PARTS 50/52

Deterministic requirements define the design capabilities required to achieve the desired margin

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Both approaches are equally viable

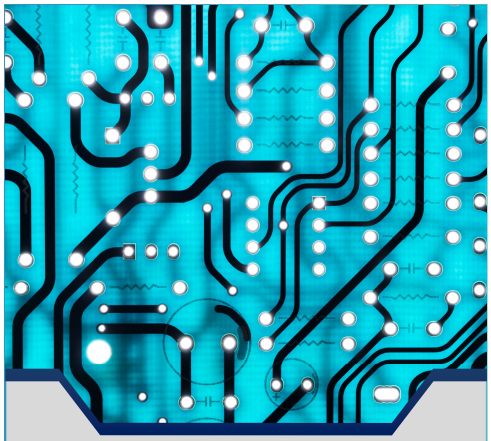
Nanette Valliere

Senior Project Manager, Division of Advanced Reactors and Non-Power Production and Utilization Facilities

Principles

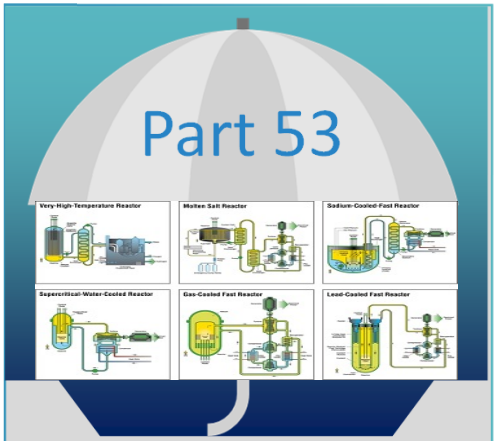
Demonstrating safety

Leveraging the best of the past and developing new tools for the future



Crediting technological advancements

Operational flexibilities with increased margins of safety



Prioritizing risk-informed and performance-based approaches

Accommodating various advanced reactor technologies

Foundation

- Relies on existing safety goals, safety performance expectations, and guidance
- Facilitates staff review efforts
- Leverages transformative methodology from Licensing Modernization Project

Licensing Modernization Project

Funded by DOE and developed by the U.S. nuclear industry.

Effective Coordination

5 years of effective coordination to support development of this novel regulatory framework.

Feedback

The staff is listening to all stakeholders and has made changes in response to stakeholder feedback.

- Eliminated the “two-tier” structure
- Provided a traditional, deterministic option
- Decoupled requirements for normal operation
- Formulated QA requirements to allow broader set of codes and standards
- Will provide a detailed explanation of the integrated intent of the rule
- Added requirements for safe, stable end state and subcritical conditions
- Offered a licensing pathway that includes prototype testing
- Expanded activities under a manufacturing license

Michele Sampson

Deputy Director, Division of Physical and Cyber Security Policy, Office of Nuclear Security and Incident Response

Creating a Technology-inclusive, Consequence-based Framework

- Providing an equivalent level of safety and security
- Developing effective guidance to support a performance-based regulatory framework
- Leveraging the Emergency Preparedness for Small Modular Reactors and Other New Technologies Rulemaking

Evaluating the Radiological Impact of a Security-initiated Event against the Consequence-based Criteria

- ✓ Inherent Design Features for Security
- ✓ Protection of Special Nuclear Material
- ✓ Scaled Access Authorization and Fitness for Duty

- ✓ Options for Traditional Physical Security Programs or New Performance-based Physical Security
- ✓ Traditional Access Authorization and Fitness for Duty Programs

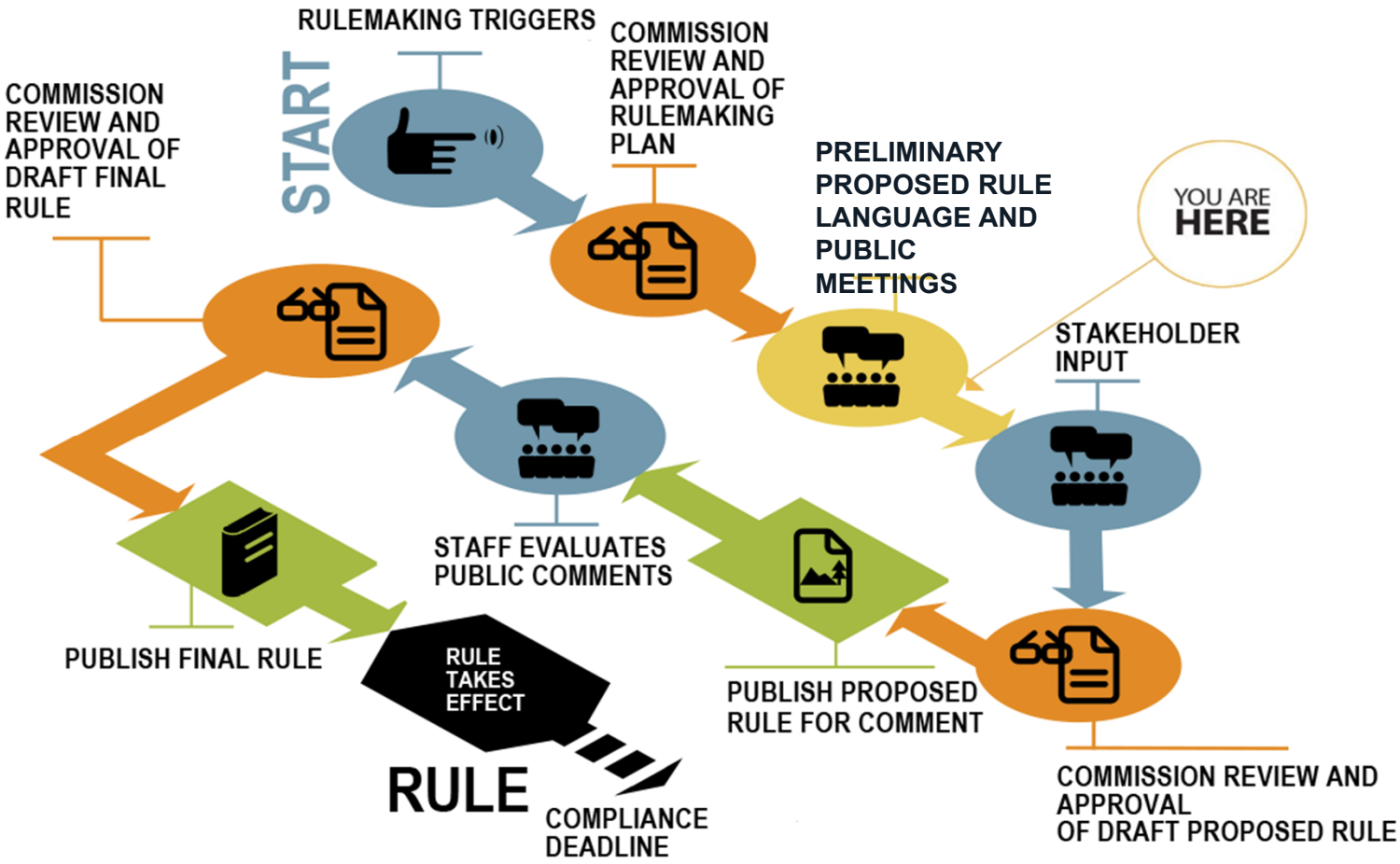
Protecting Digital Computer and Communication Systems and Networks

- Options for traditional cybersecurity regulation or new consequence-based program
- Protection of safety and security critical digital assets
- Defense in depth

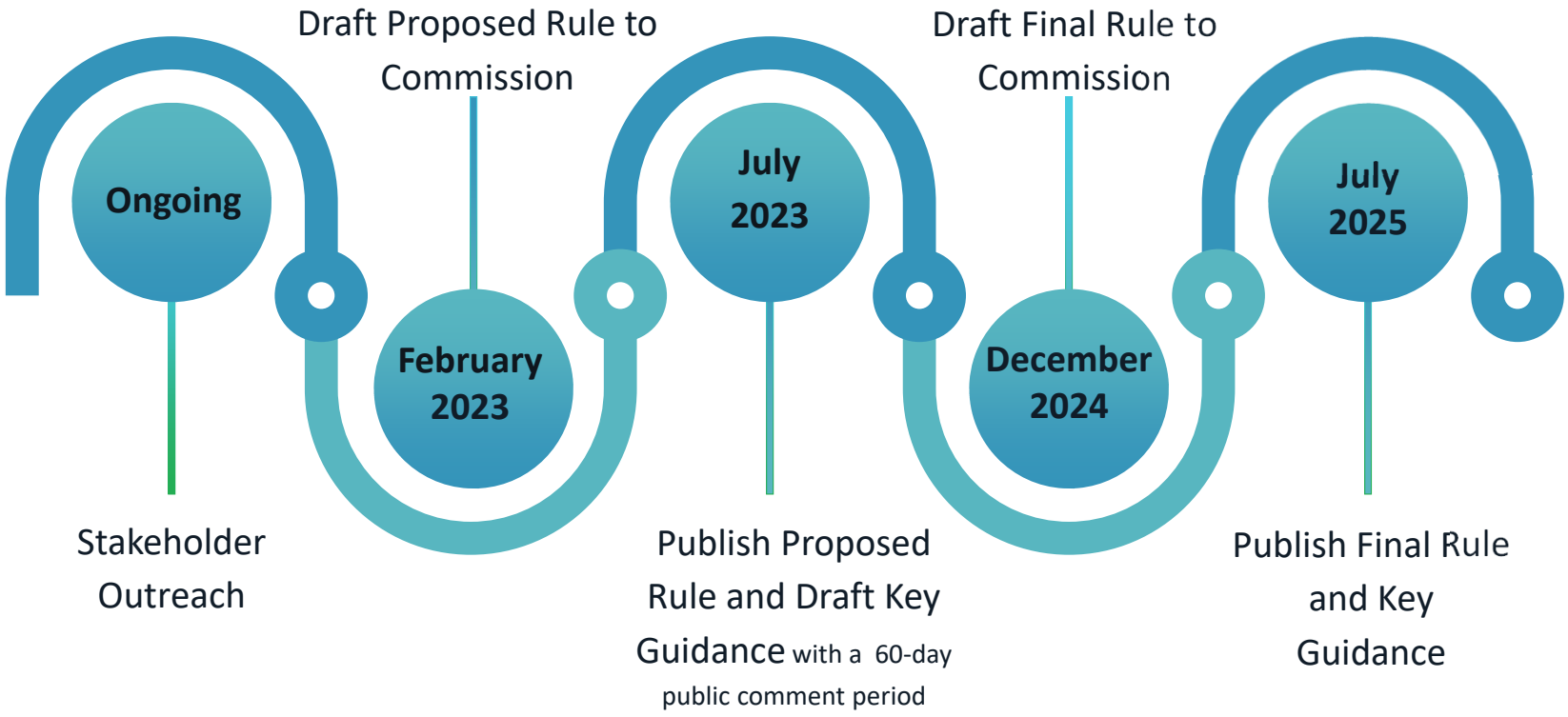
Ilka Berrios

Branch Chief, Reactor Rulemaking and Project Management Branch, Office of Nuclear Material Safety and Safeguards

Part 53 Rulemaking



Rulemaking Schedule



Rulemaking Stakeholder Engagement

Broadening engagement:

- Topic specific public and ACRS meetings
- Releasing initial and revised preliminary proposed rule language
- Further considering stakeholder comments

Public Meetings

- ✓ Over 80 hours spent in 12 public topical meetings
- ✓ Next meeting scheduled for January 6, 2022

- ✓ Over 80 hours spent in 13 meetings with ACRS
- ✓ Next meeting scheduled for December 16-17, 2021

- ✓ Over 173 public comment submittals have been received

Key Risks and Uncertainties

Addressing challenges:

- Alignment on rulemaking scope
- Engagement on key issues
- Timing of guidance development

Remaining risk:

- 60-day public comment period

The Staff is Committed to

- Continued frequent engagement with all stakeholders
- Revising preliminary rule language, as appropriate, based on stakeholder engagement

Closing Remarks

Dan Dorman

Executive Director for Operations

Acronyms

ACRS	Advisory Committee on Reactor Safeguards
CFR	Code of Federal Regulations
DOE	Department of Energy
QA	Quality assurance
QHO	Quantitative health objectives
NEIMA	Nuclear Energy Innovation and Modernization Act
NMSS	Office of Nuclear Material Safety and Safeguards
NRR	Office of Nuclear Reactor Regulation
NSIR	Office of Nuclear Security and Incident Response
PRA	Probabilistic risk assessment
US	United States of America