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

SESSION 1-10

MOVING FORWARD WITH RISK-INFORMED REGULATORY ACTIVITIES

(RMTF, NTTF – 1, 2.1, 2.3, RES LEVEL III)

Donnie Harrison

U.S. Nuclear Regulatory Commission

Donnie.Harrison@nrc.gov

301.415.2470

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LEARNING OBJECTIVES

- To summarize
  - Where the NRC and industry is heading with respect to the use of risk analysis
  - What is on the horizon for additional uses

Where We Are

- Rules
- Guidance
- Technical basis

Where We Are

- Rules
  - Most rules continue to be deterministic
  - Some additional requirements have been implemented based on risk information
    - Station blackout, ATWS, Maintenance
      - infrastructure in place and working
  - Several alternative rules have been implemented
    - 50.48(c) (fire protection)
      - Pilots complete, LARs being received and reviewed
    - 50.69 (special treatment requirements)
      - Being piloted
    - 50.61a (pressurized thermal shock)
      - Untested

Where We Are

- Guidance
  - Many risk-informed applications are supported by regulatory guidance
    - Regulatory Guide 1.174 (general guidance)
      - infrastructure in place and working
    - Regulatory Guide 1.175 (inservice inspection)
      - infrastructure in place and working
      - implemented at nearly every US plant
    - Regulatory Guide 1.177 (technical specifications)
      - infrastructure in place and working
      - expansion opportunities being pursued
    - Regulatory Guide 1.205 (fire protection)
      - infrastructure in place and working

Where We Are

- Guidance
  - Consensus standards
    - Regulatory Guide 1.200 (PRA technical adequacy)
      - Revision 2 in effect since April 1, 2010
    - ASME/ANS RA-Sa-2009
      - Infrastructure in place and being used
      - Obviates need for NRC detailed review of licensee's **base** PRA (focuses staff review on application and peer review findings)

Where We Are

- Technical information and guidance
  - Internal events PRA
    - Extensive
  - Fire PRA
    - Methods and guidance available
    - Beginning to use
  - External hazards PRA
    - Not extensive

- Technical expertise
  - Internal events PRA
    - Extensive
  - Fire PRA – NFPA 805
    - 50% of plants will have fire PRA as a result of NFPA 805 transition
    - Others developing fire PRA
  - External hazards PRA
    - Fukushima NTTF 2.1
      - Seismic PRA
      - Flooding PRA

Moving Forward with Risk-Informed Initiatives

Where We're Going

- Commission Risk-Related Task Forces
  - A Proposed Risk Management Regulatory Framework (NUREG-2150, Commissioner Apostolakis Risk Management Task Force) and Near-Term Task Force (NTTF) Recommendation 1
  - Reassessment of External Hazards (NTTF Recommendations 2.1 and 2.3) and Station Blackout (SBO)
- New Full-Scope Level III PRA study

Risk Management Task Force (RMTF)

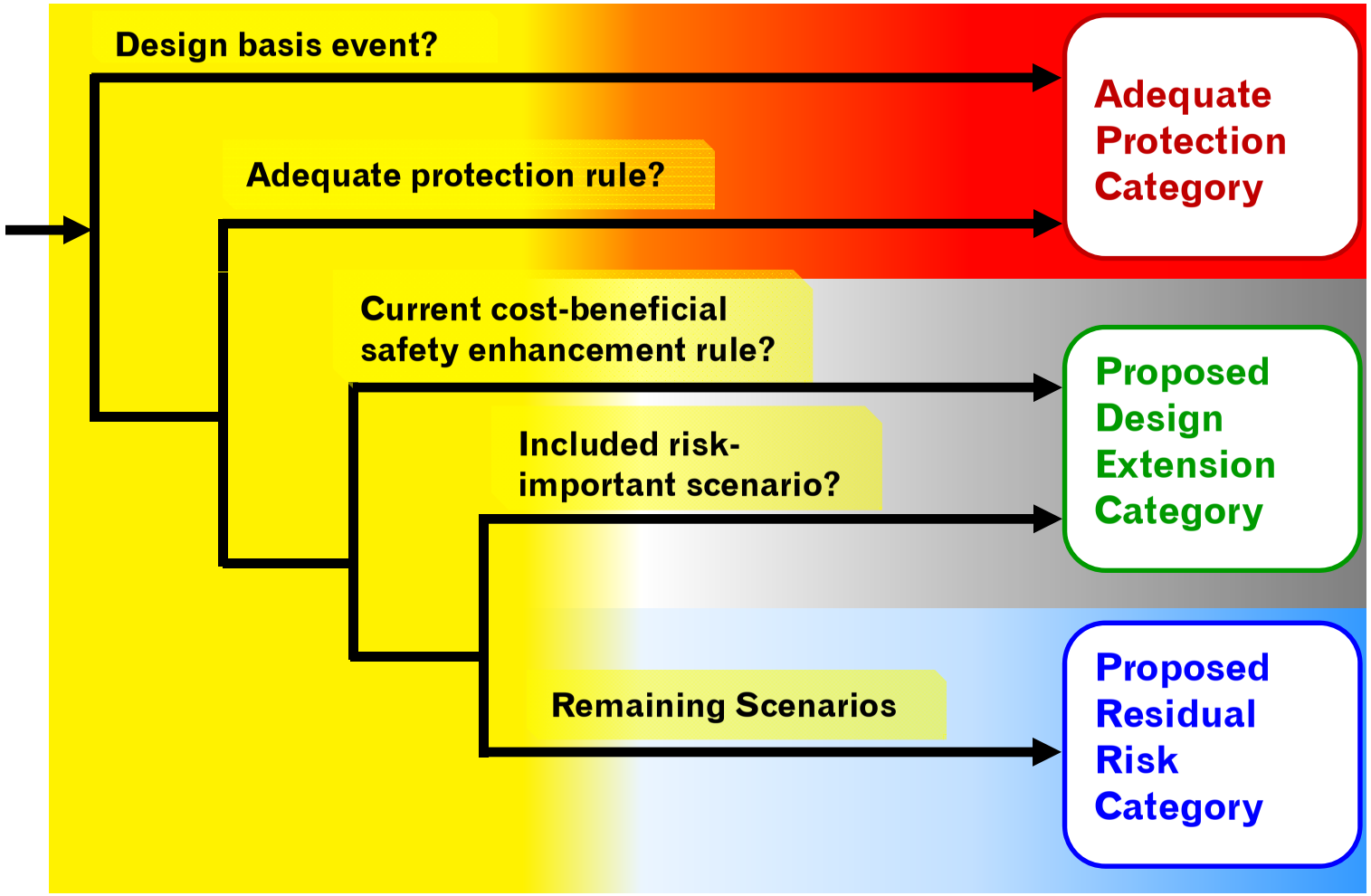
RMTF Approach

- Provide a vision for a regulatory system 10-15 years in the future
- The approach should build on the experience of the last 20 years and should be evolutionary rather than revolutionary
- The need for a new regulatory approach was also recognized by the Fukushima Near Term Task Force Recommendation 1:

"*Establish a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations.*"

A Proposed Risk Management Regulatory Framework

A Proposed Risk Management Regulatory Framework



Reassessment of External Hazards and SBO

Requests for Information

- The NRC requested information on:
  - the adequacy of facility design bases with respect to seismic and flooding hazards
  - whether facility configurations, as confirmed by seismic and flooding walkdowns, are in compliance with current facility design bases
  - current communications system power supplies and their availability during a prolonged SBO event
  - the required staffing necessary to respond to a multiunit, prolonged SBO event

Schedule Overview – 50.54(f) Letter Seismic/Flooding Reevaluations

Milestone	Operating Reactors and Construction Permit Holders
Guidance Issued	November 30, 2012
Initial Response	January 30, 2013
Licensee Seismic Hazard Evaluations Due	September 9, 2013 (CEUS) / March 9, 2015 (WUS)
Licensee Flooding Hazard Evaluations Due	March 9, 2013 – March 9, 2015 (based on prioritization)
Future Steps	Pending NRC evaluation and prioritization, with completion of evaluations for all facilities between October 2016 and April 2019

Schedule Overview – 50.54(f) Letter Seismic/Flooding Walkdowns

Milestone	Operating Reactors
Guidance Issued or Endorsed	May 31, 2012
Licensees Provide Results of Walkdowns	November 27, 2012

Full-Scope Level 3 PRA

Site Level 3 PRA – Background

- Commission paper (SECY-11-0089), dated 7/7/11, provided three options for undertaking Level 3 PRA activities[1]
  1. Maintain status quo
  2. Focused research to address gaps before proceeding
  3. Conduct a full-scope, comprehensive site Level-3 PRA
- In a staff requirements memorandum (SRM) dated 9/21/2011 the Commission approved a modified version of Option 3
  - Schedule extended from 3 to 4 years

[1] *Level 3 PRA includes the onset of core damage, the release of radioactive material to the environment, and offsite radiological consequences*.

Site Level 3 PRA – Objectives

- Develop a Level 3 PRA that (1) reflects technical advances since the last NRC-sponsored Level 3 PRAs were completed over 20 years ago, and (2) addresses scope considerations that were not previously considered
- Extract new insights to enhance regulatory decisionmaking and to help focus limited agency resources on issues most directly related to the agency's mission to protect public health and safety
- Enhance PRA capability, expertise, and documentation
- Demonstrate technical feasibility and evaluate the realistic cost of developing new Level 3 PRAs

Site Level 3 PRA – Approach

- Scope includes site radiological sources (all reactor cores, spent fuel pools, and dry storage casks on site), all internal and external initiating event hazards, and all modes of operation
  - Excludes radiological sources involving fresh nuclear fuel and radiological waste, and initiating events involving malevolent acts
- In general, the Level 3 PRA study will be based on current "state of practice"
- Additional advancements in PRA technology will be required in some areas (e.g., multi-unit risk and non-reactor-core radiological sources), but the desire for realism will be balanced against resource and schedule limitations
- The study will be for a single site; therefore, it will not necessarily provide insights applicable to all sites and all technical issues.

Where We're Going in Other Areas

- Rules
  - Pilot implementation of 50.69
  - Pilot implementation of risk managed technical specifications (Initiative 4B)
- Guidance
  - Focus on applications
  - Continue standards development
- Technical Basis
  - Continue "basic" research
  - Develop new guidance documents
  - Build staff and industry expertise
- Risk Metrics (ROP & applications) for new reactors
- Better tools for SDP

SUMMARY

- Progress has been made
- Risk analysis methods offer many additional opportunities to improve decision making
- To accomplish these, a long-term commitment is needed:
  - To build and maintain the models
  - To train staff to use them
  - To use them

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The End

Questions & Answers…..