

**October 25, 2011**

ATTACHED ARE SLIDES/HANDOUTS  
WHICH WERE PRESENTED AT THE  
10/05/11 "PUBLIC MEETING TO PERFORM TABLETOP  
EXERCISES TO COMPLETE LICENSING  
ISSUES AND TO DISCUSS THE REACTOR OVERSIGHT  
PROCESS FOR NEW REACTOR"

# ROP Tabletop Exercises for New Reactor Risk

October 5, 2011

Ronald Frahm, NRR

Donald Dube, NRO

# Commission SRM, March 2, 2011

- Commission approved a hybrid of Options 1 and 2 from SECY-10-0121, to continue existing risk-informed framework pending a series of tabletop exercises that test existing guidance
- Commission “reaffirms” existing safety goals, safety performance expectations, subsidiary risk goals and associated risk guidance, key principles (e.g., RG 1.174), and quantitative metrics
- Commission expects advanced technologies in new reactors will result in enhanced margins of safety; as a minimum, new reactors will have the same degree of protection of the public and environment as current generation reactors
- New reactors with these enhanced margins and safety features should have greater operational flexibility than current reactors

# ROP Tabletop Objectives

- Test various realistic performance deficiencies, events, etc that are or will be relevant to the licensing basis for new reactors
- ROP-related tabletops would include the primary risk-informed aspects of the ROP:
  - the SDP used for potentially risk-significant issues within the reactor safety cornerstones
  - the Mitigating Systems Performance Index (MSPI)
  - Management Directive 8.3 used to determine our level of response to events
- Confirm the adequacy of these tools for regulatory decision-making or identify areas for improvement

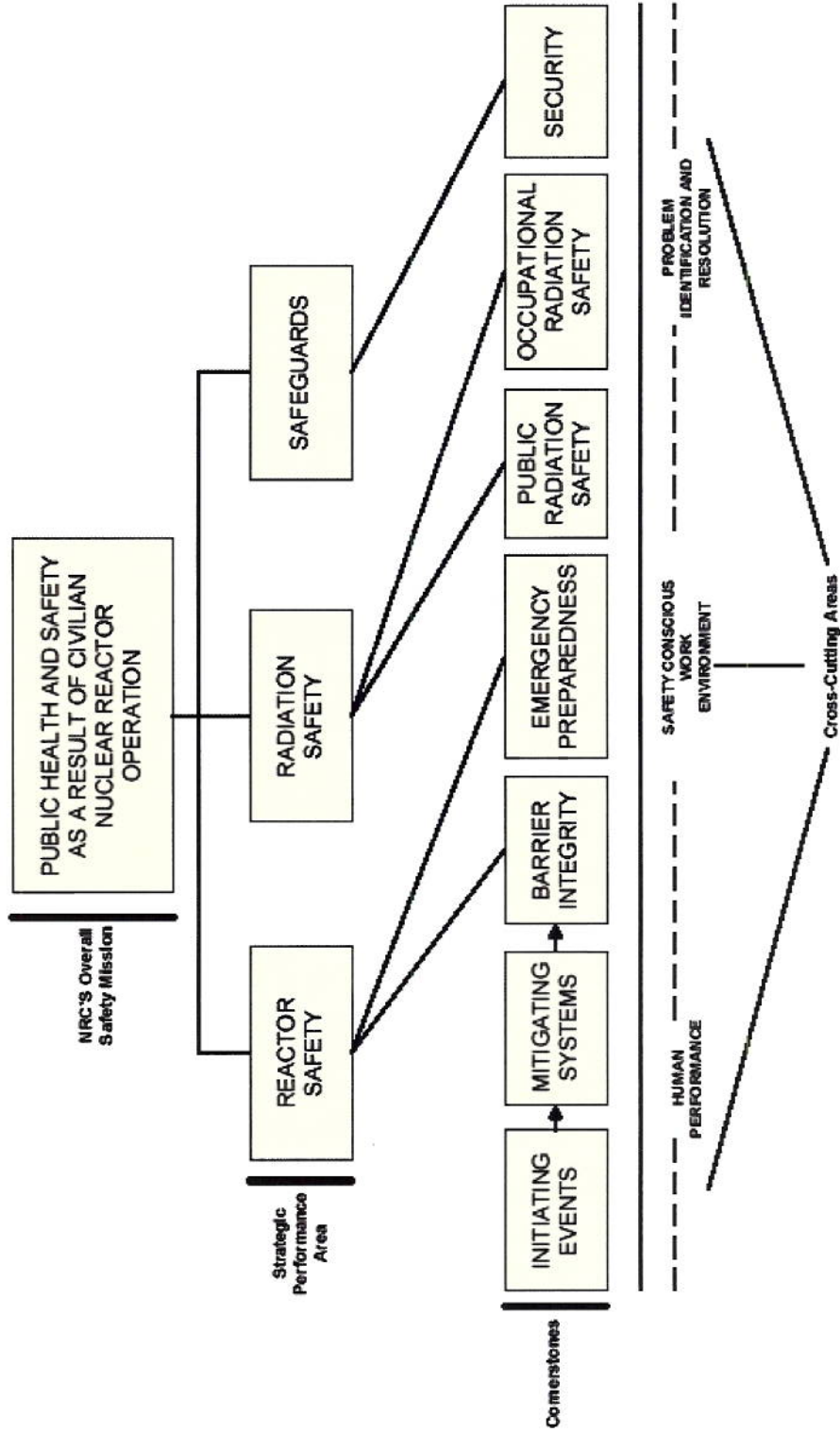
# ROP Tabletop Approach

- Identify a broad cross-section of well-vetted cases, developed from actual greater-than-green SDP findings, MSPI data and MD 8.3 applications from the current fleet of reactors
- Apply similar situations to the new reactor designs, filling in any gaps with realistic hypothetical situations and reasonable assumptions
- Compare the risk values/results from the new reactor scenarios to those derived from the current fleet to assess the adequacy of the current regulatory tools

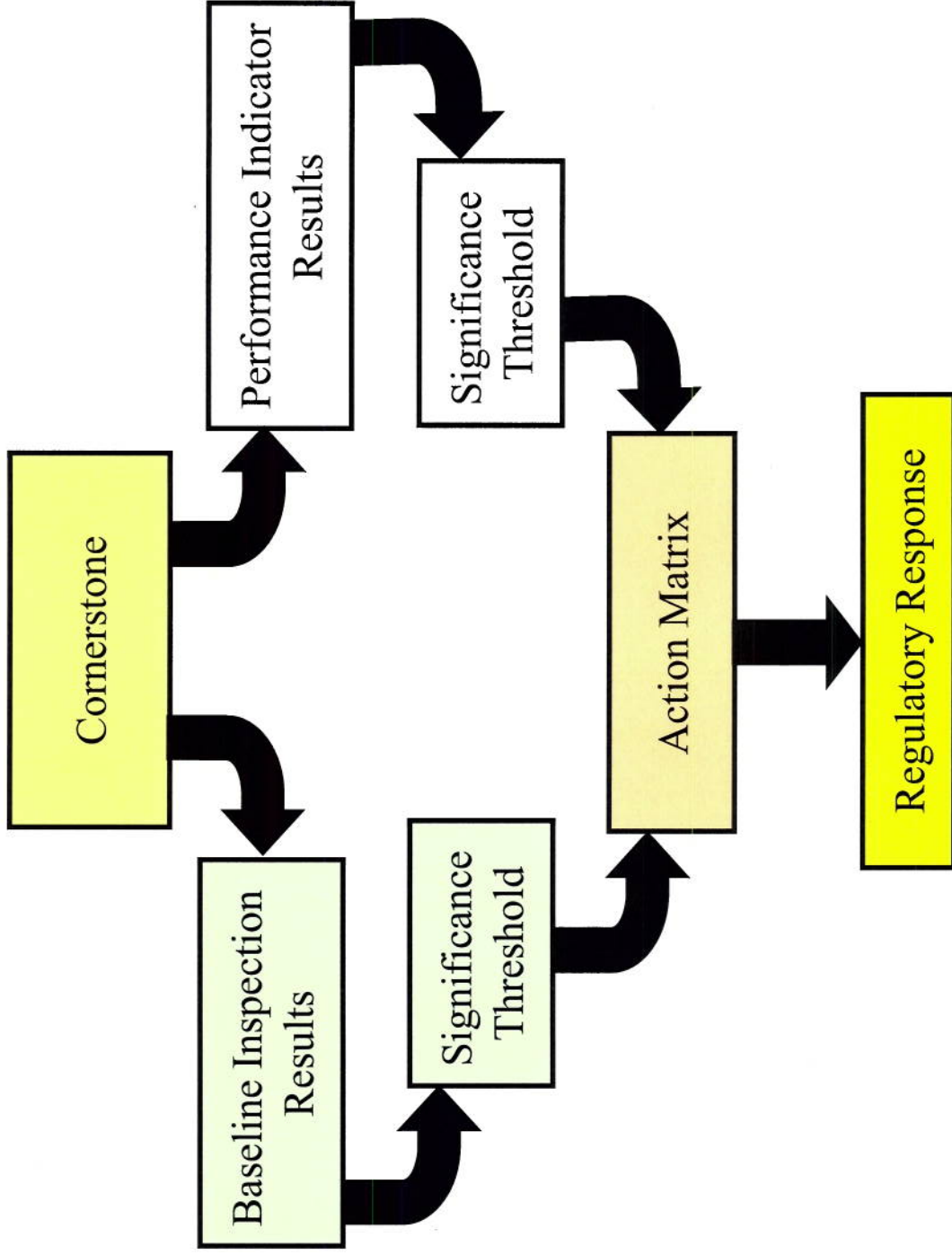
# Background: Objectives of the ROP

- Improve the Objectivity of the Oversight Processes - Subjective Decision-making is Minimized
- Improve the Scrutability of NRC Actions – Regulatory Response and NRC Actions Have a Clear Tie to Licensee Performance
- Risk-inform the Processes - NRC and Licensee Resources are Focused on Performance Deficiencies With the Greatest Impact on Safe Plant Operation

# REGULATORY FRAMEWORK



# REACTOR OVERSIGHT PROCESS



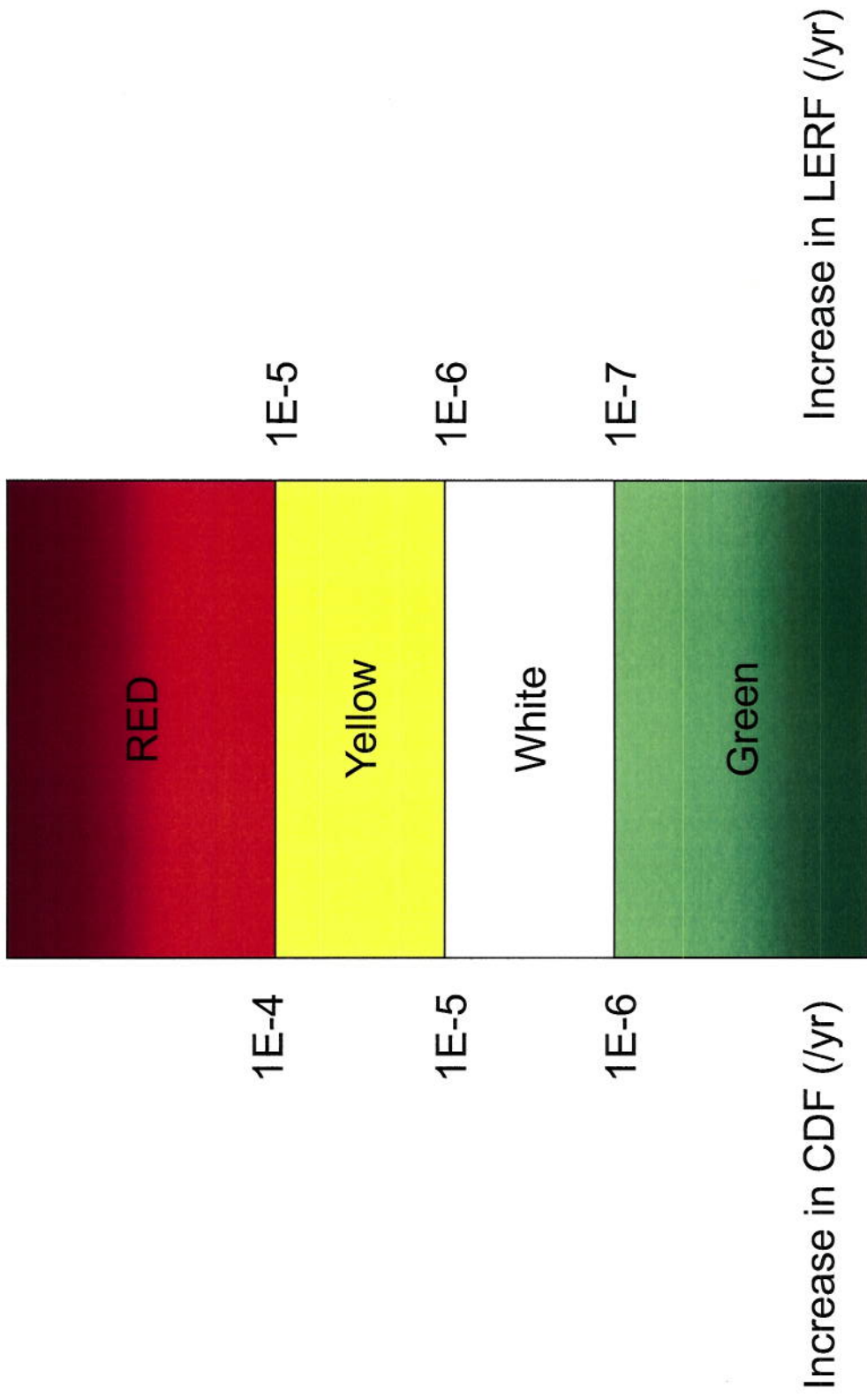


# Significance Determination Process (SDP)

- Implementation Guidance in IMC 0609, “Significance Determination Process,” and IMC 0609, Appendix A, “Determining the Significance of Reactor Inspection Findings for At-Power Situations”
- Appendix A and a few others use risk-insights to inform regulatory response. Several additional SDPs are more subjective to determine an equivalent regulatory response (i.e., emergency preparedness, radiation safety, etc)
- Risk thresholds are a function of changes in core damage frequency (CDF) and large early release frequency (LERF) against a plant’s baseline risk

# SDP

Inspection findings (licensee performance deficiencies) are evaluated for risk significance

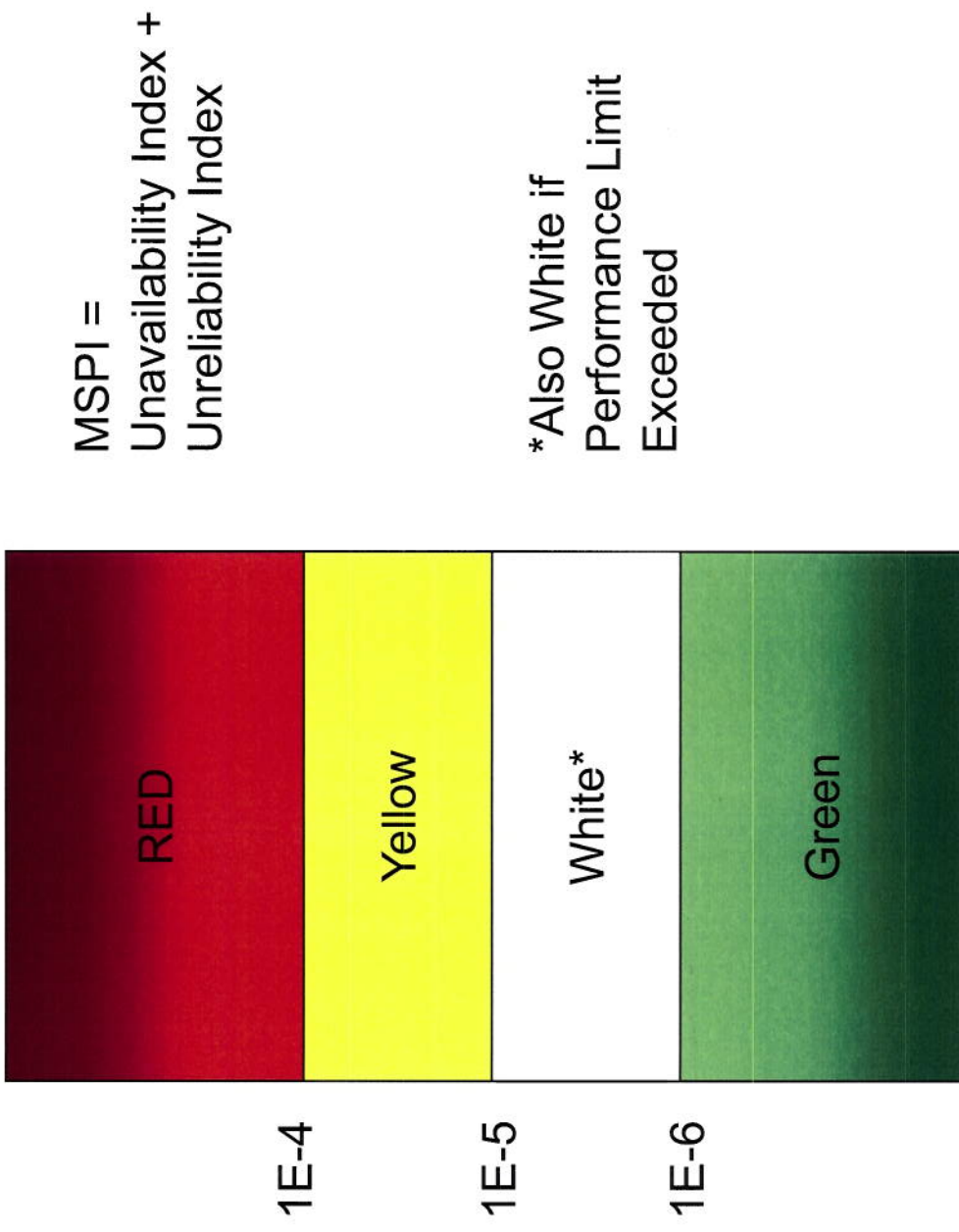


# Mitigating System Performance Index (MSPI)

- Guidance in IMC 0608, “Performance Indicator Program,” IMC 0308, Attachment 1, “Technical Basis for Performance Indicators,” and NEI 99-02, “Regulatory Assessment Performance Indicator Guideline”
- Covers five systems important to safety
- Tracks the unavailability of monitored trains and the unreliability of monitored components
- Reflects the deviation of a specific unit’s performance from an industry baseline, converted to a simplified change in core damage frequency (CDF)
- A performance limit is also used for determining degraded performance

# MSPI

MSPI monitors the performance of selected systems based on their ability to perform risk-significant functions



## MD 8.3 Event Response

- Implementation guidance in MD 8.3, “NRC Incident Investigation Program,” and IMC 0309, “Reactive Inspection Decision Basis for Reactors”
- Reactive inspection thresholds are a function of conditional core damage probability (CCDP) and conditional large early release probability (CLERP)
- Overlap of options provides flexibility based on uncertainty and deterministic insights
- Additional deterministic criteria are reviewed and documented as basis for staff decision

# MD 8.3

Operational events and degraded conditions are evaluated for risk significance to determine appropriate reactive inspection

Estimated Conditional Core Damage Probability (CCDP)			
CCDP < 1E-6	1E-6 - 1E-5	1E-5 - 1E-4	1E-4 - 1E-3
CCDP > 1E-3			
No additional inspection			
Special Inspection			
		AIT	
		IIT	

Table 1: CCDP vs Event Response

# MD 8.3

Operational events and degraded conditions are evaluated for risk significance to determine appropriate reactive inspection

Estimated Conditional Large Early Release Probability (CLERP)			
CLERP <1E-7	1E-7 - 1E-6	1E-6 - 1E-5	1E-5 - 1E-4
CLERP >1E-4			
No additional inspection			
Special Inspection			
		AIT	
		IIT	

Table 2: CLERP vs. Event Investigative Response

# Risk-Informed Aspects of the ROP

	SDP	MSPI	MD 8.3
1E-3	Red	Red	IIT
1E-4	Yellow	Yellow	AIT
1E-5	White	White	SI
1E-6	Green	Green	Baseline
<1E-7			



# Conclusions/Next Steps

- What are our preliminary conclusions based on the ROP tabletops?
- What key points have we learned that should be considered in developing our conclusions and recommendations?
- Have we run a sufficient sampling of case studies to adequately test the ROP risk-informed processes? If not, what are the gaps?
- Do we need a follow up meeting/workshop to tie up any loose ends? October 26 had been proposed, if needed.