Reactor Oversight Process

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Introduction

- The USNRC modified its reactor inspection program in the late 1990's
  - In response to substantive external concerns
  - In a manner that
    - Emphasizes quantitative analyses (when possible)
    - Is publicly reviewed and discussed (and adapted, as needed)
    - Has successfully matured.
- Risk analyses provide key information, used to
  - Define what is routinely inspected and how often
  - Assess performance of certain key equipment
  - Determine the significance of inspection findings.
- Periodic public reviews
  - Provide information on individual licensee performance
  - Support decisions on
    - Incremental inspection activities
    - Related regulatory actions.

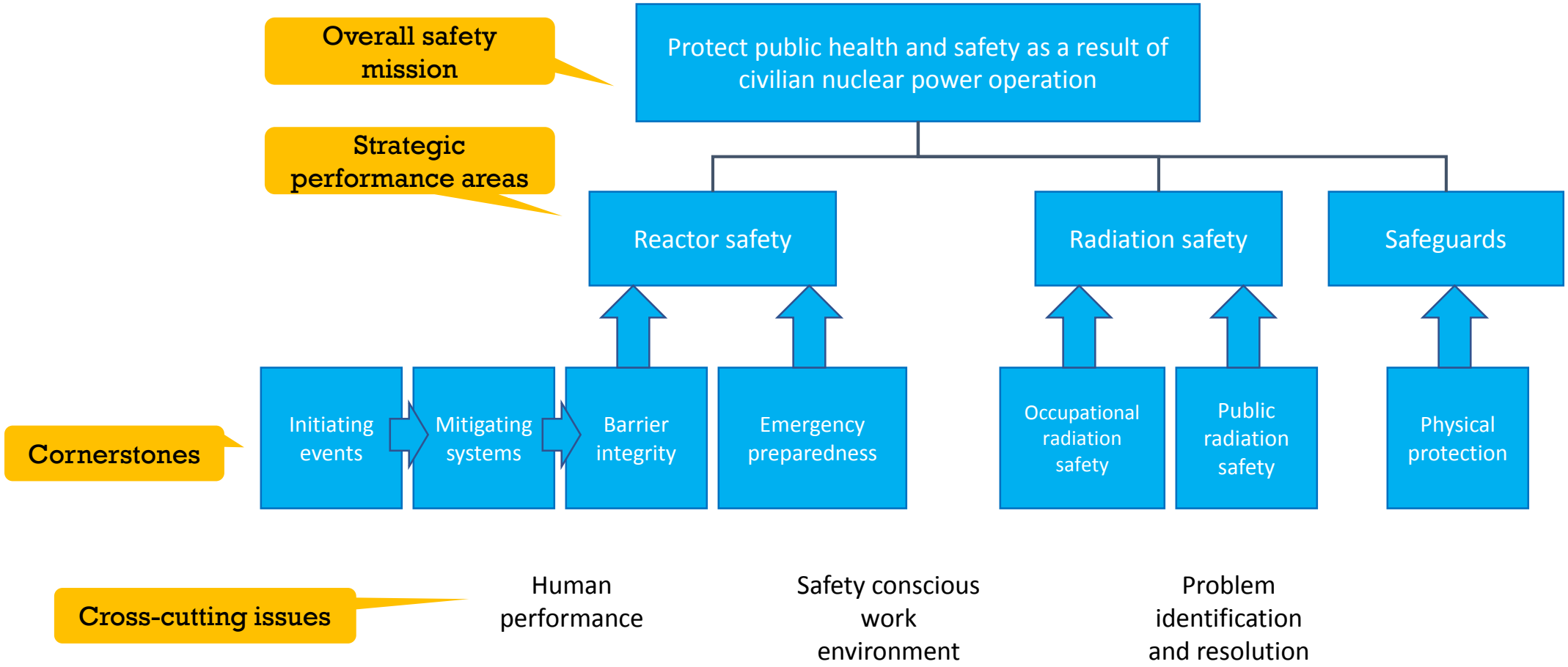
Some Important History

- Reengineering of USNRC's inspection process
  - In the late 1990's and early 2000's
    - NRC and the US nuclear industry had developed into a generally stable industry
    - Expanded use of probabilistic risk analysis was being encouraged
    - Concerns were being raised about the NRC inspection and enforcement processes
      - at times not clearly focused on the most safety important issues,
      - consisted of redundant actions and outputs, and
      - were overly subjective with NRC action taken in a manner that was at times neither scrutable nor predictable.
    - NRC undertook a major reengineering effort
    - New "reactor oversight process" was the result

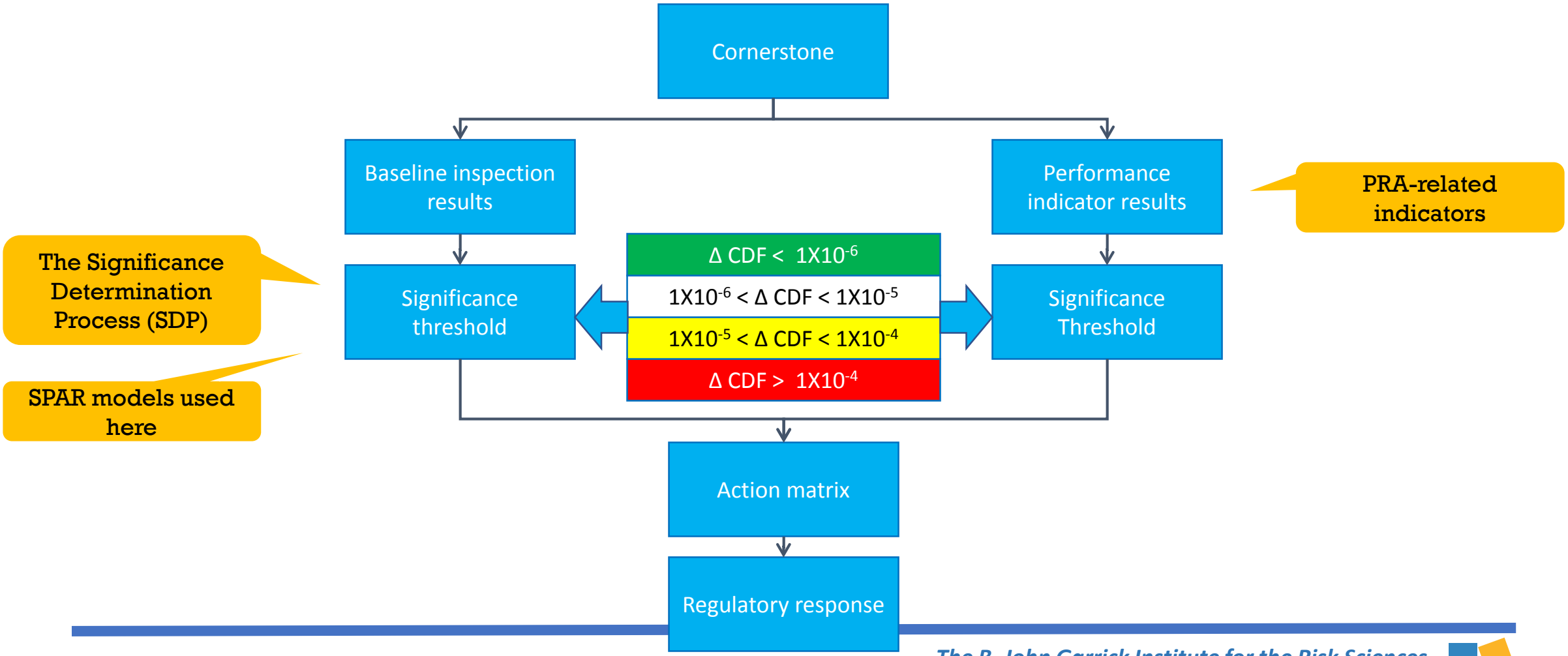
Key ROP Elements

- The Reactor Oversight Process uses a top-down regulatory framework to define how licensee performance will be assessed
- Assesses each licensee's performance using
  - quantitative and
  - qualitative information
- Uses the "action matrix" to determine regulatory actions
- Implements actions - making changes to the future oversight of each licensee

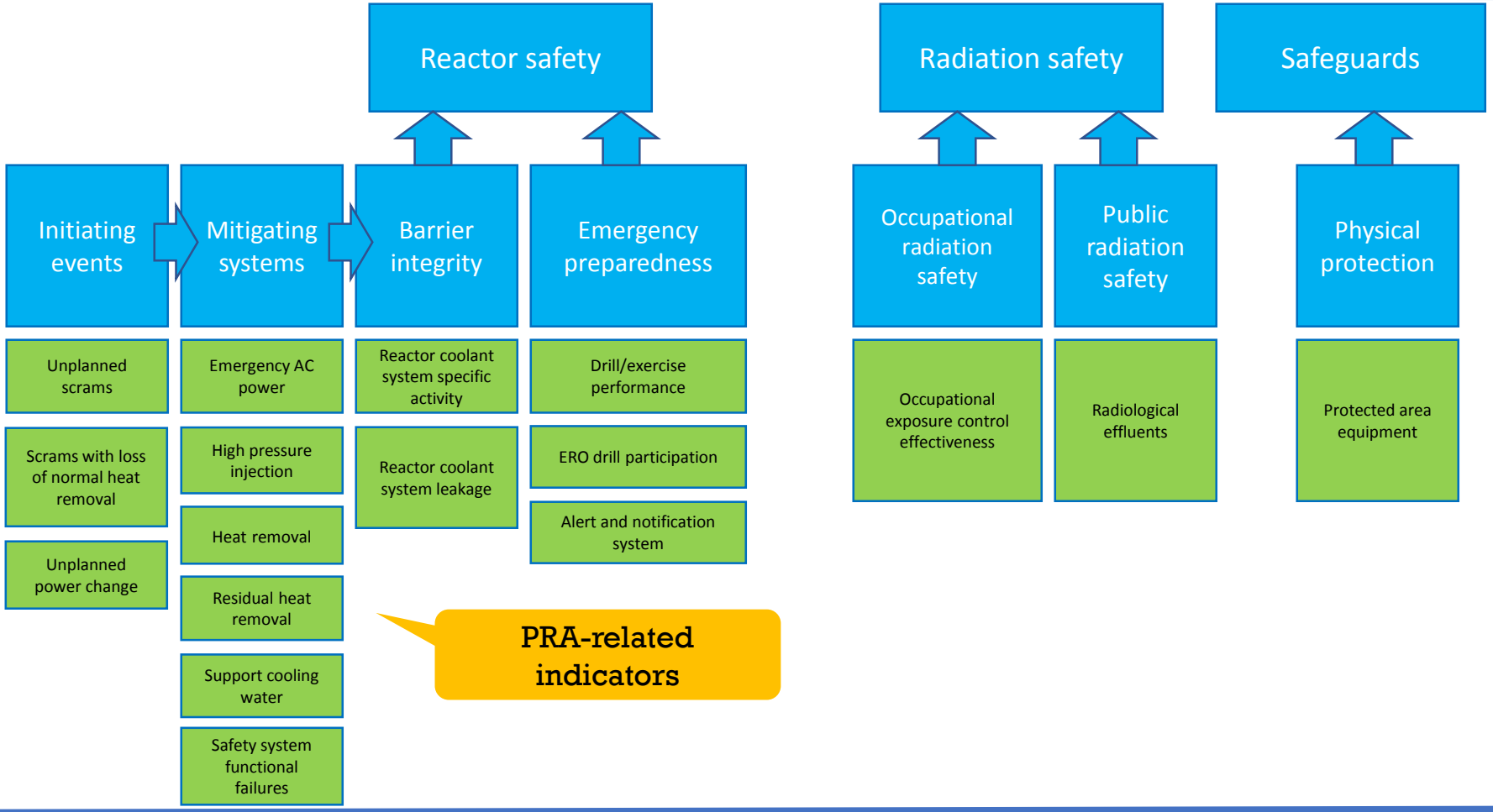
Top-Down Regulatory Framework



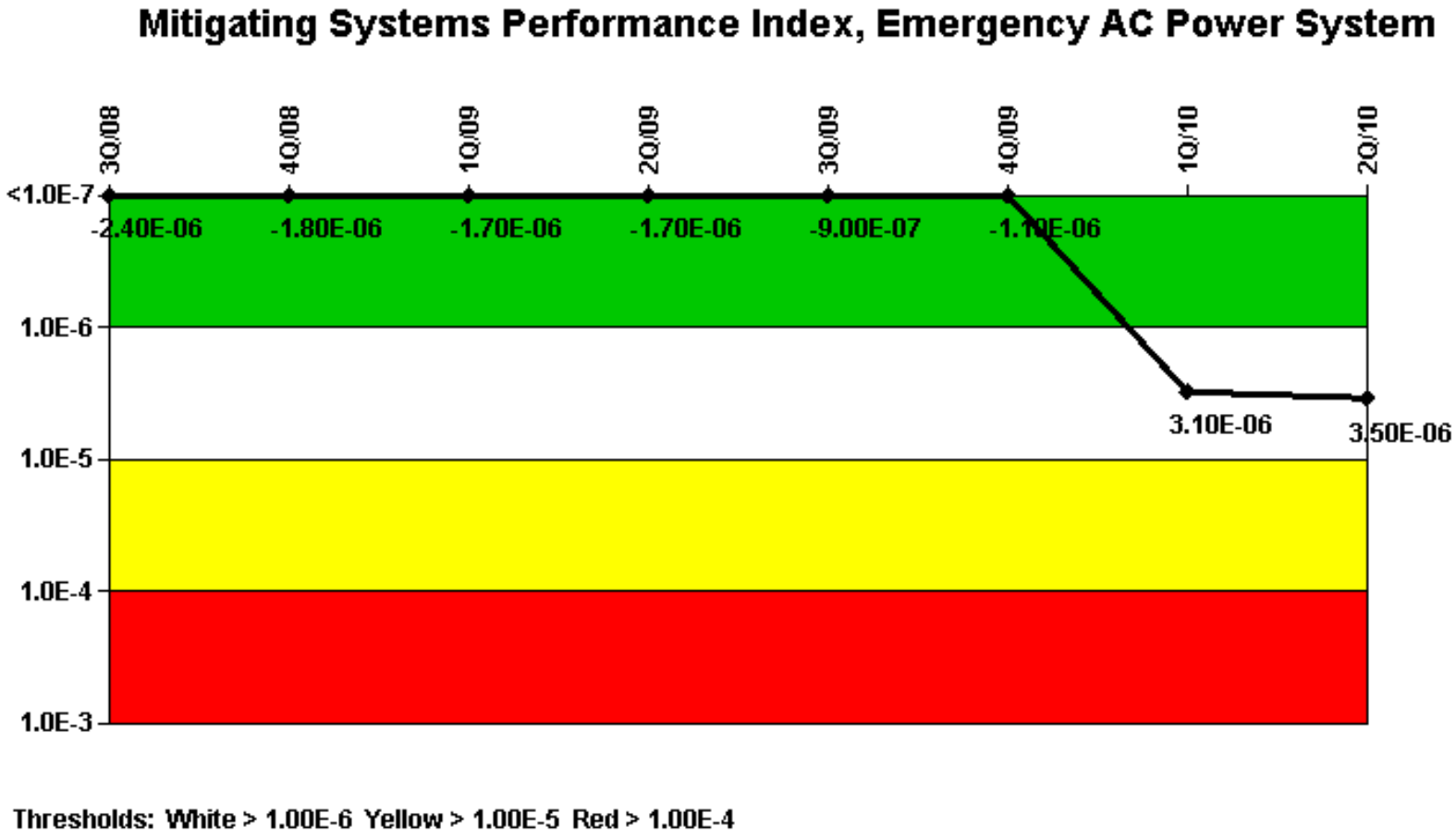
Reviewing Inspection Results & Performance Indicators and Defining Significance



Performance Indicators



Performance Indicators



Assessing the Importance of Inspection Findings – the Significance Determination Process (SDP)

❑Objectives

- To characterize the safety or security significance of inspection findings, using best available risk insights as appropriate
- To provide all stakeholders an objective and common framework for communicating the potential safety or security significance of inspection findings
- To provide a basis for timely assessment and/or enforcement actions associated with inspection findings

Significance Determination Process

- Process
  - Develop inspection findings
  - Characterize significance (initial staff assessment) [using SPAR models]
  - Obtain licensee perspectives on initial characterization
  - Finalize staff's significance determination [using SPAR models]
  - Issue final determination letter
  - Provide licensee appeal opportunity

Risk Analyses and SPAR Models

- Available licensee PRAs in late 1990's had important shortcomings
  - Multiple risk approaches and software tools
    - PRA standards were just beginning to appear
  - Considerable licensee-to-licensee variability
  - Not required to be submitted to USNRC

Risk Analyses and SPAR Models

- Using risk analyses to assessing significance of inspection findings introduced important constraints
  - "user-friendly" models
  - Consistent modeling approaches
  - Additional staff
    - Capabilities (senior reactor analysts)
    - Training

Risk Analyses and SPAR Models

- SPAR models have evolved significantly
  - Initial development pre-dated ROP changes
    - ”Simplified” models for assessing implications of generic (not plant-specific) issues
  - With ROP change
    - SPAR models offered better alternative
  - Model evolution continues
    - External hazards (found to be important)
    - Shutdown accidents
    - Accident consequences (Level 2 PRA)
  - Comparisons now made to improve consistency with
    - Plant-specific PRAs
    - Standards

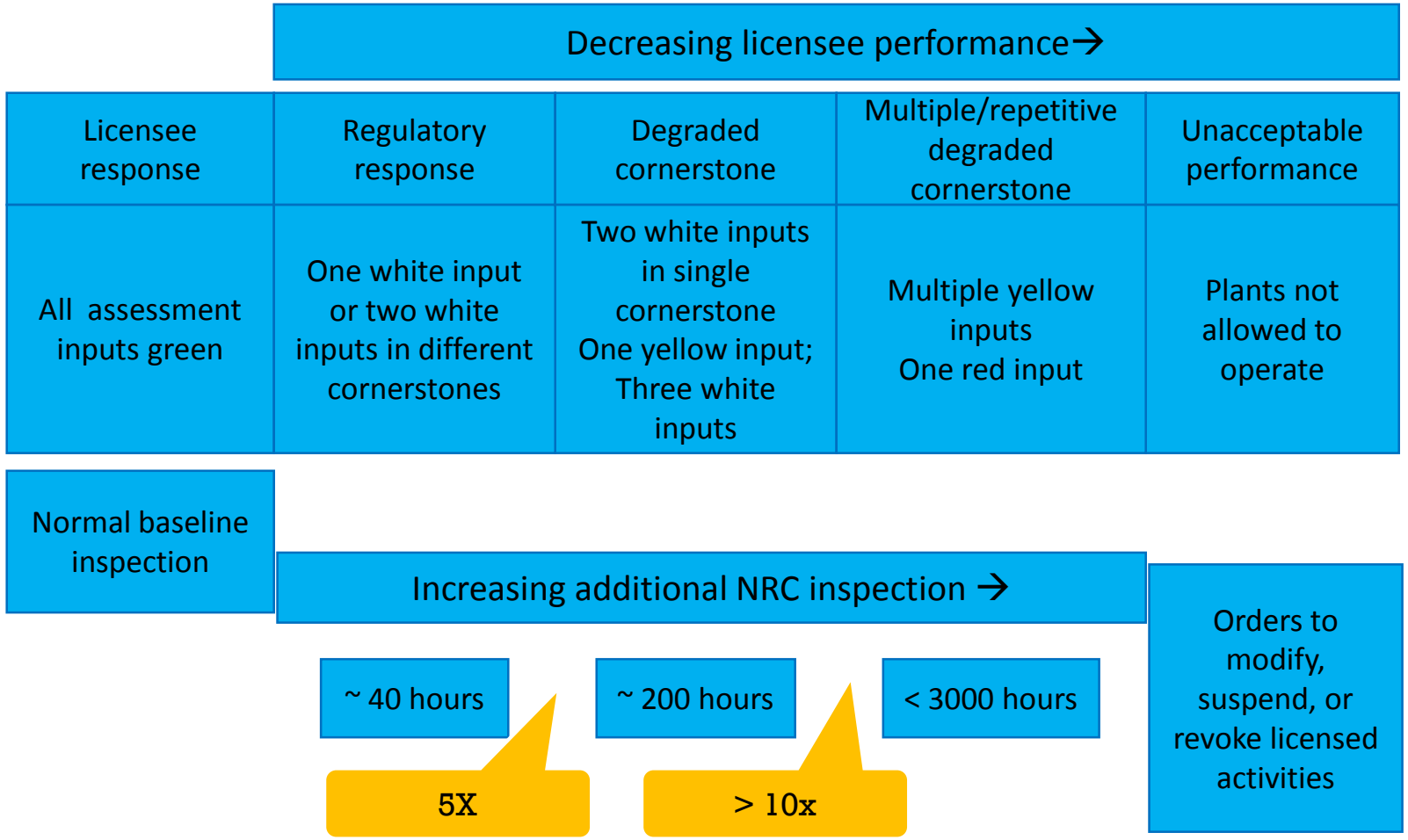
Integrating Information and Defining Actions

Exhibit 5 - ACTION MATRIX

		Licensee Response Column	Regulatory Response Column	Degraded Cornerstone Column	Multiple/ Repetitive Degraded Cornerstone Column	Unacceptable Performance Column	IMC 0350 Process
RESULTS		All Assessment Inputs (Performance Indicators (PIs) and Inspection Findings) Green; Cornerstone Objectives Fully Met	One or Two White Inputs (in different cornerstones) in a Strategic Performance Area; Cornerstone Objectives Fully Met	One Degraded Cornerstone (2 White Inputs or 1 Yellow Input) or any 3 White Inputs in a Strategic Performance Area; Cornerstone Objectives Met with Moderate Degradation in Safety Performance	Repetitive Degraded Cornerstone, Multiple Degraded Cornerstones, Multiple Yellow Inputs, or 1 Red Input; Cornerstone Objectives Met with Longstanding Issues or Significant Degradation in Safety Performance	Overall Unacceptable Performance; Plants Not Permitted to Operate Within this Band, Unacceptable Margin to Safety	Plants in a shutdown condition with performance problems placed under the IMC 0350 process
RESPONSE	Regulatory Performance Meeting	None	Branch Chief (BC) or Division Director (DD) Meet with Licensee	DD or Regional Administrator (RA) Meet with Licensee	RA (or EDO) Meet with Senior Licensee Management	Commission meeting with Senior Licensee Management	RA (or EDO) Meet with Senior Licensee Management
	Licensee Action	Licensee Corrective Action	Licensee root cause evaluation and corrective action with NRC Oversight	Licensee cumulative root cause evaluation with NRC Oversight	Licensee Performance Improvement Plan with NRC Oversight		Licensee Performance Improvement Plan / Restart Plan with NRC Oversight
	NRC Inspection	Risk-Informed Baseline Inspection Program	Baseline and supplemental inspection procedure 95001	Baseline and supplemental inspection procedure 95002	Baseline and supplemental inspection procedure 95003		Baseline and supplemental as practicable, plus special inspections per restart checklist.
	Regulatory Actions[1]	None	Supplemental inspection only	Supplemental inspection only	-10 CFR 2.204 DFI -10 CFR 50.54(f) Letter - CAL/Order	Order to Modify, Suspend, or Revoke Licensed Activities	CAL/order requiring NRC approval for restart.
COMMUNICATION	Assessment Letters	BC or DD review/sign assessment report (w/ inspection plan)	DD review/sign assessment report (w/ inspection plan)	RA review/sign assessment report (w/ inspection plan)	RA review/sign assessment report (w/ inspection plan)		N/A. RA (or 0350 Panel Chairman) review/ sign 0350-related correspondence
	Annual Public Meeting	SRI or BC Meet with Licensee	BC or DD Meet with Licensee	RA (or designee) Discuss Performance with Licensee	RA or EDO Discuss Performance with Senior Licensee Management		N/A. 0350 Panel Chairman conduct public status meetings periodically
	Commission Involvement	None	None	None	Plant discussed at AARM	Commission Meeting with Senior Licensee Management	Commission meetings as requested, restart approval in some cases.
	INCREASING SAFETY SIGNIFICANCE ---------->						

Note 1: Other than the CAL, the regulatory actions for plants in the Multiple/Repetitive Degraded Cornerstone column and IMC 0350 column are not mandatory agency actions. However, the regional office should consider each of these regulatory actions when significant new information regarding licensee performance becomes available.
Note 2: The IMC 0350 Process column is included for illustrative purposes only and is not necessarily representative of the worst level of licensee performance. Plants under the IMC 0350 oversight process are considered outside the auspices of the ROP Action Matrix. See IMC 0350, "Oversight of Operating Reactor Facilities in a Shutdown Condition with Performance Problems," for more detail.

Action Matrix (Simplified Version)



Taking Actions

- USNRC's inspection manual (Section 0305) defines follow-up actions for each Action Matrix column
  - Licensees responsible for correcting identified issues
  - USNRC inspectors monitor and verify corrective actions
  - Licensees in column 3 may be required to take additional actions
    - Safety culture
  - Licensees in column 4 expected to have third-party safety culture evaluation
  - Lack of timely action can result in additional regulatory actions

Summary

- ❑The US Reactor Oversight Process has been a successful use of risk analyses
  - To align USNRC inspection resources
  - To monitor key equipment performance
  - To assess significance of inspection findings
- ❑Quantitative approach has improved credibility
  - Some important aspects are not amenable to quantitative analysis, so handled qualitatively
- ❑Key ROP elements include
  - A strategically driven regulatory framework
  - Significance determination process (using SPAR models)
  - Action matrix
- ❑Use of SPAR models
  - Provides important measure of consistency in SDP evaluations
  - Reflects limitations in licensee PRA models (in late 1990's)