PERFORMANCE INDICATORS IN THE REACTOR OVERSIGHT PROCESS

A STATUS REPORT

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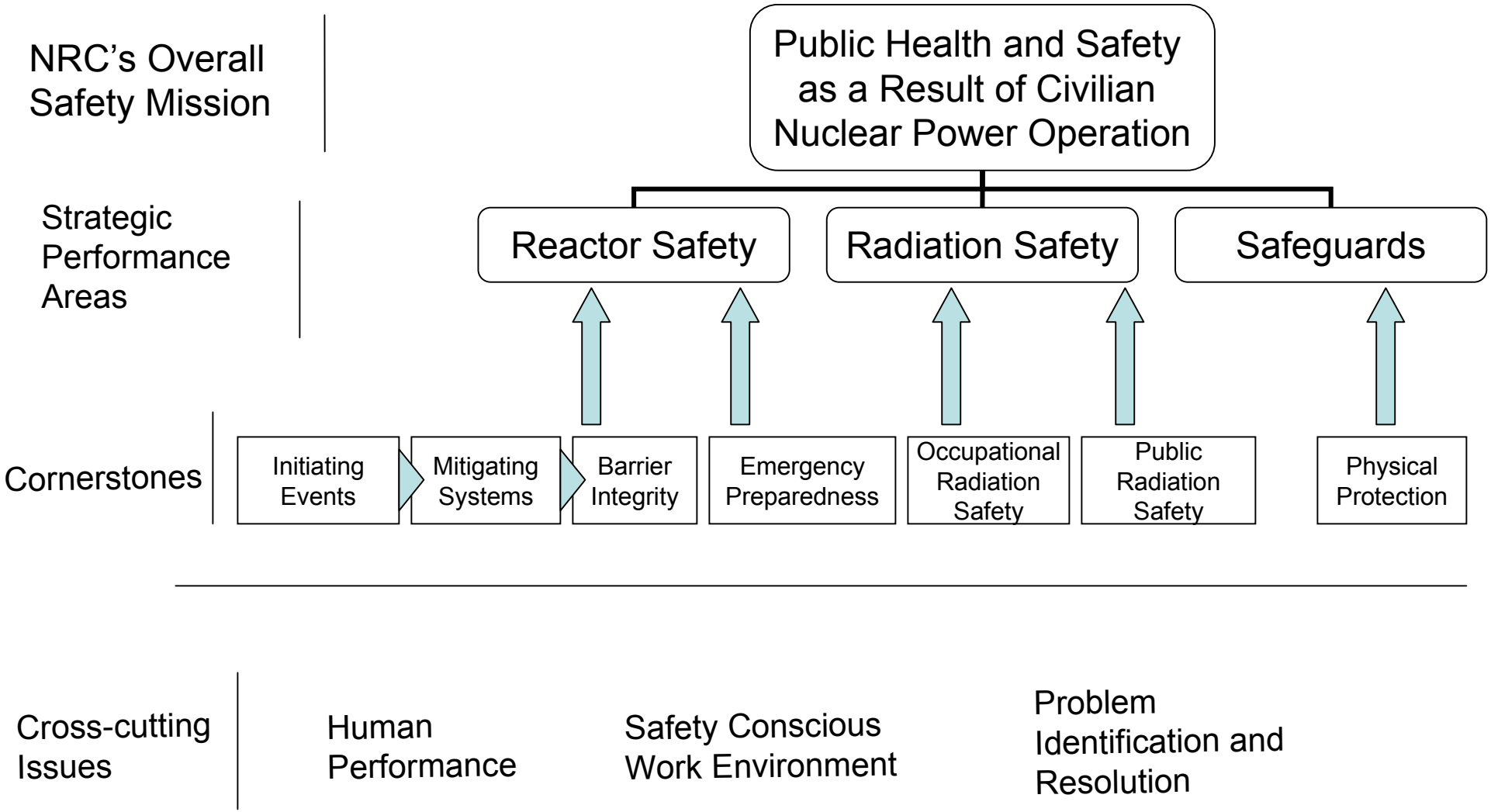
BACKGROUND ON REACTOR OVERSIGHT PROCESS

- In the late 1990's, NRC restructured the regulatory framework for reactor oversight
- The Reactor Oversight Process (ROP) is a risk-informed, tiered approach to ensuring plant safety
- NRC's overall mission is public health and safety
- Three strategic performance areas: reactor safety, radiation safety, and safeguards
- Within each strategic performance area are cornerstones of safety

REGULATORY FRAMEWORK



BACKGROUND – CONT.

- The ROP evaluates plant performance in each cornerstone of safety by analyzing inspection results and performance indicators
- Inspection findings are evaluated for safety significance using a significance determination process
- Performance indicator (PI) data is compared against prescribed risk-informed thresholds

PERFORMANCE INDICATORS

- PIs are used wherever possible in the ROP
- Green band = expected licensee performance level, cornerstone objectives met
- White band = licensee performance outside an expected range of nominal utility performance, related cornerstone still being met
- Yellow band = related cornerstone objectives still being met, but with a minimal reduction in safety margin
- Red Band = significant reduction in safety margin

PERFORMANCE INDICATORS					
Cornerstone	**Indicator**		**Thresholds**		
			Increased Regulatory Response Band	**Required Regulatory Response Band**	**Unacceptable Performance Band**
Initiating Events	Unplanned Scrams per 7000 Critical Hours (automatic and manual scrams during the previous four quarters)		>3.0	>6.0	>25.0
	Unplanned Scrams with a Loss of Normal Heat Removal (over the previous 12 quarters)		>2.0	>10.0	>20.0
	Unplanned Power Changes per 7000 Critical Hours (over previous four quarters)		>6.0	N/A	N/A
Mitigating Systems	Safety System Unavailability (SSU) (average of previous 12 quarters)	**All Plants**			
		≤2EDG	>2.5%	>5.0%	>10.0%
		>2EDG	>2.5%	>10.0%	>20.0%
		Hydro Emerg. Power	>2.0%	>4.0%	>10.0%
		BWRs			
		HPCI	>4.0%	>12.0%	>50.0%
		HPCS	>1.5%	>4.0%	>20.0%
		RCIC	>4.0%	>12.0%	>50.0%
		RHR	>1.5%	>5.0%	>10.0%
		PWRs			
		HPSI	>1.5%	>5.0%	>10.0%
		AFW	>2.0%	>6.0%	>12.0%
		RHR	>1.5%	>5.0%	>10.0%
	Safety System Functional Failures (over previous four quarters)	BWRs	>6.0	N/A	N/A
		PWRs	>5.0	N/A	N/A

PERFORMANCE INDICATORS Cont'd				
Cornerstone	**Indicator**	**Thresholds**		
		Increased Regulatory Response Band	**Required Regulatory Response Band**	**Unacceptable Performance Band**
Barriers Fuel Cladding	Reactor Coolant System (RCS) Specific Activity (maximum monthly values, percent of Tech. Spec limit)	>50.0%	>100.0%	N/A
Reactor Coolant System	RCS Identified Leak Rate (maximum monthly values, percent of Tech. Spec. limit)	>50.0%	>100.0%	N/A
Emergency Preparedness	Drill/Exercise Performance (over previous eight quarters)	<90.0%	<70.0%	N/A
	ERO Drill Participation (percentage of Key ERO personnel that have participated in a drill or exercise in the previous eight quarters)	<80.0%	<60.0%	N/A
	Alert and Notification System Reliability (percentage reliability during previous four quarters)	<94.0%	<90.0%	N/A
Occupational Radiation Safety	Occupational Exposure Control Effectiveness (occurrences during previous 4 quarters)	>2	>5	N/A
Public Radiation Safety	RETS/ODCM Radiological Effluent Occurrence (occurrences during previous four quarters)	>1	>3	N/A
Physical Protection	Protected Area Security Equipment Performance Index (over a four quarter period)	>0.080	N/A	N/A
	Personnel Screening Program Performance (reportable events during the previous four quarters)	>2	>5	N/A
	Fitness-for-Duty (FFD)/Personnel Reliability Program Performance (reportable events during the previous four quarters)	>2	>5	N/A

ASSESSMENT PROCESS

- Inspection findings are also assigned a color based on the finding's risk significance
- NRC uses inspection findings and PI information to determine appropriate agency response
- Assessment results sent to licensees and are publicly available
- Enforcement tied to licensee performance
- PIs and inspection are compatible and are not meant to overlap

	Column	Licensee Response Column	Regulatory Response Column	Degraded Cornerstone Column	Multiple/Repetitive Degraded Cornerstone Column	Unacceptable Performance
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
RESPONSE	Regulatory Conference	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
	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	
	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	
	Regulatory Actions	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
COMMUNICATION	Assessment Letters	BC or DD review/sign assessment report (w/ inspection plan)	DD review/sign assessment report (with inspection plan)	DD review/sign assessment report (w/ inspection plan)	RA review/sign assessment report (w/ inspection plan)	
	Annual Public Meeting	SRI or BC Meet with Licensee	BC or DD Meet with Licensee	RA Discuss Performance with Licensee	EDO Discuss Performance with Senior Licensee Management	
	Commission Involvement	None	None	None	Plant discussed at AARM	Commission Meeting with Senior Licensee Management
	INCREASING SAFETY SIGNIFICANCE - - - - - - - - - - ->					

PERFORMANCE INDICATOR LESSONS LEARNED

- PIs lose effectiveness over time
- Licensees challenge PI counts
- PIs should be designed so that licensee actions to improve the PI will also improve plant safety
- PIs must consider accident conditions
- PIs definitions should not contain numbers
- PIs cannot measure human performance

PI ISSUES

- Inconsistency in reporting safety system functional failures
- Should the reactor coolant leakage PI be modified to trend unidentified leakage
- Whether there is a better PI for fuel clad integrity
- Whether a containment integrity PI should be added

SUMMARY

- The NRC's assessment process was revised to be more objective
- PIs are used with inspection to assess licensee performance
- PIs have identified plants whose performance required additional oversight
- Licensees respond to PIs
- Over time, PIs become less effective
- PIs need periodic reassessment to maintain effectiveness