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Graded Approach to Inspection

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Inspection – Operating Reactors

- Creating a baseline inspection program
  - Minimum inspection for all reactor licensees
  - What to inspect, how much to inspect, how often to inspect
  - Requirements and guidance documented in inspection procedures
  - Resource requirements depend on:
    - Amount of inspection to assure adequate protection
    - Number of operating units

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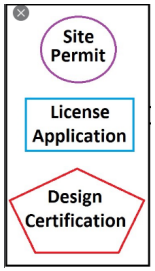
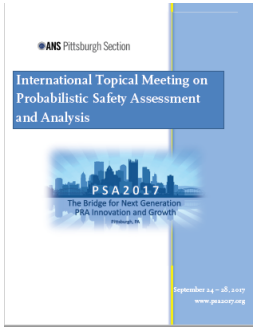
Inspection - Operating Reactors

- Step 1- Identify licensee activities and structures, systems, and components (SSCs) that are important to safety.





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Inspection – Operating Reactors

- Step 2 - Determine which factors are applicable to the decision
  - Type of facility (PWRs have different ISI requirements)
  - Stage in life cycle (construction and decommissioning inspection requirements differ from operational inspections)
  - Operating experience - focus inspections on areas where safety-significant SSCs have a higher failure probability
  - Inspector experience
  - Special and infrequently performed activities

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Inspection – Operating Reactors

- Step 3 - Integrate the applicable factors into the determining the optimal resource effort required to ensure licensees are operating their facilities in a manner that protects public health and safety, and the environment. Regulator determines the appropriate inspection sample size and frequency.
  - What to inspect, how much to inspect, how often to inspect

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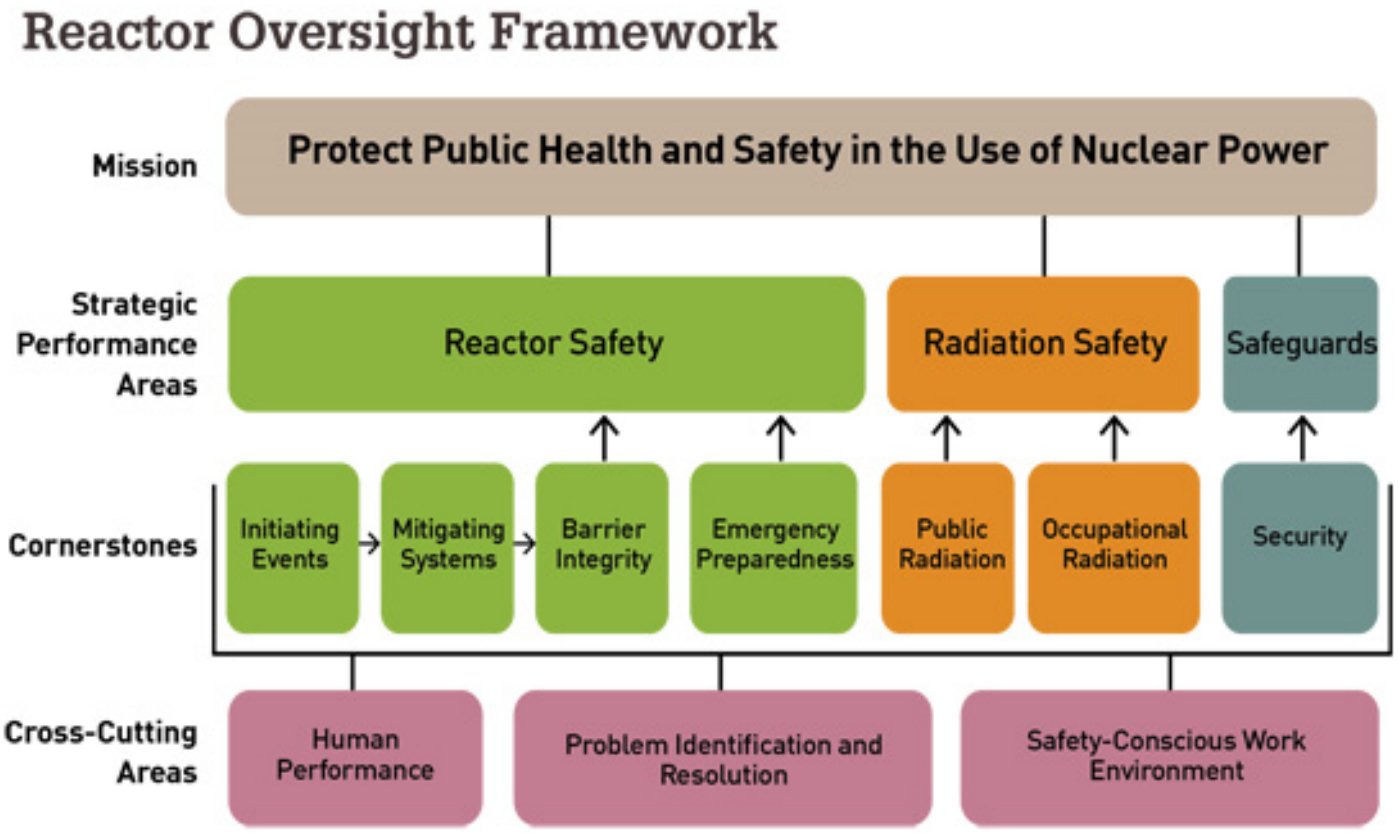
Inspection – Operating Reactors



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Inspection – What to Inspect

- Process described in SECY-99-007
- What to inspect
  - Each cornerstone has several attributes from which the inspectable areas are derived.
  - Inspectable areas were selected based on their risk significance

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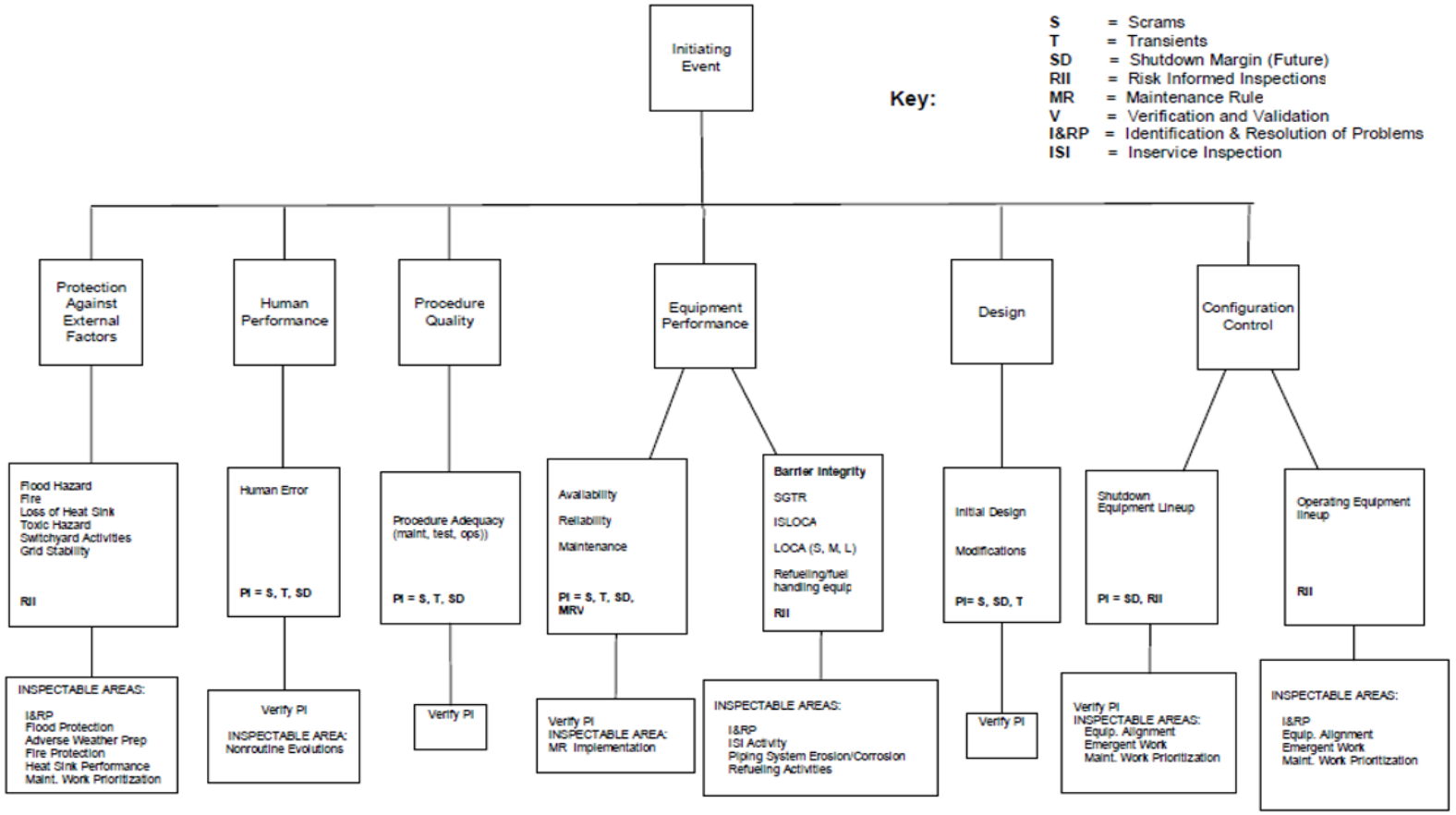
Initiating Events



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Inspection – What to Inspect

- Risk Information Matrices (RIMs) developed in determining which activities, systems, or components are to be inspected in the baseline inspection program.

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Inspection - RIM

CORNERSTONE			INSPECTABLE AREA	PERFORMANCE INDICATOR	FREQUENCY	HOURS FOR 2-UNIT SITE PER YEAR	LEVEL OF EFFORT	BASES
I 30	M 60	B 10	Equipment Alignment	None	Semiannual and as required by maintenance	76 hrs/yr.	One system walkdown every 6 months. If available system success criteria from the site specific risk study, and the system design basis should be reviewed to focus the inspection. RIM2 should be used for system selection if plant specific information has not yet been developed. In conjunction with maintenance on higher risk systems, validate critical features on lineup of the train or system providing the backup function. Hours based on 8 hrs semiannually for a complete risk important system walkdown; 4 hrs/month in walkdowns to support verification of operable system train because other train is OOS, and 1 hr/month for Identification and Resolution of Problems/Issues.	High risk configurations may occur during normal operations and on- line maintenance activities due to multiple out-of-service SSCs, and such configurations can lead to high Core Damage Probability.
I 10	M 90	B	Fire Protection	None	Triennial	36 hours/3 yrs. 12 hr/yr Residents	Selection of areas inspected should consider insights from the plant specific fire risk analysis. Regional SRA to provide input. Walkdown all accessible areas of high significance. Hours are based on a regional based Program Implementation Review, and 4 hours of Identification and Resolution of Problems/Issues. Residents should perform a monthly walkdown of high fire risk areas (hours based on One hr/walkdown) to verify transient combustible loading and fire doors/barriers.	Estimated fire risk is comparable to many internal initiating events. If potential fire initiators, aids to propagation, or fire barrier breaches exist, safe shutdown of the plant may not be possible due to the failures of the inspectable features and areas.

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Inspection – Operating Reactors

- How much to inspect / how often to inspect
  - Sample size and number of hours were developed based on expert judgement and relevant risk information on how much inspection activities would be sufficient to ensure verification that the licensee was meeting the objectives of all seven cornerstones.
  - IMC 0308, Attachment 2, “Technical Basis for Inspection Program,” documents scope and basis for each inspectable area.

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Inspection – Operating Reactors

- What to inspect
  - Inspection procedures provide guidance to inspectors on sample selection, focusing on highest risk SSCs or activities

Initiating Events Cornerstone	
Inspection Objective: Identify any equipment alignment discrepancies that could result in a risk-significant initiating event and impact the availability and functional capability of plant equipment.	
Risk Priority	Examples
Operating—Equipment lineups affecting initiating event frequencies or functional capabilities of plant equipment	Maintenance which leaves only one operating feed pump providing feed Instrument air lineup
Shutdown—Equipment lineups during special tests or evolutions	System lineups during pressurized-water reactor (PWR) midloop operation or boiling-water reactor (BWR) vessel draindown Misalignment of electrical equipment during shutdown that could cause loss of offsite power and affect decay heat removal

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Inspection – Operating Reactors

- Sample sizes / Frequency
  - Inspection procedures describe required sample sizes for completion, and frequency of inspection

Sample Requirements		Minimum Baseline Completion Sample Requirements		Budgeted Range	
Sample Type	Section(s)	Frequency	Sample Size	Samples	Hours
Partial Walkdown*	03.01	Annual	12 per site	12–16	80 +/- 12 per site
Complete Walkdown**	03.02	Annual	2 per site	2	

Each partial walkdown sample is budgeted at 4 hours.
** Perform one complete walkdown sample approximately every 6 months. Each complete walkdown sample is budgeted at 12 hours.

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Inspection – Feedback Loop

- Inspection program should have a feedback loop to regularly adjust sample sizes, resource estimates, and what to inspect
  - Operating experience (what to inspect)
  - Biennial ROP realignment – realign sample sizes and resources
  - Feedback from inspectors

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Inspection – Resources

- Resource requirements for 2-Unit PWR (annual hours)

	2000	2019
71111 (Reactor Safety) Procedures	1547	1286
71114 (EP) Procedures	72	88
71124 (Radiation Protection) Procedures	172	142
71130 (Security) Procedures	96	278
Other Procedures (71151, 52, 53)	278	505
Plant Status	700	699
Total Hours	2865	2998

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Inspection Based on Performance

- Graded approach to inspection based on performance
  - As licensee performance declines, inspection increases
- Described by Action Matrix

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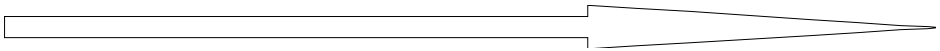
Action Matrix Concept

Licensee Response	Regulatory Response	Degraded Performance	Multiple/Repetitive Degraded Cornerstone	Unacceptable Performance

Column 1 Column 2 Column 3 Column 4 Column 5



- Increasing safety significance
- Increasing NRC inspection efforts
- Increasing NRC/licensee management involvement
- Increasing regulatory actions

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Inspection Based on Performance

- Step 1 – Identify activities and SSCs important to safety
  - Focus on activity or SSC where performance is deficient
- Step 2 – Determine which factors applicable
  - Safety significance of deficiency
  - Isolated vs site-wide (extent of condition)
- Step 3 – Integrate factors to determine optimal resources
  - Scope of inspection effort described in supplemental inspection procedures based on number and/or safety significance of performance deficiencies and performance indicators

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Inspection Based on Performance

- Supplemental Inspections
  - Column 2 – IP 95001 supplemental inspection (40-120 hours)
  - Column 3 – IP 95002 supplemental inspection (200 hours)
  - Column 4 – IP 95003 supplemental inspection (3000 hours) – diagnostic site-wide inspection
- Objectives and requirements described in each procedure
  - All inspection objectives must be satisfactorily met for licensee move back to Column 1

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References

- IMC 0305, “Operating Reactor Assessment Program”
- IMC 0308, Attachment 2, “Technical Basis for Inspection Program”
- IMC 2515, “Light-Water Reactor Inspection Program”
- Inspection Procedure 95001, “Supplemental Inspection Response to Action Matrix Column 2 Inputs
- Inspection Procedure 95002, “Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area
- Inspection Procedure 95003, “Supplemental Inspection for Repetitive Degraded Cornerstones, Multiple Degraded Cornerstones, Multiple Yellow Inputs or One Red Input

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Action Matrix

		Licensee Response Column (Column 1)	Regulatory Response Column (Column 2)	Degraded Performance Column (Column 3)	Multiple/Repetitive Degraded Cornerstone Column (Column 4)	Unacceptable Performance Column (Column 5)	IMC 0350 Process[1]
RESULTS		All assessment inputs (performance indicators and inspection findings) green; Cornerstone objectives fully met	One or Two white inputs in a strategic performance area; Cornerstone objectives met with minimal degradation in safety performance	One degraded cornerstone (3 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 One 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 are placed in the IMC 0350 process
RESPONSE	Regulatory Performance Meeting	None	Branch Chief or Division Director meets with licensee	Regional Administrator or designee meets with senior licensee management.	EDO/DEDO or designee meets with senior licensee management	EDO/DEDO or designee meets with senior licensee management	RA/EDO or designee meets 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 & restart plan with NRC oversight
	NRC Inspection	Risk-informed baseline inspection program	Baseline and supplemental inspection (IP 95001)	Baseline and supplemental inspection (IP 95002)	Baseline and supplemental inspection (IP 95003)		Baseline and supplemental as practicable; Special inspections per restart checklist.
	Regulatory Actions[2]	None	Supplemental inspection only	Supplemental inspection only; Plant discussed at AARM if conditions met	10 CFR 2.204 DFI; 10 CFR 50.54(f) letter; CAL/Order; Plant Discussed at AARM	Order to modify, suspend, or revoke license; Plant discussed at AARM	CAL/Order requiring NRC approval for restart; Plant discussed at AARM
COMMUNICATION	Assessment Letters	Branch Chief or Division Director reviews and signs assessment letter w/ inspection plan	Division Director reviews/signs assessment letter w/ inspection plan	Regional Administrator reviews/signs assessment letter w/ inspection plan	Regional Administrator reviews/signs assessment letter w/ inspection plan		N/A. RA or 0350 Panel Chairman review/ sign 0350-related correspondence
	Annual Involvement of Public Stakeholders	Various public stakeholder options involving the senior resident inspector or Branch Chief	Various public stakeholder options involving the BC or DD	Regional Administrator or designee discusses performance with senior licensee management	EDO/DEDO or designee discuss performance with senior licensee management		N/A. 0350 Panel Chairman conducts periodic public status meetings
	External Stakeholders[3]	None	State Governors	State Governors, DHS, Congress	State Governors, DHS, Congress	State Governors, DHS, Congress	
	Commission Involvement	None	None	Possible Commission meeting if licensee remains for 3 years	Commission meeting with senior licensee management within 6 months.[4]	Commission meeting with senior licensee management	Commission meetings as requested; Restart approval in some cases.
	INCREASING SAFETY SIGNIFICANCE →						