

Sdp \ Introduction \
SDPpowerpoint.pdf



HRTD
Human Resources
Training & Development

Significance Determination Process

Technical Training Center
Chattanooga, Tennessee

C-5

Learning Objectives

- **Given a scenario, use IMC-0612, Appendix B to determine if an issue has sufficient significance to warrant use of the significance determination process.**
- **Given a scenario, use IMC-0609, Appendix A, and a Phase 2 pre-solved table to determine the risk significance.**

Purpose of SDP

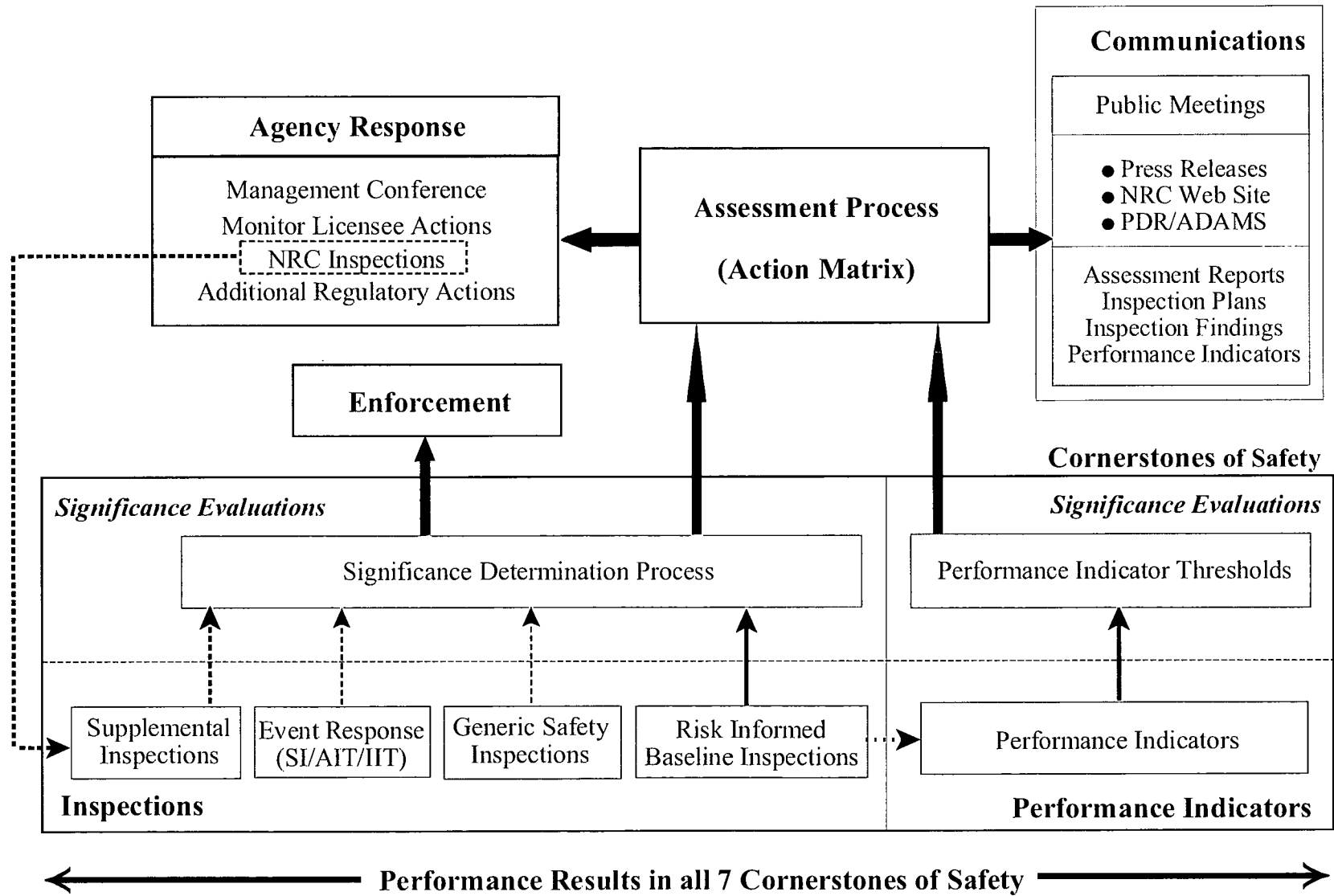
- **The Significance Determination Process (SDP) uses risk insights, where appropriate, to help the NRC inspectors and staff to determine the safety significance of inspection findings.**

SDP Objectives

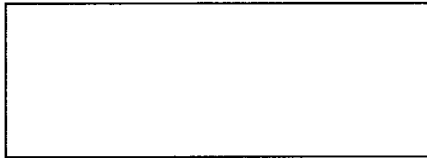
- **To characterize the significance of an inspection finding for the NRC licensee performance assessment process, using best available risk insights as appropriate.**

The SDP thus assigns a color to the inspection finding.

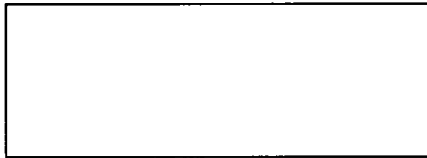
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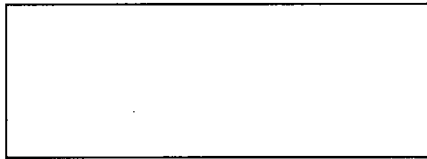
SDP Colors



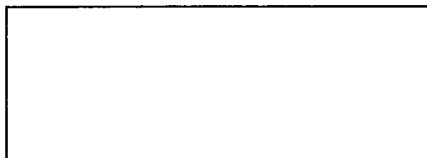
Green – very low safety significance.
 $\Delta\text{CDF} < 1\text{E-6}$



White – low to moderate safety significance.
 $1\text{E-6} \leq \Delta\text{CDF} < 1\text{E-5}$



Yellow – substantial safety significance.
 $1\text{E-5} \leq \Delta\text{CDF} < 1\text{E-4}$



Red – high safety significance.
 $1\text{E-4} \leq \Delta\text{CDF}$

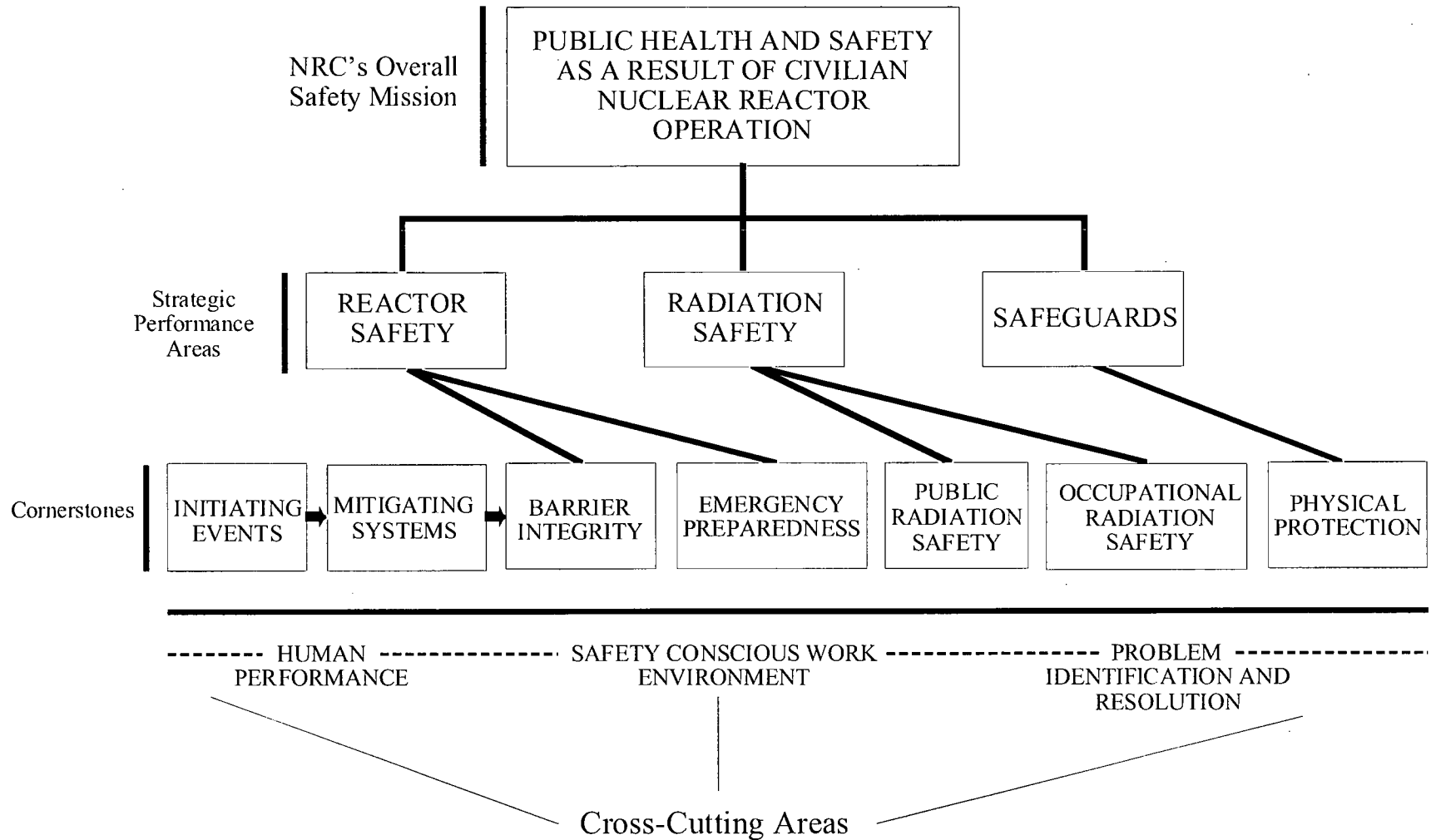
SDP Objectives (Continued)

- **To provide all stakeholders an objective and common framework for communicating the potential safety significance of inspection findings.**
- **To provide a basis for assessment and/or enforcement actions associated with an inspection finding.**
- **To provide the inspectors with plant-specific risk information for use in risk-informing the inspection program.**

Types of SDPs

- **At least one SDP supports each cornerstone associated with the strategic performance areas defined in IMC 2515.**
- **The SDPs and related instructions are found in IMC 0609.**

Exhibit 1: REGULATORY FRAMEWORK



SDP Listing

- A. Significance Determination of Reactor Inspection Findings for At-Power Situations**
- B. Emergency Preparedness SDP**
- C. Occupational Radiation Safety SDP**
- D. Public Radiation Safety SDP**
- E. Physical Protection SDP**
- F. Fire Protection SDP**

SDP Listing

G. Shutdown Safety SDP

H. Containment Integrity SDP

**I. Operator Requal. Human
Performance SDP**

J. SG Tube Integrity Findings SDP

**K. Maint. Risk Assess. & Risk
Management SDP**

**M. Significance Determination
Process Using Qualitative Criteria**

Determining the Significance of Reactor Inspection Findings for At- Power Situations

**Technical Training Center
Chattanooga, Tennessee**

Entry Conditions

- **This SDP provides a simplified risk-informed framework to estimate the increase in core damage frequency during at-power situations due to conditions which contribute to unintended risk increases caused by** deficient licensee performance.

Deficient Performance

- Deficient licensee performance or performance deficiency **is an issue that is the result of a licensee not meeting a requirement or standard where the cause was reasonably within the licensee's ability to foresee and correct, and that should have been prevented. A performance deficiency can exist if a licensee fails to meet a self-imposed standard or a standard required by regulation. *IMC 0612.***

Examples of Deficient Performance

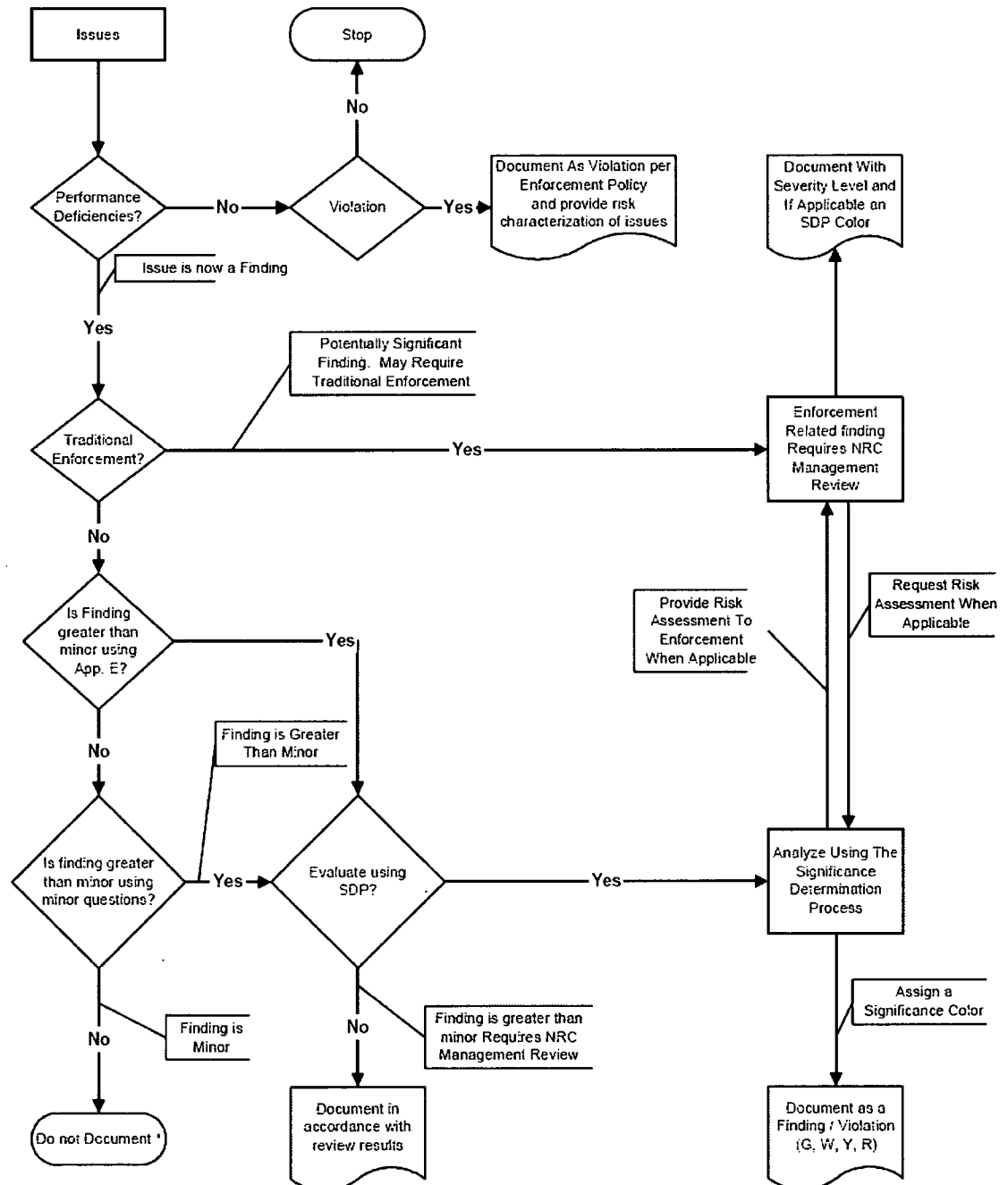
- **Safety-related pump discharge valve remained closed following surveillance testing.**
- **Debris left in safety-related tank following maintenance activities.**
- **Failing to take proper corrective action when testing demonstrated a problem.**

Entry Conditions (Cont'd)

- **Conditions which do not represent deficient licensee performance are considered part of the acceptable plant risk and are not candidates for SDP evaluation.**
- **Each Issue should be screened by using IMC 0612, Appendix B, to determine whether the issue is more than a minor issue.**
- **If issue is not minor, then it is a candidate for SDP evaluation.**
- **This SDP is not used for event evaluation.**

Use Figure 1 and the questions listed below to determine if a finding has sufficient significance to warrant further analysis or documentation.

Figure 1



* see exception in Section 05.03

IMC 0612

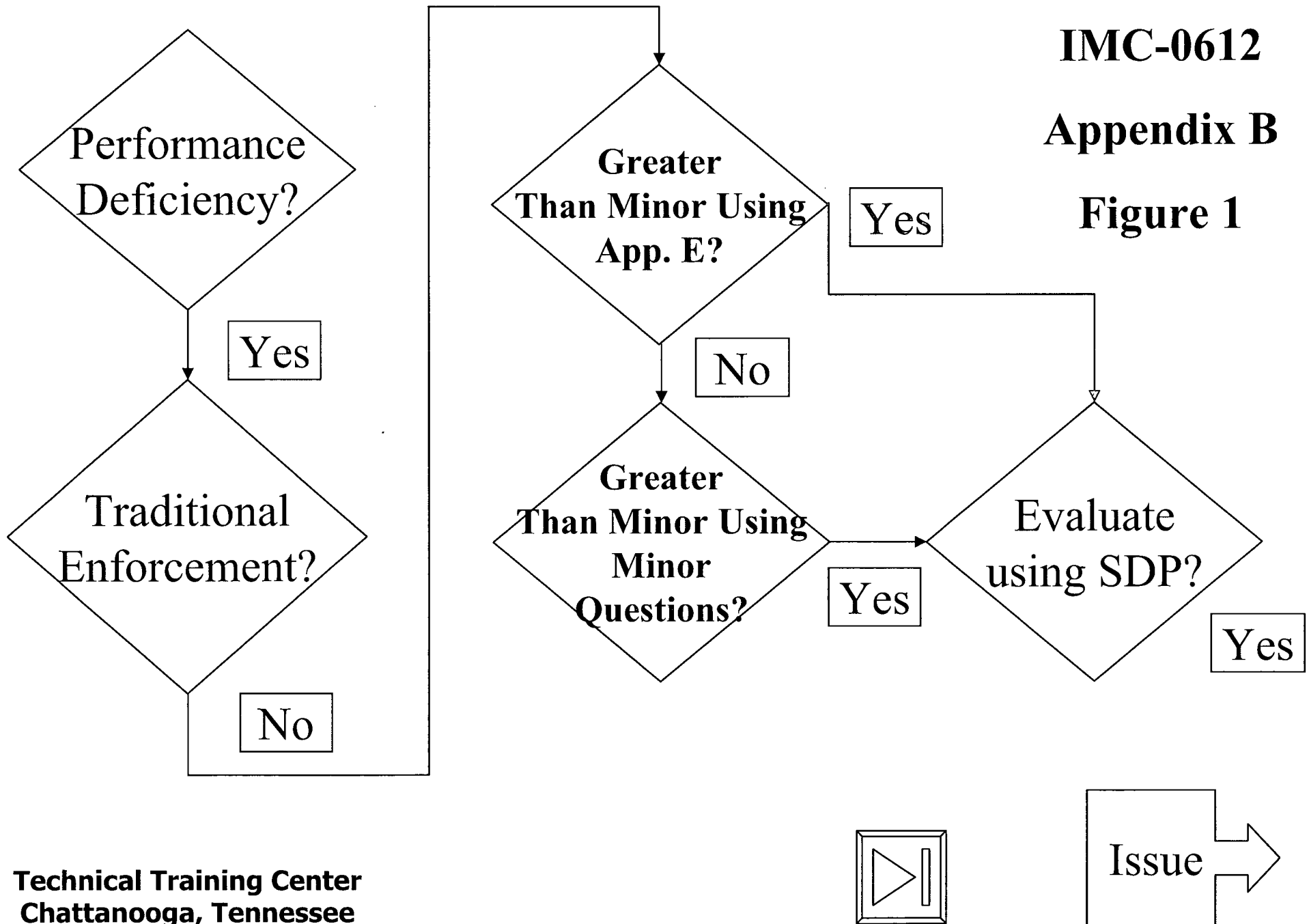
Appendix B:

Issue Screening

IMC-0612

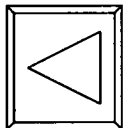
Appendix B

Figure 1



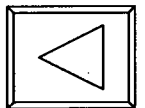
Performance Deficiency Question

- **Did the licensee fail to meet a requirement or standard, where the cause was reasonably within the licensee's ability to foresee and correct and which should have been prevented?**
- **A performance deficiency can exist if a licensee fails to meet a self-imposed standard or a standard required by regulation.**



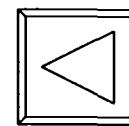
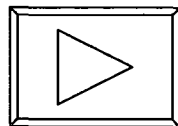
Traditional Enforcement Questions

- **Does the issue have actual safety consequence (overexposure, excessive radioactive release)?**
- **Does the issue have the potential for impacting the NRC's ability to perform its regulatory function?**
- **Are there any willful aspects of the violation?**



Minor Questions

- Could the issue be reasonably viewed as a precursor to a significant event?
- If left uncorrected, could the finding become a more significant safety concern?
- Does the finding relate to a performance indicator that would have caused the PI to exceed a threshold?
- Is the finding associated with one of the cornerstone attributes listed at the end of this attachment and does the finding affect the associated cornerstone objective?
- 9 maintenance risk assessment and risk management questions (not listed here).



Initiating Events

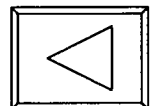
- **Objective – to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations.**
- **Attributes: design control, protection against external factors, configuration control, equipment performance, procedure quality, and human performance.**

Mitigating Systems

- **Objective – to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).**
- **Attributes: design control, protection against external factors, configuration control, equipment performance, procedure quality, and human performance.**

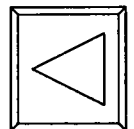
Barrier Integrity

- **Objective – to provide reasonable assurance that physical design barriers (fuel cladding, RCS, and containment) protect the public from radionuclide releases caused by accidents.**
- **Attributes: design control, configuration control, procedure quality, human performance, cladding performance (cladding), RCS equipment and barrier performance (RCS), and SSC and barrier performance (containment).**



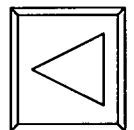
SDP Questions

- **Is the event associated with an increase in the likelihood of an initiating event?**
- **Is the finding associated with the operability, availability, reliability, or function of a system or train in a mitigating system?**
- **Is the finding associated with the integrity of fuel cladding, the reactor coolant system, reactor containment, control room envelope, auxiliary building (PWR), or ... (BWR)?**
- **Is the finding associated with degraded conditions that could concurrently influence any mitigation equipment and an initiating event?**



SDP Questions (cont'd)

- Is the finding associated with or involve impairment or degradation of a fire protection feature?**
- Is the finding associated with the spent fuel pool cooling system radiological barrier?**
- Is the finding associated with inadequate 10 CFR 50.65(a)(4) risk assessment (quantitative only) and/or risk management?**



SDP Phases

- **Phase 1 – Characterization and Initial Screening of Findings**
 - Characterization of the finding and an initial screening of low-significance findings for disposition by the licensee's corrective action program.
- **Phase 2 – Risk Significance Estimation and Justification Using the Site Specific Risk-Informed Inspection Notebook and Pre-Solved Table**
 - Plant-specific estimation of the risk significance of an inspection finding and development of the basis for the determination.

SDP Phases (Continued)

- **Phase 3 – Risk Significance Estimation Using Any Risk Basis That Departs from the Phase 1 or Phase 2 Process**
 - Any departure from the guidance provided for Phase 1 or 2 constitutes a Phase 3 analysis. Phase 3 analysis methods will utilize appropriate PRA techniques and rely on the expertise of NRC risk analysts.

Determine Applicable Scenarios from Table 2.

TPCS	AFW	EIHP	FB	HPR	#	STATUS
Mitigation Capability - Table 4						
<div> <div>Initiating Event Likelihood (Table 1)</div> </div>						1 OK
						2 OK
						3 CD
						4 CD
						5 CD

Plant name abbrev.: CALL

Table 3.X for each scenario

A Little Math

- If events **A** and **B** are independent, then the **Pr(A and B)** is:

$$\text{Pr}(A \text{ and } B) = \text{Pr}(A) \text{Pr}(B)$$

- **Logarithms**

$$\log AB = \log A + \log B$$

SDP Tables

- **In IMC - 0609**

- Table 4, Remaining Mitigation Capability Credit
- Table 5, Counting Rule Worksheet

- **In Site Specific Workbook**

- Table 1, Categories of Initiating Events
- Table 2, Initiators and Dependency
- Table 3.X, Worksheets for required initiating event scenarios.

Example using notebook

	TDAFW Issue	
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SDP Phase 2 Steps (IMC 0609, App. A, Att. 1)

**Step 2.1.1: Check for the most
current version of SDP
Notebook and Pre-solved
Worksheet.**

**Step 2.1.2: Determine the
exposure time.**

1.1 Exposure Time

- **If the inception of the condition is unknown:**
 - determine last successful demonstration of functionality.
 - Exposure time = (date discovered inoperable - date of functionality demonstration)/2
 - called $t/2$

SDP Phase 2 Steps

(IMC 0609, App. A, Att. 1 – cont'd)

Step 2.1.3: Find the appropriate target for the inspection finding in the pre-solved table.

Step 2.1.4: Determine the risk significance of the inspection finding and the potential risk contribution due to Large Early Release Frequency (LERF).

Callaway pre-solved table.

SDP Phase 2 Steps

(IMC 0609, App. A, Att. 1 – cont'd)

Step 2.1.5: Screen for the potential risk contribution due to external events if results from Step 2.1.4 are Green and is greater than or equal to $1E-7$.