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Sandia National Laboratories

Exceptional service in the national interest

Sandia National Laboratories Work Planning and Control

Approach and Best Practices

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Achieving Operational Excellence

Operational excellence relies on routine application of Plan-Do-Check-Act (PDCA) quality principles:

- Defect prevention methodologies
- Use of operational awareness
- A questioning attitude
- Critical thinking

Operational excellence assumes application of five Key Principles:

- A preoccupation with failure
- A reluctance to oversimplify
- A sensitivity to operations
- A commitment to resilience
- An appropriate deference to expertise

How it Works

ES&H Issues Integration—assure that ES&H considerations are integrated into the planning and execution of all work.

Safe and Compliant Mission Work—assure that mission work is accomplished in an efficient, safe, and compliant manner.

Learning Culture—support establishment of a learning culture within ES&H organizations and throughout the Laboratories.

ES&H Performance Assurance (PAS) Implementation—support and use the PAS elements to effectively obtain data to influence future programs and safety initiatives.

Effective Communications—communications on lessons learned and safety improvement initiatives increase Sandia learning.

Continual Improvement—assure continual improvement through self-identification of deficiencies for assigned areas of responsibility.

Safety Culture Principles

Why it Matters

Performance Assurance is a tool that helps all of us improve safety performance:

- Safety is integral to our work
- Improve safety culture by increased learning and reporting
- Mutual trust – eliminate the fear of management reprisal
- Reduce/eliminate accidents, injuries, and reportable events
- Promote the development and modification of “Best” safety practices

Work Planning & Control

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ENVIRONMENT SAFETY & HEALTH

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Sandia's WP&C Journey

- WP&C program was expanded in 2013 to include risk assessment and Engineered Safety Principles in the process.
  - The revamp was a result of three realized significant events:
    - Realization for need of improved system/process hazard analysis risk assessment
    - What/If analysis to identify and mitigate risks
    - Critical thinking is vital to WP&C and execution
  - Multi-Organizational Work Agreement (MOWA) process to coordinate WP&C implementation between work groups

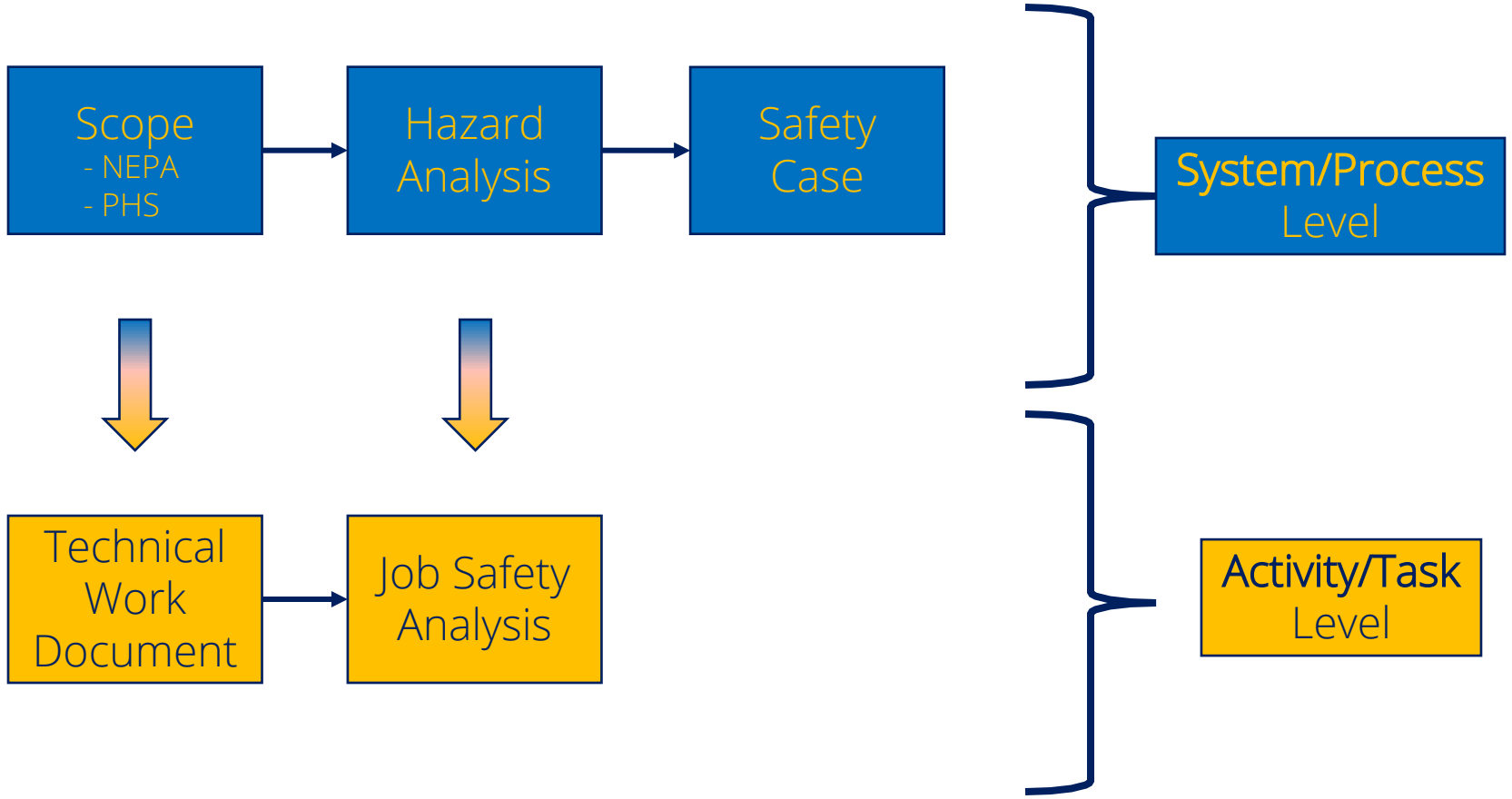
Why did SNL choose this WP&C approach?

- The process was initially established in December 2013
- Addresses both system/process- and task-level planning
- Supports managers in making risk-informed decisions and integrates stakeholders throughout the process

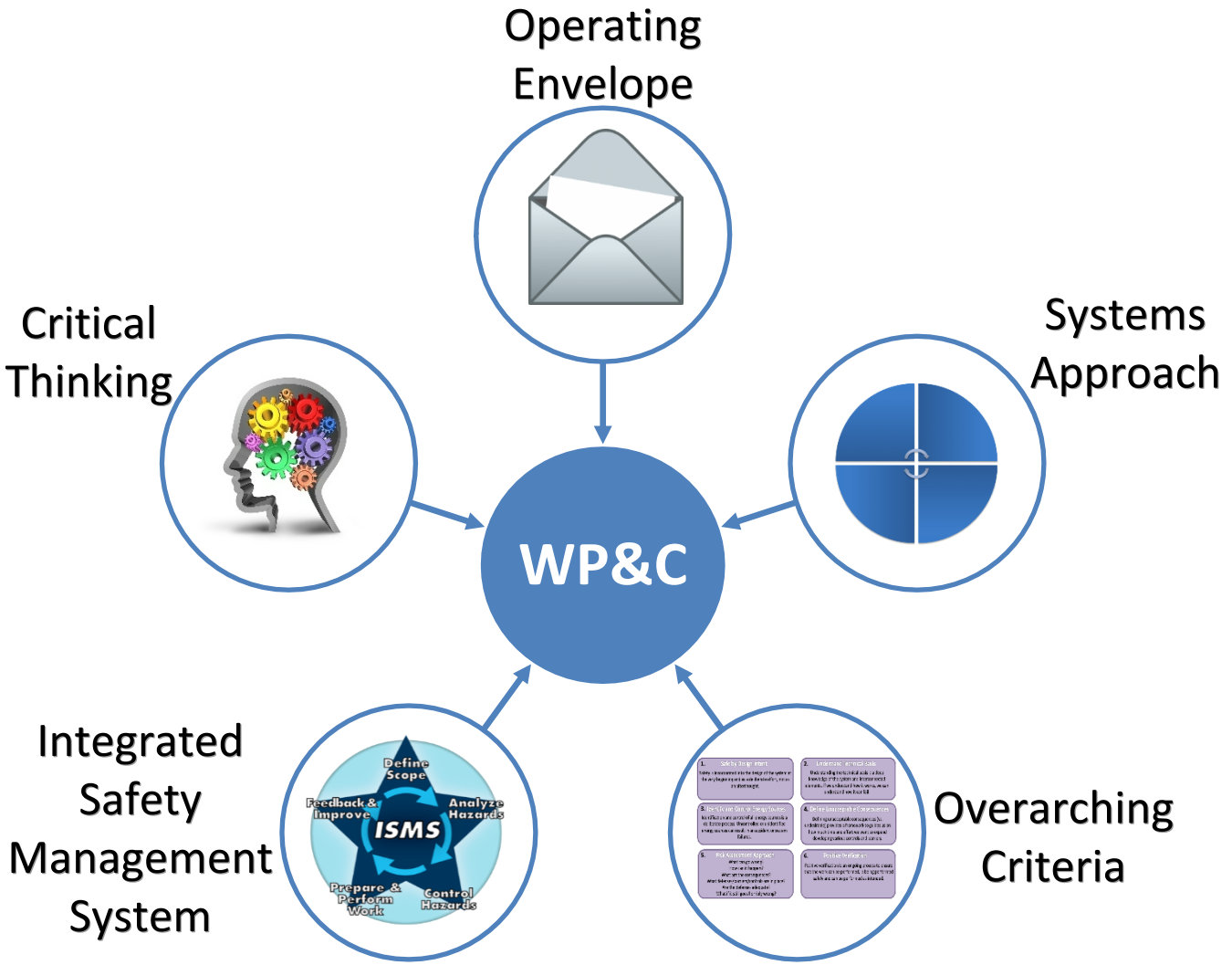
Through Work Planning & Control, we can achieve our mission performance objectives with a higher level of assurance.

→ Greater success!

Systems Approach to Safety Management



Guiding Principles & Requirements



Overarching Criteria
(aka Principles of Engineered Safety)

1. Safe by Design Intent

Safety is incorporated into the design of the system at the very beginning and as a deliberate effort, not as an afterthought.

2. Understand Technical Basis

Understanding the technical basis is a deep knowledge of the system and interconnected elements. If we understand how it works, we can understand how it can fail.

3. Identify and Control Energy Sources

Identification and control of all energy sources is a deliberate process. Uncontrolled or unidentified energy sources can result in an accident or system failures.

4. Define Unacceptable Consequences

Defining unacceptable (vs. undesirable) consequences provides a framework to guide us on how much time and effort we need to expend developing various controls and barriers.

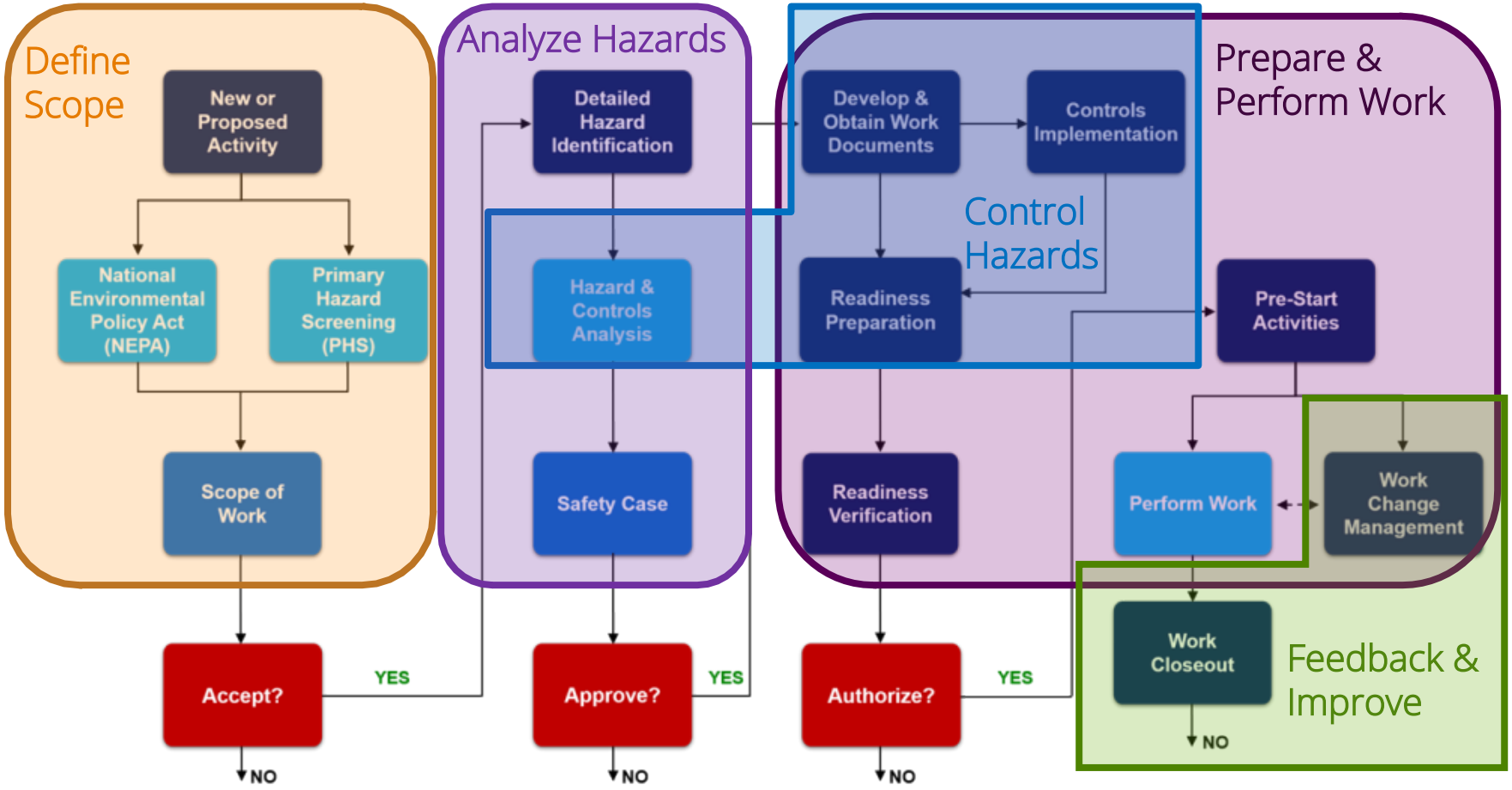
5. Risk Assessment Approach

What can go wrong?
How can it happen?
What are the consequences?
What defenses, barriers, and controls are in place?
Are the defenses adequate?
What if it still goes horribly wrong?

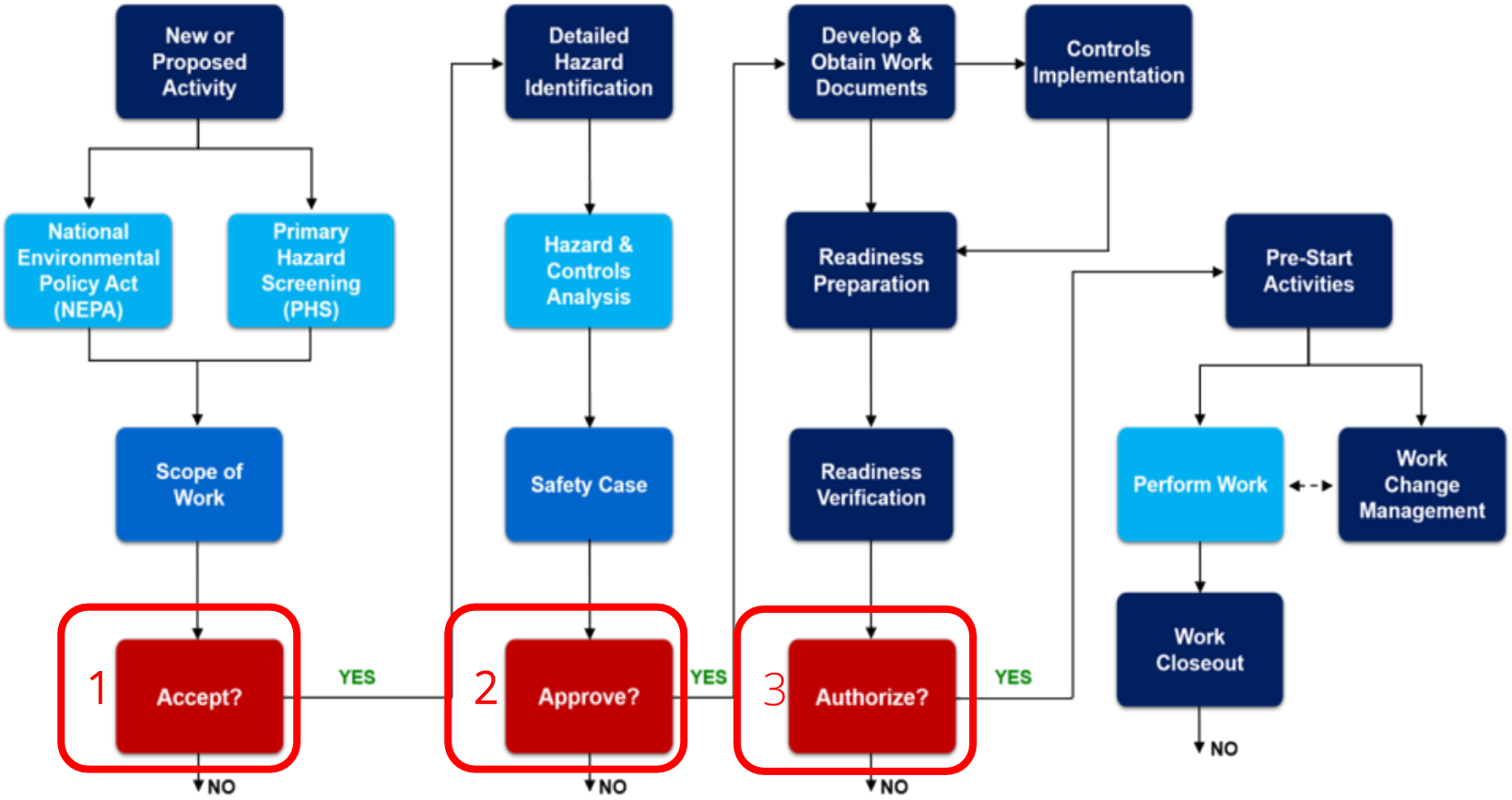
6. Positive Verification

Positive verification is an ongoing process to ensure that the work can be performed and is being performed safely and as intended.

WP&C / ISMS Relationship



Key Decision Points – Three ‘A’s

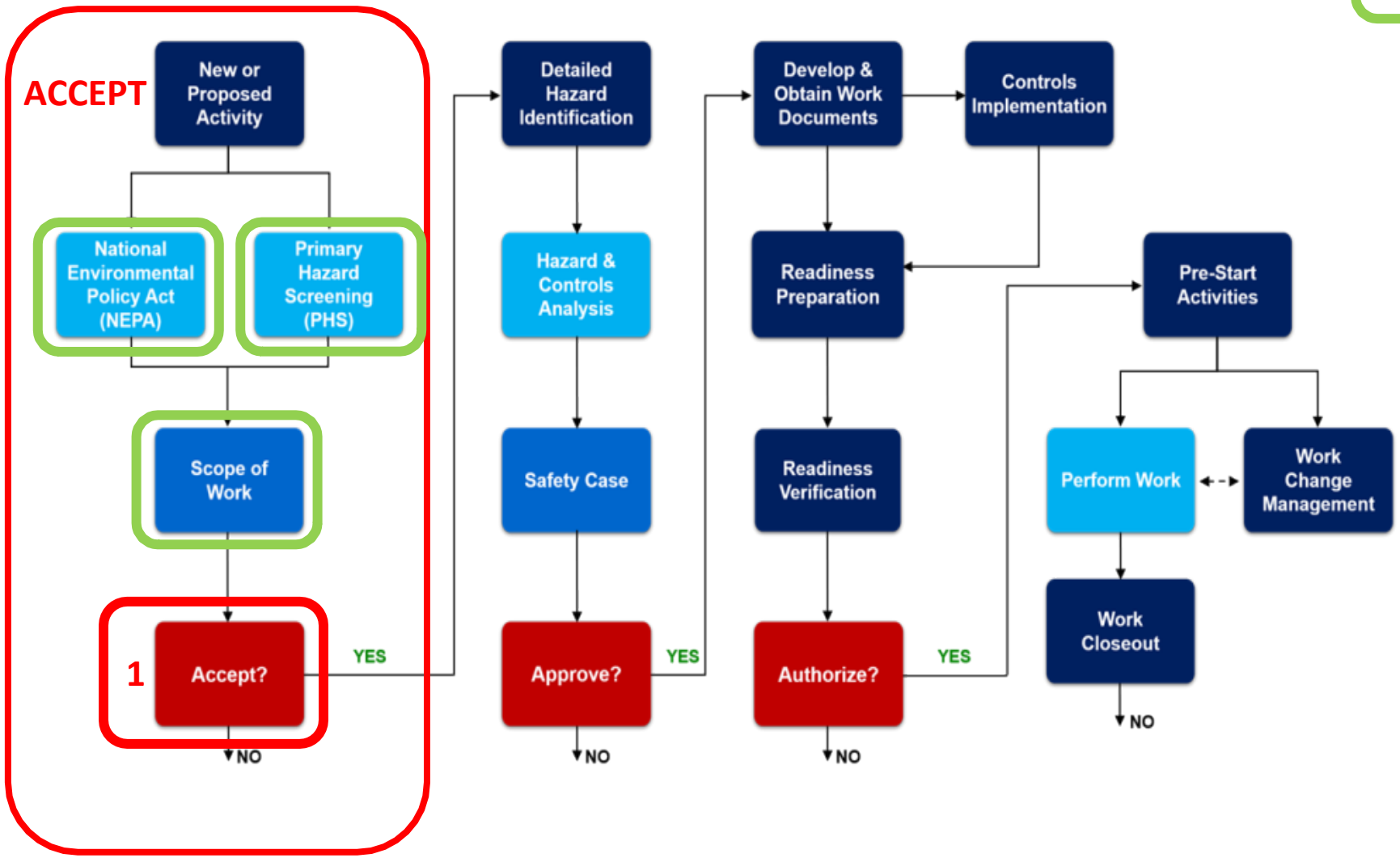


Decision Maker Levels

- Level of manager needed to approve WP&C decision points is elevated as risk increases.
- Addresses worker, environment and mission impacts.
- Separate from hazard categories/classifications related to safety basis requirements for facilities.
- Decision maker could be different at any one of the three decision points.

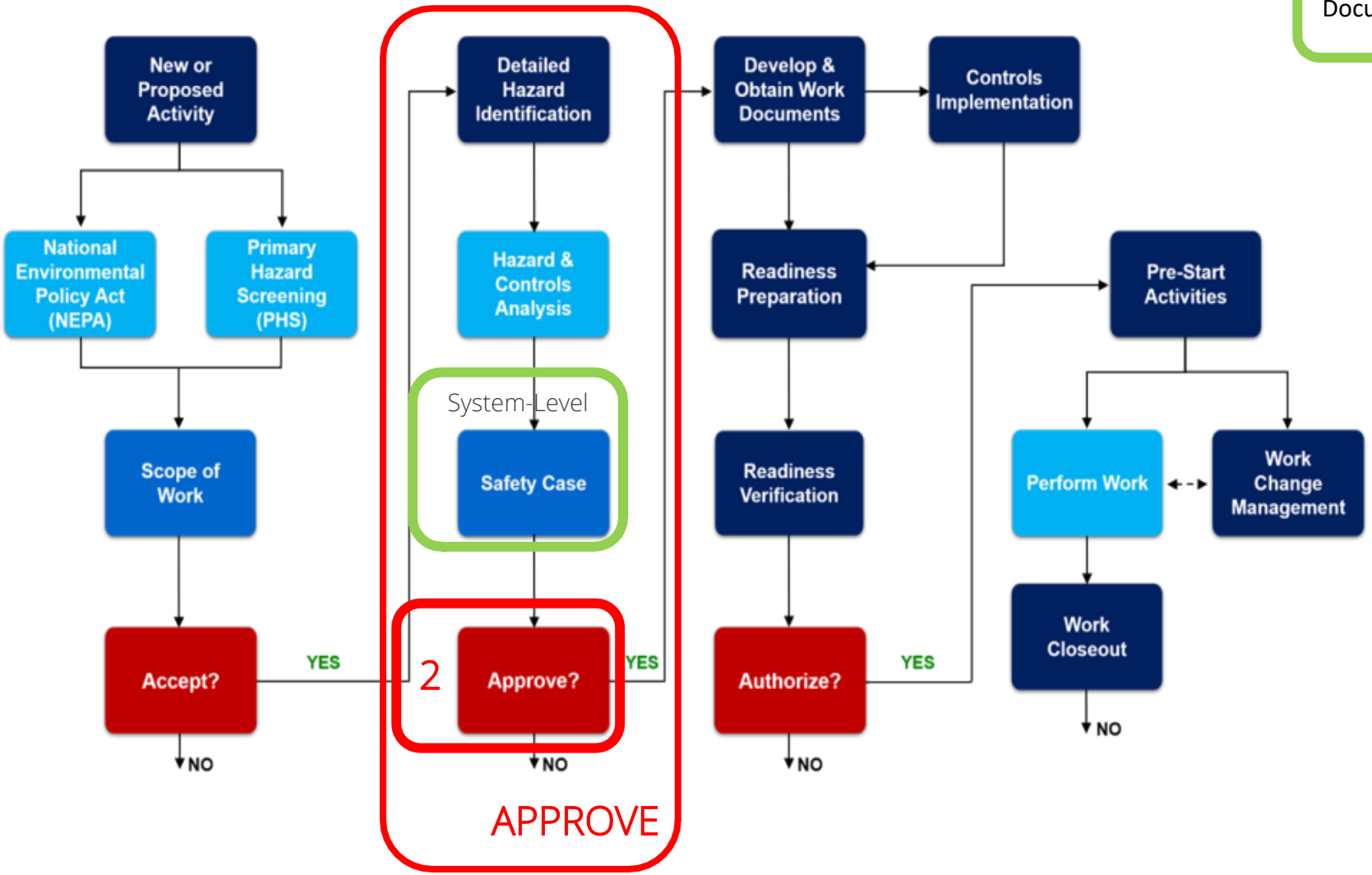
WP&C Process

Key Documentation



WP&C Process

Key Documentation



Purpose of Safety Case

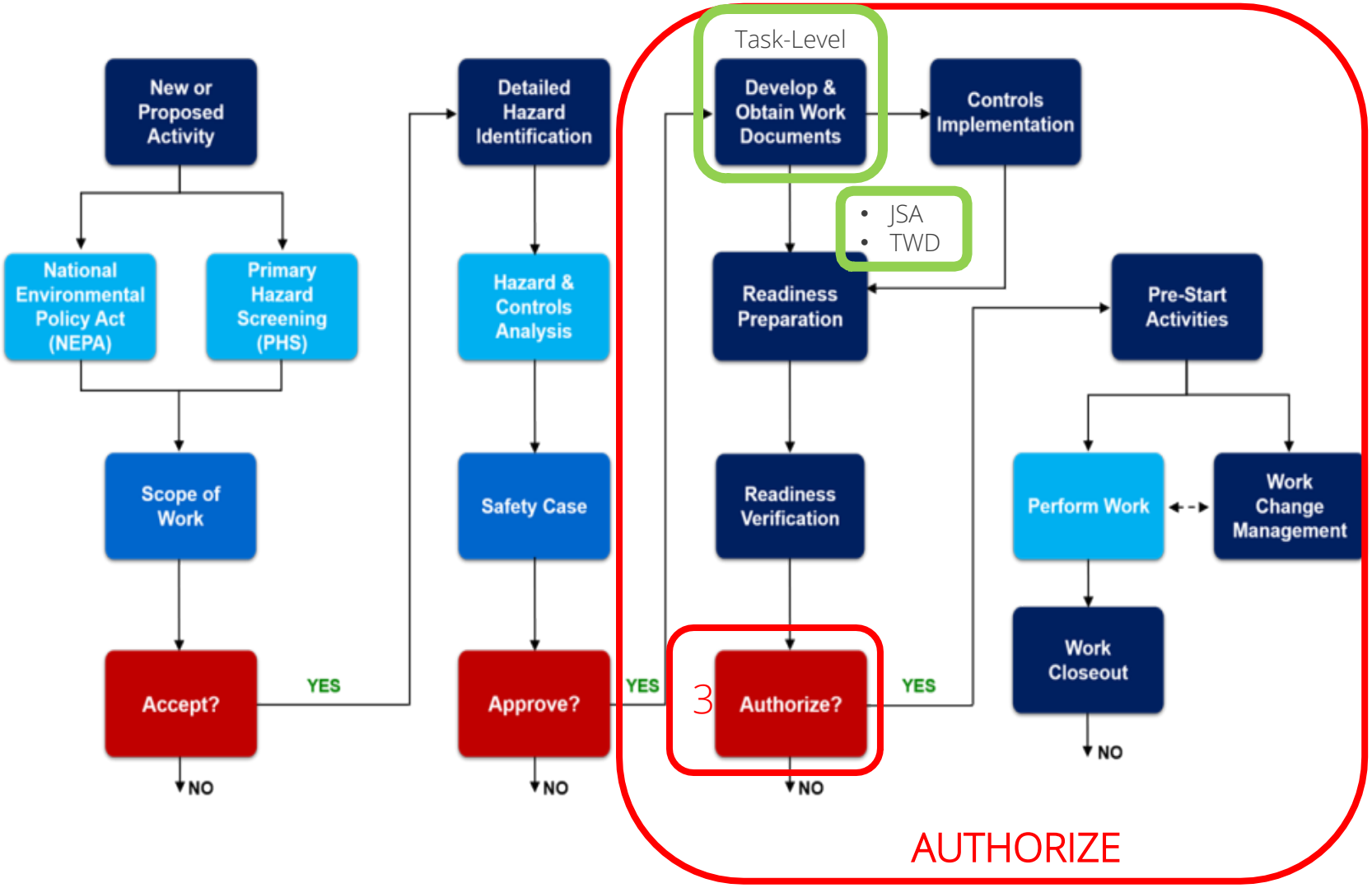
The Safety Case is *evidence* that the system has been critically analyzed and risks managed appropriately.

- Documents risk associated with a system
- Communicates risk
- Aids in making risk-informed decisions

The Safety Case is like an executive summary which states key information about a system and enables decision-making with regard to risk.

WP&C Process

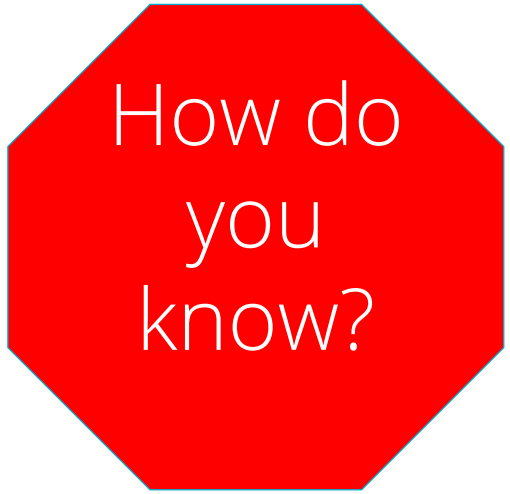
Key Documentation



Positive Verification

Initial actions

- Readiness review
- Pre-job brief



Continuous/ongoing operations

- Operational/situational awareness
- Management assessments and walkthrough

WP&C Change Management

WPC documents are not static

Review and re-evaluate often - compare against operating envelope

- Establish review cycles
- Triggers for off-cycle review
- Log updates

Recognition and management of change is critical

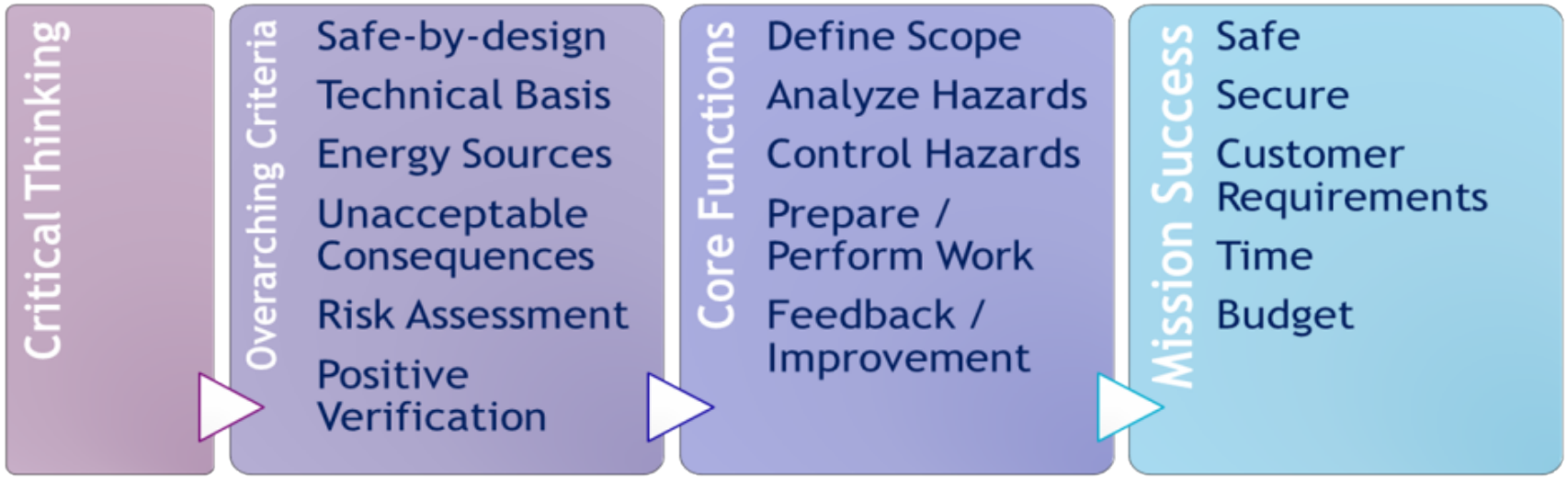
Feedback and Improvement

The purpose of the feedback and improve process is to:

- Identify and correct processes or deviations that lead to unsafe or undesired work outcomes.
- Evaluate and mitigate risks associated with work processes.
- Provide managers and team members with information to improve the quality and safety of subsequent similar work.

Best Practice: Critical Thinking

- Critical thinking is fundamental to achieving mission performance objectives safely.
- This approach is deliberately integrated into Sandia's WP&C process to promote effective application of six overarching criteria throughout implementation of the five ISMS core functions.
- The practice supports effective identification of failure modes, risks, and control measures.
- The Safety Case provides documentation of the critical thinking process, including the approach taken to managing risks and justification for acceptance of residual risk by the manager.



Best Practice: Multi-Organizational Work Agreement

- Labs-wide standard template developed to promote consistency in documenting roles and responsibilities for multiorganizational work, and provide an avenue for early agreement by involved parties on the approach to:
  - Developing work planning documentation
  - Coordinating interfaces between involved organizations
  - Identifying and analyzing ES&H risks
  - WP&C decision-making
  - Performing oversight of work
- Addresses systemic issues associated with work occurring across multiple organizations, where a breakdown in the clear understanding and acceptance of roles and responsibilities of participating organizations was a contributing cause to an incident
- Documents basic work scope, roles and responsibilities, related documentation, and applicable approvals

Best Practice: What-If Hazard Analysis and QRA

- Sandia-developed hazard analysis and qualitative risk assessment tool designed for consistent yet flexible implementation across diverse mission applications
- Supports a comprehensive, consistent approach to hazard analysis and qualitative risk assessment
- Facilitates discussion between ES&H SMEs and line organizations during conduct of hazard analysis process
- Allows for a consistent approach to evaluating effectiveness of controls applied during the HA/QRA process
- Provides a structured approach for estimating risks, understanding key risks, and identifying residual risk

Questions?