NRC Nuclear Safety Culture Components

INPO
"Principles for a Strong Nuclear Safety Culture"
November 2004

Principle 1. Everyone is personally responsible for nuclear safety.

Principle 2. Leaders demonstrate commitment to safety.

Principle 3. Trust permeates the organization.

Principle 4. Decision-making reflects safety first.

Principle 5. Nuclear technology is recognized as special and unique.

Principle 6. A questioning attitude is cultivated.

Principle 7. Organizational learning is embraced.

Principle 8. Nuclear safety undergoes constant examination.

NRC
Manual Chapter 0305, "Operating Reactor Assessment Program"
Manual Chapter 0310, "Components Within The Crosscutting Areas"

Problem Identification & Resolution (PI&R)
P1. Corrective Action Program
P2. Operating experience
P3. Self- and Independent Assessments

Human Performance
H1. Decision-Making
H2. Resources
H3. Work Control

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H4. Work Practices

Safety Conscious Work Environment
S1. Environment for Raising Concerns
S2. Preventing, Detecting, and Mitigating Perceptions of Retaliation

Other Safety Culture Components
D1. Accountability
D2. Continuous learning environment
D3. Organizational change management
D4. Safety policies

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The following matrix lists the INPO Principles and Attributes in the left column by order of Principle. The NRC Safety Culture Components are listed in the right column and are listed in an order that generally matches with the INPO Principle.

INPO Principles	NRC Inspection Manual Chapter 0305 (Section 06.07.c and d)
1. Everyone is personally responsible for nuclear safety. Responsibility and authority for nuclear safety are well defined and clearly understood. Reporting relationships, positional authority, staffing, and financial resources support nuclear safety responsibilities. Corporate policies emphasize the overriding importance of nuclear safety. Attributes: ➢ The line of authority and responsibility for nuclear safety is defined from the board of directors to the individual contributor. Each of these positions has clearly defined roles, responsibilities, and authorities, designated in writing and understood by the incumbent. ➢ Support groups, such as human resources, labor relations, and business and financial planning, also understand their roles in contributing to nuclear safety. ➢ People and their professional capabilities, values, and experiences are regarded as the nuclear organization's most valuable asset. Staffing levels are consistent with the demands related to maintaining safety and reliability. ➢ Board members and corporate officers periodically take steps to reinforce nuclear safety, including visiting sites to assess management effectiveness first-hand. ➢ The line organization, starting with the chief executive officer, is the primary source of information and the only source of direction. Other parties, such as oversight organizations and committees, review boards, and outside advisors, who provide management information essential to effective self-evaluation,	**D1. Accountability** - Management defines the line of authority and responsibility for nuclear safety. Specifically (as applicable): (a) Accountability is maintained for important safety decisions in that the system of rewards and sanctions is aligned with nuclear safety policies and reinforces behaviors and outcomes which reflect safety as an overriding priority. (b) Management reinforces safety standards and displays behaviors that reflect safety as an overriding priority. (c) The workforce demonstrates a proper safety focus and reinforces safety principles among their peers. **D4. Safety policies** - Safety policies and related training establish and reinforce that nuclear safety is an overriding priority in that: (a) These policies require and reinforce that individuals have the right and responsibility to raise nuclear safety issues through available means, including avenues outside their organizational chain of command and to external agencies, and obtain feedback on the resolution of such issues. (b) Personnel are effectively trained on these policies. (c) Organizational decisions and actions at all levels of the organization are consistent with the policies. Production, cost and schedule goals are developed, communicated, and implemented in a manner that reinforces the importance of nuclear safety. (d) Senior managers and corporate personnel periodically communicate and reinforce nuclear safety such that personnel understand that safety is of the highest priority.

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are not allowed to dilute or undermine line authority and accountability. ➢ All personnel understand the importance of adherence to nuclear safety standards. All levels of the organization exercise healthy accountability for shortfalls in meeting standards. ➢ Relationships among utilities, operating companies, and owners are not allowed to obscure or diminish the line of responsibility for nuclear safety. ➢ The system of rewards and sanctions is aligned with strong nuclear safety policies and reinforces the desired behaviors and outcomes.	

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2. Leaders demonstrate commitment to safety. Executive and senior managers are the leading advocates of nuclear safety and demonstrate their commitment both in word and action. The nuclear safety message is communicated frequently and consistently, occasionally as a standalone theme. Leaders throughout the nuclear organization set an example for safety. Attributes: ➢ Managers and supervisors practice visible leadership in the field by placing "eyes on the problem," coaching, mentoring, and reinforcing standards. Deviations from station expectations are corrected promptly. ➢ Management considers the employee perspective in understanding and analyzing issues. ➢ Managers and supervisors provide appropriate oversight during safety-significant tests or evolutions. ➢ Managers and supervisors are personally involved in high-quality training that consistently reinforces expected worker behaviors. ➢ Leaders recognize that production goals, if not properly communicated, can send mixed signals on the importance of nuclear safety. They are sensitive to detect and avoid these misunderstandings. ➢ The bases, expected outcomes, potential problems, planned contingencies, and abort criteria for important operational decisions are communicated promptly to workers. ➢ Informal opinion leaders in the organization are encouraged to model safe behavior and influence peers to meet high standards. ➢ Selection and evaluation of managers and supervisors consider their abilities to contribute to a strong nuclear safety culture.	**H4. Work Practices** - Personnel work practices support human performance. Specifically (as applicable): (a) The licensee communicates human error prevention techniques, such as holding pre-job briefings, self and peer checking, and proper documentation of activities. These techniques are used commensurate with the risk of the assigned task, such that work activities are performed safely. Personnel are fit for duty. In addition, personnel do not proceed in the face of uncertainty or unexpected circumstances. H.4(a) (b) The licensee defines and effectively communicates expectations regarding procedural compliance and personnel follow procedures. H.4(b) (c) The licensee ensures supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported. H.4(c)

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3. Trust permeates the organization. A high level of trust is established in the organization, fostered, in part, through timely and accurate communication. There is a free flow of information in which issues are raised and addressed. Employees are informed of steps taken in response to their concerns. Attributes: ➢ People are treated with dignity and respect. ➢ Personnel can raise nuclear safety concerns without fear of retribution and have confidence their concerns will be addressed. ➢ Employees are expected and encouraged to offer innovative ideas to help solve problems. ➢ Differing opinions are welcomed and respected. When needed, fair and objective methods are used to resolve conflict and unsettled differing professional opinions. ➢ Supervisors are skilled in responding to employee questions in an open, honest manner. They are recognized as an important part of the management team, crucial to translating safety culture into practical terms. ➢ The effects of impending changes (such as those caused by sale or acquisition, bargaining unit contract renegotiations, and economic restructuring) are anticipated and managed such that trust in the organization is maintained. ➢ Senior management incentive programs reflect a bias toward long-term plant performance and safety. ➢ Complete, accurate, and forthright information is provided to oversight, audit, and regulatory organizations. ➢ Managers regularly communicate to the workforce important decisions and their bases, as a way of building trust and reinforcing a healthy safety culture. Worker understanding is periodically checked.	S1. **Environment for Raising Concerns** - An environment exists in which employees feel free to raise concerns both to their management and/or the NRC without fear of retaliation and employees are encouraged to raise such concerns. Specifically (as applicable): (a) Behaviors and interactions encourage free flow of information related to raising nuclear safety issues, differing professional opinions, and identifying issues in the CAP and through self assessments. Such behaviors include supervisors responding to employee safety concerns in an open, honest, and non-defensive manner and providing complete, accurate, and forthright information to oversight, audit, and regulatory organizations. Past behaviors, actions, or interactions that may reasonably discourage the raising of such issues are actively mitigated. As a result, personnel freely and openly communicate in a clear manner conditions or behaviors, such as fitness for duty issues that may impact safety, and personnel raise nuclear safety issues without fear of retaliation. S.1(a) (b) If alternative processes (i.e., a process for raising concerns or resolving differing professional opinions that are alternates to the licensee's corrective action program or line management) for raising safety concerns or resolving differing professional opinions exists, then they are communicated, accessible, have an option to raise issues in confidence, and are independent, in the sense that the program does not report to line management (i.e., those who would in the normal course of activities be responsible for addressing the issue raised). S.1(b) **S2. Preventing, Detecting, and Mitigating Perceptions of Retaliation** - A policy for prohibiting harassment and retaliation for raising nuclear safety concerns exists and is consistently enforced in that: (a) All personnel are effectively trained that harassment and

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	retaliation for raising safety concerns is a violation of law and policy and will not be tolerated. S.2(a) (b) Claims of discrimination are investigated consistent with the content of the regulations regarding employee protection and any necessary corrective actions are taken in a timely manner, including actions to mitigate any potential chilling effect on others due to the personnel action under investigation. S.2(b) (c) The potential chilling effects of disciplinary actions and other potentially adverse personnel actions (e.g., reductions, outsourcing, and reorganizations) are considered and compensatory actions are taken when appropriate. S.2(c) **D3. <u>Organizational change management</u>** -Management uses a systematic process for planning, coordinating, and evaluating the safety impacts of decisions related to major changes in organizational structures and functions, leadership, policies, programs, procedures, and resources. Management effectively communicates such changes to affected personnel.

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4. Decision-making reflects safety first. Personnel are systematic and rigorous in making decisions that support safe, reliable plant operation. Operators are vested with the authority and understand the expectation, when faced with unexpected or uncertain conditions, to place the plant in a safe condition. Senior leaders support and reinforce conservative decisions. Attributes: ➢ The organization maintains a knowledgeable workforce to support a broad spectrum of operational and technical decisions. Outside expertise is employed when necessary. ➢ Managers, supervisors, and staff clearly understand and respect each other's roles in decision-making. ➢ Plant personnel apply a rigorous approach to problem-solving. Conservative actions are taken when understanding is incomplete. ➢ Single-point accountability is maintained for important safety decisions, allowing for ongoing assessment and feedback as circumstances unfold. ➢ Candid dialogue and debate are encouraged when safety issues are being evaluated. Robust discussion and healthy conflict are recognized as a natural result of diversity of expertise and experience. ➢ Decision-making practices reflect the ability to distinguish between "allowable" choices and prudent choices. ➢ When previous operational decisions are called into question by new facts, the decisions and associated underlying assumptions are reviewed to improve the quality of future decisions.	**H1. Decision-Making** - Licensee decisions demonstrate that nuclear safety is an overriding priority. Specifically (as applicable): (a) The licensee makes safety-significant or risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. This includes formally defining the authority and roles for decisions affecting nuclear safety, communicating these roles to applicable personnel, and implementing these roles and authorities as designed and obtaining interdisciplinary input and reviews on safety significant or risk-significant decisions. H.1(a) (b) The licensee uses conservative assumptions in decision making and adopts a requirement to demonstrate that the proposed action is safe in order to proceed rather than a requirement to demonstrate that it is unsafe in order to disapprove the action. The licensee conducts effectiveness reviews of safety-significant decisions to verify the validity of the underlying assumptions, identify possible unintended consequences, and determine how to improve future decisions. H.1(b) (c) The licensee communicates decisions and the basis for decisions to personnel who have a need to know the information in order to perform work safely, in a timely manner. H.1(c)

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5. <u>Nuclear technology is recognized as special and unique.</u>

The special characteristics of nuclear technology are taken into account in all decisions and actions. Reactivity control, continuity of core cooling, and integrity of fission product barriers are valued as essential, distinguishing attributes of the nuclear station work environment.

Attributes:

- Activities that could affect core reactivity are conducted with particular care and caution.
- Features designed to maintain critical safety functions, such as core cooling, are recognized as particularly important.
- Design and operating margins are carefully guarded and are changed only with great thought and care. Special attention is placed on maintaining fission product barriers and defense-in-depth.
- Equipment is meticulously maintained well within design requirements.
- Insights from probabilistic risk analyses are considered in daily plant activities and plant change processes.
- Plant activities are governed by comprehensive, high-quality processes and procedures.
- Employee mastery of reactor and power plant fundamentals, as appropriate to the job position, establishes a solid foundation for sound decisions and behaviors.

H2. <u>Resources</u> - The licensee ensures that personnel, equipment, procedures, and other resources are available and adequate to assure nuclear safety. Specifically, those necessary for:

(a) Maintaining long term plant safety by maintenance of design margins, minimization of long-standing equipment issues, minimizing preventative maintenance deferrals, and ensuring maintenance and engineering backlogs which are low enough to support safety. H.2(a)

(b) Training of personnel and sufficient qualified personnel to maintain work hours within working hour guidelines. H.2(b)

(c) Complete, accurate and up-to-date design documentation, procedures, and work packages, and correct labeling of components. H.2(c)

(d) Adequate and available facilities and equipment, including physical improvements, simulator fidelity and emergency facilities and equipment. H.2(d)

H3. <u>Work Control</u> - The licensee plans and coordinates work activities, consistent with nuclear safety. Specifically (as applicable):

(a) The licensee appropriately plans work activities by incorporating H.3(a):

- risk insights;
- job site conditions, including environmental conditions which may impact human performance; plant structures, systems, and components; human-system interface; or radiological safety; and
- the need for planned contingencies, compensatory actions, and abort criteria.

(b) The licensee appropriately coordinates work activities by incorporating actions to address H.3(b):

- the impact of changes to the work scope or activity on the plant and human performance,

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	• the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance, • the need to keep personnel apprised of work status, the operational impact of work activities, and plant conditions that may affect work activities, • the licensee plans work activities to support long-term equipment reliability by limiting temporary modifications, operator workarounds, safety systems unavailability, and reliance on manual actions. Maintenance scheduling is more preventive than reactive.

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6. A questioning attitude is cultivated. Individuals demonstrate a questioning attitude by challenging assumptions, investigating anomalies, and considering potential adverse consequences of planned actions. This attitude is shaped by an understanding that accidents often result from a series of decisions and actions that reflect flaws in the shared assumptions, values, and beliefs of the organization. All employees are watchful for conditions or activities that can have an undesirable effect on plant safety. Attributes: ➢ While individuals expect successful outcomes of daily activities, they recognize the possibility of mistakes and worst-case scenarios. Contingencies are developed to deal with these possibilities. ➢ Anomalies are recognized, thoroughly investigated, promptly mitigated, and periodically analyzed in the aggregate. ➢ Personnel do not proceed in the face of uncertainty. ➢ Workers identify conditions or behaviors that have the potential to degrade operating or design margins. Such circumstances are promptly identified and resolved. ➢ Employees understand that complex technologies can fail in unpredicted ways. They are aware that latent problems can exist, and they make conservative decisions considering this potential. ➢ Group-think is avoided through diversity of thought and intellectual curiosity. Opposing views are encouraged and considered.	**P1. Corrective Action Program** - The licensee ensures that issues potentially impacting nuclear safety are promptly identified, fully evaluated, and that actions are taken to address safety issues in a timely manner, commensurate with their significance. Specifically (as applicable): (a) The licensee implements a corrective action program with a low threshold for identifying issues. The licensee identifies such issues completely, accurately, and in a timely manner commensurate with their safety significance. P.1(a) (b) The licensee periodically trends and assesses information from the CAP and other assessments in the aggregate to identify programmatic and common cause problems. The licensee communicates the results of the trending to applicable personnel. P.1(b) (c) The licensee thoroughly evaluates problems such that the resolutions address causes and extent of conditions, as necessary. This includes properly classifying, prioritizing, and evaluating for operability and reportability conditions adverse to quality. This also includes, for significant problems, conducting effectiveness reviews of corrective actions to ensure that the problems are resolved. P.1(c) (d) The licensee takes appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity. P.1(d) (e) If an alternative process (i.e., a process for raising concerns that is an alternate to the licensee's corrective action program or line management) for raising safety concerns exists, then it results in appropriate and timely resolutions of identified problems. P.1(e)

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7. Organizational learning is embraced. Operating experience is highly valued, and the capacity to learn from experience is well developed. Training, self-assessments, corrective actions, and benchmarking are used to stimulate learning and improve performance. Attributes: ➢ The organization avoids complacency and cultivates a continuous learning environment. The attitude that "it can happen here" is encouraged. ➢ Training upholds management standards and expectations. Beyond teaching knowledge and skills, trainers are adept at instilling nuclear safety values and beliefs. ➢ Individuals are well informed of the underlying lessons learned from significant industry and station events, and they are committed to not repeating these mistakes. ➢ Expertise in root cause analysis is applied effectively to identify and correct the fundamental causes of events. ➢ Processes are established to identify and resolve latent organizational weaknesses that can aggravate relatively minor events if not corrected. ➢ Employees have confidence that issues with nuclear safety implications are prioritized, tracked, and resolved in a timely manner.	**P2. Operating experience** - The licensee uses operating experience (OE) information, including vendor recommendations and internally generated lessons learned, to support plant safety. Specifically (as applicable): (a) The licensee systematically collects, evaluates, and communicates to affected internal stakeholders in a timely manner relevant internal and external OE. P.2(a) (b) The licensee implements and institutionalizes OE through changes to station processes, procedures, equipment, and training programs. P.2(b) **D2. Continuous learning environment** - The licensee ensures that a learning environment exists. Specifically (as applicable): (a) The licensee provides adequate training and knowledge transfer to all personnel on site to ensure technical competency. (b) Personnel continuously strive to improve their knowledge, skills, and safety performance through activities such as benchmarking, being receptive to feedback, and setting performance goals. The licensee effectively communicates information learned from internal and external sources about industry and plant issues.

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8. Nuclear safety undergoes constant examination. Oversight is used to strengthen safety and improve performance. Nuclear safety is kept under constant scrutiny through a variety of monitoring techniques, some of which provide an independent "fresh look." Attributes: ➢ A mix of self-assessment and independent oversight reflects an integrated and balanced approach. This balance is periodically reviewed and adjusted as needed. ➢ Periodic safety culture assessments are conducted and used as a basis for improvement. ➢ The pitfalls of focusing on a narrow set of performance indicators are recognized. The organization is alert to detect and respond to indicators that may signal declining performance. ➢ The insights and fresh perspectives provided by quality assurance, assessment, employee concerns, and independent oversight personnel are valued. ➢ Senior executives and board members are periodically briefed on results of oversight group activities to gain insights into station safety performance.	**P3. Self- and Independent Assessments** - The licensee conducts self- and independent assessments of their activities and practices, as appropriate, to assess performance and identify areas for improvement. Specifically (as applicable): (a) The licensee conducts self-assessments at an appropriate frequency; such assessments are of sufficient depth, are comprehensive, are appropriately objective, and are self-critical. The licensee periodically assesses the effectiveness of oversight groups and programs such as CAP, and policies. P.3(a) (b) The licensee tracks and trends safety indicators which provide an accurate representation of performance. P.3(b) (c) The licensee coordinates and communicates results from assessments to affected personnel, and takes corrective actions to address issues commensurate with their significance. P.3(c)

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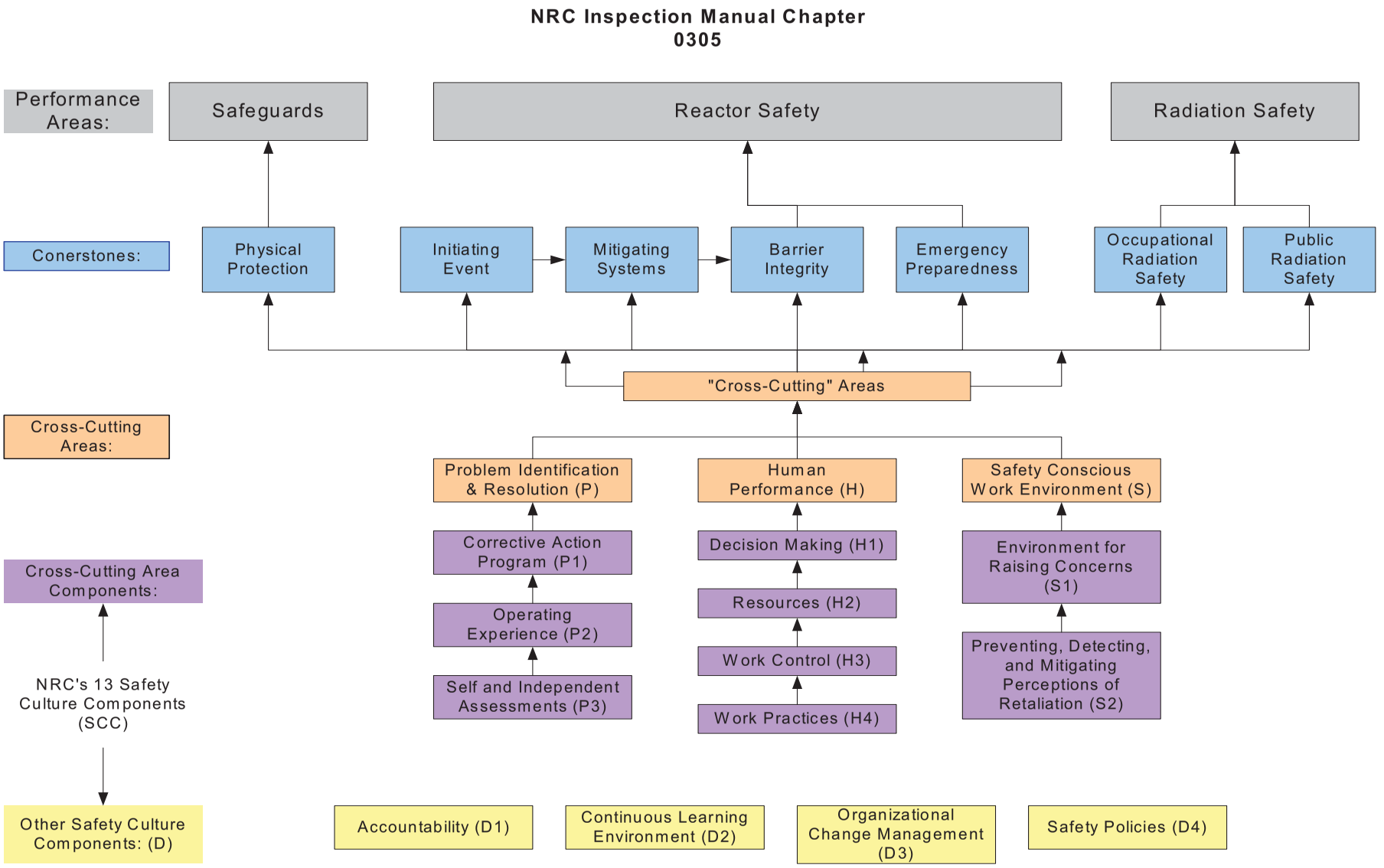

Safety Conscious Work Environment
SCWE

The Nuclear Regulatory Commission provides guidance on their expectations for each nuclear power plant to maintain a "Safety Conscious Work Environment". This guidance is provided in NRC Regulatory Issue Summary 2005-18. The following elements are detailed in this guidance as fundamental to a safety conscious work environment:

- **Employees Are Encouraged To Raise Safety Concerns**
- **Management Is Promptly Notified of Concerns**
- **Concerns Are Promptly Prioritized and Reviewed**
- **Timely Feedback Is Provided to the Concerned Individual**
- **Appeal Process for Concerns**
- **Self-Assessments of Problem Identification and Resolution (PI&R) Processes**
- **An Alternative Process to Line Management (Employee Concerns Program)**

Management Behaviors in support of SCWE:

- Managers have an "open-door" policy in the office and make themselves available in the field.
- Managers are aware of employees' potential reluctance to raise concerns.
- Managers understand the importance of identity protection.
- Managers have good basic listening skills, seek and express appreciation of employees who raise concerns.

Employee Behaviors in support of SCWE

- Taking individual responsibility for reporting concerns.
- Clearly communicating the concern and confirming that the person who receives the concern understands it.
- Being willing to suggest resolutions to concerns and participate in their resolution.
- Following up to ensure the concern is adequately addressed.
- Showing respect for other employees who identify concerns.